BILINGUAL EDUCATION PROPOSAL (ENGLISH) IN NATURAL SCIENCES AND MATHEMATICS, SUPPORTED BY THE DESIGN AND EVALUATION OF VIRTUAL LEARNING OBJECTS (VLOs) IN THE FIFTH-GRADER STUDENTS CENTRO DOCENTE RAFAEL TELLO-SANTANDER DE QUILICHAO

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Project for obtaining the bachelor degree in Modern Languages English and French

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Mg. Adriana Idrobo Hurtado

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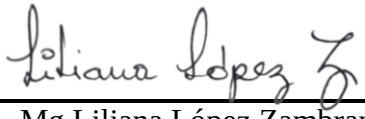
Santander de Quilichao, September 28th

Signatures

Lic. Cristian Fernando Salazar Valencia
Judge



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Chairperson

September, 28th, 2021

Date

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Dedication

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Juan Pablo Lara Cuetia

Abstract

This research aimed to design a bilingual education proposal in Natural Sciences and Mathematics subjects, supported by the design and evaluation of Virtual Learning Objects (VLOs) for the fifth grade of the Rafael Tello headquarters. It was designed according to PEI and the basic standards of competences in foreign languages proposed by MEN, to integrate English into the lesson plans and VLOs to create transversality spaces. The qualitative approach was taken into account, which enabled to describe and understand the use of VLOs in the school context; and the exploratory design allowed to delve into topics on which there is little research at the local level, like bilingual education. Likewise, a questionnaire was used as an instrument, formulated from the CODA criteria with the aim that Natural Sciences, Mathematics teachers and the coordinator could evaluate the VLOs and the proposal. Finally, the analysis of the results allowed to establish the possibility that students could reach the level established by the MEN for the fifth grade, besides of being a great contribution to Instituto Técnico, its headquarters and to Santander de Quilichao Municipality, since it support different social processes of the community from several areas of knowledge.

Keywords: Bilingualism, Bilingual Education, Transversality, Virtual Learning Objects.

Resumen

La presente investigación tuvo como finalidad diseñar una propuesta de educación bilingüe (inglés) en Ciencias Naturales y Matemáticas, apoyada en el diseño y evaluación de Objetos Virtuales de Aprendizaje (OVA) para el grado quinto de la sede Rafael Tello. El proyecto fue diseñado acorde al PEI y los estándares básicos de competencias en lenguas extranjeras propuestos por el MEN. El enfoque cualitativo permitió describir y comprender el uso de los OVA en el contexto escolar; y el diseño exploratorio permitió profundizar en temáticas que tienen poca investigación a nivel local, como la educación bilingüe. Asimismo, el cuestionario fue usado como instrumento para que los docentes de dichas áreas y la coordinadora pudieran evaluar los OVA diseñados y la propuesta. Finalmente, el análisis de resultados permitió establecer que es posible que los estudiantes puedan alcanzar el nivel estipulado por el MEN para grado quinto, además de ser un gran aporte para el Instituto Técnico y el Municipio de Santander de Quilichao, ya que facilita el apoyo de diferentes procesos sociales de la comunidad desde diversas áreas del conocimiento.

Palabras clave: Bilingüismo, Educación Bilingüe, Transversalidad, Objetos Virtuales de Aprendizaje.

Résumé

Cette recherche visait à concevoir une proposition d'éducation bilingue (anglais) dans les Sciences naturelles et les Mathématiques, soutenue par la conception et l'évaluation des Objets Virtuels d'Apprentissage (OVAs) pour la cinquième année du siège Rafael Tello. Le projet a été conçu selon le PEI institutionnel et aux normes de base de compétences en langues étrangères proposées par le MEN. L'approche qualitative a été rendu compte ce qui a permis de décrire et de comprendre l'utilisation des OVA dans le contexte scolaire; aussi, l'étude exploratoire a été mise en œuvre, ce qui a permis d'approfondir des sujets sur lesquels il y a peu de recherches au niveau local, comme l'éducation bilingue. Également, un questionnaire a été utilisé comme instrument, afin que les enseignants de Sciences Naturelles, Mathématiques et la coordinateur puissent évaluer les OVA et le projet. Enfin, les analyses des résultats ont permis d'établir que c'est possible que les élèves puissent atteindre le niveau prévu par le MEN pour la cinquième année, en plus d'être une grande contribution à l'Institución Educativa Instituto Técnico et à la municipalité de Santander de Quilichao car il facilite le soutien de différents processus sociaux de la communauté à partir de divers domaines de connaissance.

Mots-clés : Bilinguisme, Éducation Bilingue, Transversalité, Objects Virtuel d'Apprentisage.

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Introduction

The present research work entitled "Bilingual Education Proposal (English) in Natural Sciences and Mathematics, supported by the Design and Evaluation of Virtual Learning Objects (VLOs) in the Fifth-Grader Students Centro Docente Rafael Tello-Santander De Quilichao", seeks to offer an innovative learning model for the institution located in the Municipality of Santander de Quilichao, Cauca; promoting the bilingual education, considering that this initiative has not been implemented in any public educational institution at the local level.

Likewise, this research aims to design and evaluate the VLOs as a support of the aforementioned proposal for Centro Docente Rafael Tello, which was designed according to Proyecto Educativo Instirucional (PEI) to later integrate English into the development of the different academic activities, lesson plans and VLOs approached from a transversal thematic, in order to take advantage of the resources offered by the institution.

For the development of this idea the qualitative approach was used, which allowed the researchers to describe and understand the use of VLOs in the school context. It was based on the exploratory design that admits addressing thematics on which there is little research at the local level. Additionally, a questionnaire was used as an instrument created from the criteria established by CODA tool in order for the Natural Sciences, Mathematics teachers and the coordinator of the headquarter were able to evaluate the VLOs designed and the Proposal, at the same time it was useful to collect the information.

Besides, this proposal was developed in four steps; the first one was the identification of the topics, for this, the researchers met with the Natural Sciences and Mathematics teachers of the fifth grade for the socialization of the curriculum based on the guidelines of Ministerio de

Educación; in addition, there was a selection of topics to work on in the lesson plans; the second one was the elaboration of the lesson plans according to the selected topics in the Natural Sciences and Mathematics areas integrating English; the third one was the design of the VLOs in accordance with the lesson plans and, the fourth one was the evaluation of the VLOs through a questionnaire based on the CODA criteria addressed to the teachers of these subjects and the coordinator of the headquarters.

Finally, through the analysis of the Bilingual Education Proposal and the VLOs evaluation, it was determined that this kind of proposal not only contributes to strengthening bilingualism but also supports academic and social processes of the institutions and Santander de Quilichao municipality, thanks to the beath and collective richness generated by the transversality that makes part of this proposal.

1. Justification

Nowadays, English is one of the most spoken languages around the world, since it has a high linguistic prestige that generates social, economic, labor, cultural and educational benefits, among others. For this reason, in Colombia through Ley General de Educación, Ley 115, 1994, art 21, m "La adquisición de elementos de conversación y de lectura al menos en una lengua extranjera;" (p.7). Has been determined which must be included in the PEI (Proyecto Educativo Institucional) of every educational establishment of the country. Most of the institutions such as Centro Docente Rafael Tello have chosen to include English within their curricular guidelines, following the parameters proposed by el Ministerio de Educación Nacional, MEN.

Certainly, bilingualism has a great importance, thanks to the advantages it brings with it; because learning a foreign language focused on the different areas of learning, not only enriches the student in knowledge but also provides the opportunity to know a new culture and, therefore, to opt for a future job and academic offers at a global level.

In Colombia, el Plan Nacional de Bilinguismo was renewed, in which it was determined that all educational establishments should seek to improve the communication skills in a foreign language (MEN, 2004); however, this plan has not been implemented in official institutions due to different factors such as the lack of budget and specialized teachers in the different areas of knowledge who are fluent in English; unlike most non-official schools, which according to the MEN are classified into two categories: international bilingual schools and national bilingual schools, these schools have a considerable administrative autonomy that allows the organization of their Proyecto Educativo Institucional-PEI and curriculum to be prepared according to the needs that their managers consider pertinent, allowing these educational centers to adopt bilingual education as a pillar of personal and academic training for their students.

Likewise, Information and Communication Technologies (ICT) have revolutionized the school environment. El Ministerio de las Tecnologías de la Información y de las Comunicaciones (MinTic) through the Colombia Vive Digital program, states that ICT facilitates the access to knowledge, enriches and motivates learning, benefiting the interaction and exchange of information between teachers and students. The development of Virtual Learning Objects (VLOs) has become educational resources supported by the use of ICT as tools implemented in education. Due to being reusable, they allow teaching and learning in person, remote and virtual way.

La Institución Educativa Instituto Técnico, to which the Centro Docente Rafael Tello belongs, in its Manual de Convivencia Social y de Formacion Escolar has projected for the year 2022 to be a leading institution in educational processes that promote the training of autonomous, transcendent and competent people through a pedagogical model according to the demands and challenges of the 21st century (Consejo Directivo Instituto Técnico, 2018). Therefore, this proposal encourages the bilingual education in Natural Sciences and Mathematics subjects in English using the VLOs for the fifth grader students of Centro Docente Rafael Tello, since they are fundamental areas in both the learning process and the Pruebas Saber.

In summary, it promotes bilingual education through the design and evaluation of VLOs as educational resources improving and strengthening the teaching methodology as an innovative learning model at Centro Docente Rafael Tello, motivating and encouraging both teachers and students for learning the Natural Sciences and Mathematics through English.

2. Problem Statement

La Institución Educativa Instituto Técnico, at its headquarters Centro Docente Rafael Tello, is an official institution located in the department of Cauca, Santander de Quilichao Municipality, does not have a bilingual education proposal that encourages the learning of the different areas of knowledge using English, according to el Ministerio de Educación Nacional (2017) through the Pruebas Saber low results in a foreign language are evidenced, despite the National Government through el MEN (2014), has promoted el Programa Nacional de Inglés 2015-2025 Colombia Very Well!, a comprehensive, intersectoral strategy and long-term which, simultaneously with the other programs promoted by this governing body, benefits the improvement of educational quality and its goal by 2025 is to transform Colombia into one of the most educated countries in Latin America and the country with the highest level of that language in South America.

Additionally, the inexistence of graduates in Modern Languages in the institution, demonstrates the need to design a bilingual education proposal that allows the Natural Sciences and Mathematics learning in English according to the curricular guidelines proposed by the Colombian educational system.

For this reason, the present work aims to design and evaluate the effectiveness and viability of the design of the Bilingual Education Proposal (English) at Centro Docente Rafael Tello through the desing of VLOs in the Natural Sciences and Mathematics areas, with the aim of reaching appropriate levels according to the grade and the standards suggested by the MEN, based on the Common European Framework of Reference for Languages (an international standard that defines linguistic competence that was created by the Council of Europe, it establishes the levels of performance that the learner goes reaching in a foreign language, the scale of levels are from an A1, basic level of English, to a C2, advanced level of English) (MEN, 2006). These standards

propose that students from fourth to seventh grade must have a basic level A.2. This covers essential knowledge making use of elementary vocabulary to communicate. Therefore, this initiative seeks to answer the following research question: How to design a bilingual education proposal in Natural Sciences and Mathematics areas, supported by the design and evaluation of VLOs in the fifth grader students at the Centro Docente Rafael Tello headquarters?

3. Objectives

3.1. General Objective

To design a bilingual education proposal (English) in Natural Sciences and Mathematics supported by the design and evaluation of VLOs in the Fifth grader students in the headquarters Centro Docente Rafael Tello.

3.2. Specific Objectives

- To identify the topics to develop in the Bilingual Education Proposal in Mathematics and Natural Sciences subjects of fifth grader in the headquarters Centro Docente Rafael Tello.
- To elaborate the lesson plans of Natural Sciences and Mathematics in English according to the planned topics in the Proyecto Educativo Institucional (PEI) and the curriculum.
- To design the VLOs as a support of the Bilingual Education Proposal in Natural Sciences and Mathematics subjects for the fifth grader in the headquarters Centro Docente Rafael Tello.
- To evaluate the VLOs designed through a questinnaire based on the CODA criteria, applied to the Natural Sciences and Mathematics teachers and the headquarters coordinator to evaluate the effectiveness and viability of the proposal.

4. Reference Framework

4.1. Background

Regarding previous studies related to the use of VLOs as digital content focused on bilingual education, three were taken into account at the international level and four at the national level.

4.1.1. International Background

Nowadays, the different learning processes are increasingly linked to the use of ICT, especially in this era of the pandemic and virtual education, situations that have led to providing, creating, and facilitating distinct spaces to learn, interact and perceive the various educational processes, so the first background taken as an international reference is a project titled "Incidencia de un objeto virtual de aprendizaje en los procesos de aprendizaje sobre el territorio" carried out by Arias (2017) whose objective was to identify the ways in which a virtual learning object can influence the type of relationships that children have in a particular context. For this study, the quantitative approach was used since it was important to statistically measure through a game (VLO) designed by the researchers called "Nuestro Territorio" the present reality of the group in relation to knowledge, and the perception that they have of their environment. Instruments such as non-participant observation, the pre-test, and the post-test were used to collect the information.

It is important to highlight that this project has many relations with the Bilingual Education Proposal, by giving us a general concept about how to structure and design VLOs in the educational context. At the same time, it allowed us to strengthen the structure of the VLOs and expand it much more by including content that is consistent with the proposals of the MEN and create easy-to-access content. Furthermore, with this project, the researchers could know the different evaluation criteria of a virtual learning object, which was fundamental to carry out the

last step of this proposal; despite being quantitative criteria, these were a great contribution to adapt it in a qualitative way to evaluate the VLOs.

Another background taken as an international reference is a project made by Arcón (2014), who conducted an investigation about the intercultural bilingual education and the Sacapulteka culture in the primary schools of Sacapulas, Quiché in Guatemala. The information from this project was collected through qualitative and quantitative methods; carrying out the research of topics related to bilingualism in students and teachers, taking into account cultural aspects and the use of resources for bilingual education in the schools of the municipality of Sacapulas.

The language of the population taken to carry out the research (Sakapulteko) makes up part of a Mayan town in the municipality of Sakapulas, who seeks to keep both the culture and language. The castilianization process has been implemented in this municipality since the 60s; however, the teaching of the Sakapulteko language has been omitted in the ancestral education, that is why the research focuses on bilingual education according to the methodologies and pedagogies used by schools in first to third grades in that municipality.

The relation between this research and the development project is the statement of the bilingual education as an opportunity to develop a bilingual diversity in the student environment to reinforce the educational, cultural and linguistic field while they are learning. Furthermore, the researches of this project and the researchers of the bilingual education proposal for the teaching of Natural Sciences and Mathematics in English by using the VLOs, both, the curriculum of the grades and the institutional vision are having into account with the aim of keeping the original base of the topics and benefit not only the students, but also the teachers who will have the VLOs as useful tool to guide the classes.

In bilingual education, cultural aspects are taken into account as well as tools that contribute to the enrichment of the teaching methods used by teachers, benefiting and strengthening the acquisition of the foreign language in students, such is the case of the research carried out by Cardona (2014), entitled “Diseño y desarrollo de recursos educativos para la enseñanza bilingüe de matemáticas en primer ciclo de primaria en el Istmo de Tehuantepec-México”. This project took into account cultural, thematic and linguistics, with which the indigenous education teachers can find support for the teaching and learning processes in multilingual and multicultural environments, being the indigenous language the one used in daily life and Spanish as a second language. The idea for this project arose due to the lack of programs focused on intercultural bilingual education (indigenous language-Spanish).

In addition, Cardona focused on the design of educational resources that, although they are not virtual (as in this case where the VLO is used as an educational tool), they are designed to promote the proposal by generating methodological innovation and serve as an aid to the indegenous system's teachers, contributing positively to the teaching and learning process, as well as creating multilingual and multicultural contexts.

The relationship that exists between the previous proposal and the current one is the inclusion of a second language in mathematics teaching; thus achieving a broader knowledge of the language. Besides, Cardona’s proposal allowed to this one address transversality by integrating different areas of knowledge and at the same time, gives it a social approach by supporting institutional and community processes as developed in the previous project.

4.1.2. National Background

As mentioned above, it is important to use methodological strategies that benefit and reinforce second language learning. Duque (2018), did a work entitled “OVA para el aprendizaje del inglés en grado sexto de la Institución etno-educativa San Juan Bautista de la Salle” Bogotá, Colombia. In general terms, this proposal was centered on the use of VLOs as a pedagogical and technological strategy to strengthen and motivate the English learning in sixth grader students, in order to reach the proposed standards by MEN and taking into account the benefits it has professionally. So, for the development of this one, the qualitative approach and the experimental design were taken into account besides, for the design of the VLOs the researcher considered the instructional model ADDIE which represents the phases of the investigation: analysis, design, development, implementation and evaluation.

The design and evaluation of VLOs as a support of bilingual education proposal (English) in Natural Sciences and Mathematics is relevant to strengthen the second language while the Mathematics and Natural Sciences subjects that require a certain level of knowledge are given in a modern and pedagogical way. So, Duque’s proposal is related to the current one in that in both of them, the reinforcement of English through the VLOs plays an important role. Besides, Duque’s degree project served as a guide for the steps to carry out this Bilingual Education Proposal as well as for the design of the VLOs.

At present, bilingual education is the central axis of private schools; since it allows the students to develop communicative and cognitive skills in a foreign language (English); besides, its implementation makes its curriculum innovate. In the thesis entitled “diseño de la propuesta bilingüe para el Gimnasio Grow Together” (Yepez y Ruiz, 2016), it was born from the bilingual

education proposed by the MEN and it proposed an immersion programs to encourage the process of acquiring a foreign language and native language in children. The main axis of these programs is to develop communication and cultural skills through the teaching of academic content in two languages, therefore, Science subject will be seen in Spanish and English thus, the student will be able to communicate in both languages.

The relationship between Yepez and Ruiz project with the current one is that both are focused on creating an innovative, open and dynamic bilingual proposal, taking into account what MEN has stipulated and the advantages of bilingualism in the different areas of students' life. Moreover, that project was useful to develop the theoretical information of some of the concepts like bilingualism, Plan Nacional de Bilingüismo and Common European Framework of References for Languages, which are the backbone of this Bilingual Education Proposal.

Likewise, the work titled "propuesta curricular para la integración del inglés al área de ciencias naturales" (Alarcón, Angulo, Caro, Garzón, 2014) developed in the Instituto Técnico Industrial Francisco José de Caldas, of Bogotá, it intended to accelerate the bilingual process in the school with the integration of English in Natural Sciences for third, fourth and fifth grades. To carry out this research project, the basic standards of competences in these subjects proposed by the MEN, the curriculum of the institution, the characteristics of the students and bilingualism in Colombia were taken into account. Finally, this research was approved by the Natural Sciences and English teachers.

Thus, the aforementioned proposal is linked to the development of this one, since the authors implemented the bilingual education in the Natural Sciences class, creating at the same time an innovative teaching model for the institution; for this reason, it is very supportive due to it serves

as a guide for the development of the activities implemented during the design taking into account the curriculum of the institution, English standards and Natural Sciences and Mathematics competences standards established by MEN.

Furthermore, the project proposal “Implementación de una propuesta de bilingüismo para el colegio Guimarc en su proceso de institución monolingüe a bilingüe" of (Gonzalez, Chacón, Gamba y Escobar, 2010) developed in Guimarc school in Bogotá, Colombia, based on the implementation of the project which is done through modules in English, focused on Natural Sciences, Arts and English with students of transition; which contain basic expressions that are used in the daily environment. In addition, they have created primers for parents, with the objective of making them part of the children's learning while doing their homework.

Finally, this project is associated with the present work since the authors’ gaze focuses on implementing the teaching of the aforementioned school subjects, using English as a base, Besides the methodological aspects were useful to define the ones the researchers would use in the Bilingual Education Proposal.

4.2. Contextual Framework

Colombia is politically formed by 32 departments including Cauca department, which is located in the southwest of the country, this is divided into 42 municipalities enclosing Santander de Quilichao municipality located in northern Cauca, it is composed by 99,357 inhabitants in 2018 approximately in according to the DANE, of which 48,752 are men and 50.602 are women. This municipality has 7 non-bilingual private schools, 21 educational institutions and 5 educational centers for a total of 117 non-bilingual official educational centers, including Institucion Educativa Instituto Tecnico that has three school days (morning, afternoon and

evening); composed of three headquarters (Rafael Tello, Jose Edmundo Sandoval and Francisco de Paula Santander); with approximately 3.015 students in the preschool, elementary school and secondary school categories. The internal organization is made up of a Principal, 6 coordinators, 100 teachers and 15 administrative assistants; therefore, it makes part of the largest institutions in northern Cauca.

The Centro Docente Rafael Tello located in 6 # 9-88 street of Olaya Herrera neighborhood, has approximately 551 students, it has an academic school day that starts at 7:00 A.M until 12:35 PM; the schedules are divided in 5 hours per day with 10 minutes break and 20 minutes of pedagogical break. For the fifth grade, Natural Sciences and Mathematics classes are distributed in blocks of 4 hours per week; the learning objective of these subjects is to address in a general way each one of the suggested topics during the elementary school cycle to prepare the students for the Pruebas Saber and for the secondary school cycle. In addition, the proposed curriculum seeks to promote the learning of these subjects following the parameters established by the MEN whose objective is to strengthen critical, investigate, logical mathematical thinking, critical reading and quantitative-qualitative reasoning necessary to advance in the process in the training of basic and secondary education.

Furthermore, the academic coordinator of the institution and teachers of Natural Sciences and Mathematics of the fifth grade had an important role because one of their main functions is to evaluate and make a control of the curricular plan and PEI, supervise compliance with the coexistence manual, and all the academic activities as well as the correct application of proposed learning criteria in each of the different subjects of the institution, besides teachers must always design learning strategies that offer students various activities that can lead to the achievement of

the objectives being this proposal an opportunity to innovate the development of each of the classes.

4.3. Conceptual Framework

For the development of the conceptual framework, the concepts of bilingualism, bilingual education, the Common European Framework of References for Languages, educational transversality and Virtual Learning Objects (VLO) were taken into account, since these terms are fundamental pillars for the development of the proposal.

4.3.1. Bilingualism

Due to the globalization, the need to include bilingualism in all societies has arisen; this term is defined as: "native-like control of two or more languages" Bloomfield (1933) cited by Cummins (1986, p.7), starting from this definition, the importance of bilingualism at a global level is highlighted, since people who speak two or more languages can opt for good academic and job offers, in turn allows the socio-economic development and advancement of society.

Bilingualism can be classified depending on the communicative level that people have. Ramírez (1992) cited by Bermúdez and Fandiño (2012, p.105), talks about four types of bilingualism from a sociocultural perspective: 1. Stable bilingualism, which responds to the linguistic differentiation between two groups that share the same terrain, and where the bilingual group is forced to distinguish the use of one language from the other according to sociolinguistic domains; 2. Dynamic bilingualism, where the social situation and differentiation between roles and use of diversity languages are directed towards a linguistic assimilation; 3. Transitional bilingualism, in which two languages assume the same functions, which lends itself to the

exclusive use of one of the languages to fulfill the different communicative functions; and 4. Vestigial bilingualism, in which it reflects almost a total linguistic assimilation and where bilingualism fulfills a symbolic function that is associated with a small minority on the verge of extinction.

4.3.2. Bilingual Education

Since the 1950s, bilingual education has entered the educational system of different countries; like bilingualism, bilingual education has been the subject of analysis and research leading to proposing postulates and theories related to its implementation at an academic level, integrating a second language through processes of transversality which implies the union of other areas of knowledge to reinforce the learning of a foreign language or a specific topic.

Bilingual education is defined as the teaching of two languages in distinct areas of knowledge through an educational planning process, in order to learn a second language applied in school curricula (UNESCO, 1989). Bilingual education seeks to create a space of transversality by taking social and cultural aspects through the preparation of materials for the development of academic activities according to the institutional curriculum.

For García (2004) cited by Cariman (2015) states that:

> La educación bilingüe supone procesos de "negociación", intercambio de saberes y construcción social en valoración del otro, un posible modelo de enseñanza. Este paradigma debiera permear las políticas educativas, ya que las particularidades lingüísticas, sociales, económicas y políticas, inciden en la realidad y cotidianidad de niños, niñas y jóvenes que se integran a sistemas educativos con diversidad cultural (p.1).

4.3.3. Common European Framework of References for Languages

There is an international standard that seeks to measure the level of the process of learning a foreign language. The common European framework is a basis for the preparation of language programs, school curricula, exams and books in order to check the progress of students in terms of mastery of a language. (Council of Europe, 2001).

Ministry of Education, Culture and Sport (2002) indicates that the Council of Europe has classified the reference framework by levels ranging from basic level to advanced level, which are taken as a reference point to establish the progress of a student in the process of learning a foreign language, as well as the preparation of study plans and competency standards in educational institutions in different countries such as Colombia.

The Common Framework of Reference is divided into three main levels, which are basic, intermediate or independent and advanced or competent, each with subdivisions that correspond to the description of each main level. In the first place, the A1 and A2 level, which corresponds to the basic level, which proposes that the student is able to understand and using daily familiar expressions, the B1 and B2 level or intermediate level presents the student as a person capable of understanding main ideas and secondary texts with descriptions of real and social situations.

Finally, the C1 and C2 level or advanced level suggests that the student is in the capacity to understand any kind of texts, in addition to expressing fluently and clearly different points of view on varied subjects. Therefore, the goal level with the proposal presented is level A2, which must be handled by students from fourth to seventh grade.

4.3.4. Educational Transversality

In schooling, transversality has taken on an important role because it enriches academic training by relating the areas of knowledge.

Velásquez (2009) mentions that:

> La transversalidad se refiere a una estrategia curricular mediante la cual algunos ejes o temas considerados prioritarios en la formación de nuestros estudiantes, permean todo el currículo, es decir, están presentes en todos los programas, proyectos, actividades y planes de estudio contemplados en el Proyecto Educativo Institucional –PEI– de una institución educativa (p.36)

4.3.5. Virtual Learning Objects

In school contexts, the use of technologies has allowed advances in the way of teaching such as Virtual Learning Objects (VLOs). The MEN (n.d) defines it as "Recurso digital que puede ser reutilizado en diferentes contextos educativos. Pueden ser cursos, cuadros, fotografías, películas, videos y documentos que posean claros objetivos educacionales, entre otros". These tools are useful, accessible and facilitate a greater approach to learning.

4.4. Theoretical Framework

For the development of the theoretical framework, which bases this research proposal, each one of the concepts proposed in the conceptual framework were taken into account. With this theoretical framework, the reader will be able to identify the theories that were taken as reference to support this research project.

First of all, it is worth starting with the concept of bilingualism highlighting its importance in the learning process, its regulation within the Colombian educational system, the main theories, and postulates proposed by different authors.

Bilingualism is approached by different authors such as Bloomfield (1933) cited by Bermúdez and Jiménez (2012), who argue that "el bilingüismo implica un dominio de dos lenguas igual que un nativo" (p.101). In other words, it is the ability to handle two languages naturally, just as we do with our mother tongue by producing well-formed sentences.

In addition, Cerdá (1986) cited by Bermúdez and Jiménez (2012), claims that bilingualism consists in the ability of the speaker to use two languages interchangeably. By extension, it is said of the sociolinguistic condition by which a community uses two different languages to cover exactly the same collective and private communicative tasks (p, 102). This implies that a bilingual person has not only the ability to handle a second language, but is also capable of understanding aspects that range from the social to the cultural.

According to these authors, the advantages of bilingualism in the students will increase their potential of the native language, not only in educational aspects but also in cultural fields.

Additionally, being bilingual has become a necessity both, in Colombia and in the rest of the world; due to globalization is integrating humanity more, allowing the diversity of social groups to find themselves obliged to learn another language, with the purpose of enriching themselves in different areas of life.

In consonance with Ardila (2012) the cognitive aspects are also benefited by bilingualism; among which can be found: the learning of new cognitive strategies, a better understanding of the first language, and an increase in cognitive control:

Learning new cognitive strategies

The new cognitive strategies may be more noticeable in the grammatical and lexical aspect; because the bilingual person may be able to retain greater phonological competence, which is related to considerable awareness and superior auditory discrimination. In this case, when the students improve their listening abilities in English, at the same time they improve in other subjects, due to the retention capability.

A better understanding of the first language

By learning another language, we understand that the native language is not the only way of seeing the world, but that only part of our lives and reality can be ordered through it. Likewise, Lombardi (1986), as cited in Ardila (2012, p.103), claims that it has been shown that "bilingualism is associated with better metalinguistic and metacognitive skills". In accordance with this concept, it is also possible to identify the linguistic richness developed in the native language of the students, by obtaining amplitude in the concepts and meanings in the words.

An increase in cognitive control

Craik & Bialystok (as cited in Ardila, 2012) argues that “bilingualism has been associated with a more effective controlled processing in children; and even more, apparently the simultaneous use of two languages in the competition can increase the executive functions”.

Krashen (1985), presents a theory composed of five main hypotheses which are: The acquisition/learning hypothesis, the monitor's hypothesis, the natural order hypothesis, the affective filter hypothesis and the input hypothesis; however just one of them was taken into account, because of the relation with the project. The input hypothesis: For Krashen, the acquisition of a second language is when the individual is in an environment in which there are samples of the target language. In general terms, bilingualism contributes to the improvement of intellectual abilities because of the amplitude of native language in educational and cultural aspects.

Education First (EF) conducted a study in 2016, in which it evaluated the knowledge of English in millions of adults around the world. To indicate the level, EF divided the countries and territories investigated into five categories: very high to very low. Based on the results found, in Latin America, the level of English is low, although there are indications that in a few years it will improve since most Latin American countries have adopted programs to increase education in this language.

Among the Latin countries with a high level of English, we find Argentina and the Dominican Republic; referring to the countries with the lowest levels is Colombia with 48.41%. However, in Colombia, through Law 115 of 1994, "La adquisición de elementos de conversación y lectura en al menos una lengua extranjera" was established (MEN, 1994, párr. 104). Which is one of the objectives for basic and middle Education; likewise, around 2004 the MEN designed the Plan Nacional de Bilinguismo, a project aimed at improving educational quality and raising the standards of foreign language proficiency.

Currently, competitiveness, tourism, and offers of goods and services have allowed Colombia to progress significantly, however; for there to be a complete advance of the country in these aspects, it is necessary that people master a foreign language and be able to communicate with other cultures; For this reason, it is essential that children and young people who enrolled in public schools have excellent foundations in learning English, which has not been a priority in official educational establishments; For this reason, the Plan Colombia Bilingüe 2014-2018 has been organized in order to improve the teaching of English in the 23 students of basic and secondary education (MEN, n.d).

The Instituto Colombiano para la Evaluación de la Educación ICFES (as cited in MEN, n.d) affirms that, nowadays, despite the efforts and resources that the country has invested to contribute to the improvement of the levels of English, only 1% of the 11th-grade students of the official Institutions manage to reach the Pre-Intermediate B1 level, the ideal goal that will allow them to access better job and professional opportunities. Of 15,300 English teachers at the secondary level in the official sector, only 40% are at Intermediate B2 level (ideal goal level). In turn, the English teacher training programs (Bachelor's degrees in Languages) offered by universities only graduate 50% of graduates with an Intermediate B2 level of English (ideal Intermediate B2 / Advanced C1). Besides, there is a deficit of 3,200 English teachers in secondary school, so it is not possible to cover the teaching of three hours per week in each of the grades.

So, it is important to know the main aspects about bilingual education which is the backbone of this research since the main objective is to design a proposal of this type for the institution, besides bilingual education has been consolidated in many educational institutions by developing curricula and school plans integrating thematic contents in a second language.

Bilingual education is important because it contributes to the learning of linguistic and phonetic elements of another language, thus providing the training of bilingual people, who will be able to make the most of the advantages of speaking two or more languages. It also helps in the acquisition of knowledge, positively affecting the academic performance of students. Cummins (1999) cited by Ramírez (2011, p.356), refers that "the learning of two languages carries cognitive and linguistics for students. There is a positive relationship between the languages studied, which facilitates the transfer between them and the learning of academic and conceptual aspects".

Currently, from the different educational contexts and with frequent changes in the cultural, economic, political and social, the curriculum is becoming more and more strict; in order to impact the educational processes of each student; for this reason, the development of curricular transversality projects proposed by the MEN has emerged so that they are put into practice through pedagogical projects, with the purpose of training and improving the quality of education (Jauregui, 2018).

In this way, it can be summarized that the previous theories on bilingual education provide a contribution for the design and development of the project proposed by the researchers, by giving a series of phases that must be followed to consolidate a proposal of this type in any educational institution starting from the renewal the curricular plans and area plans taking into account the institutional mission and vision.

The concept of transversality arises as an alternative to introduce everyday life issues and address them in the classroom, in order to promote criticism and reflective thinking. The MEN (as cited in Jauregui, 2018) establishes that transversality is presented as an instrument to enrich

the training work and connect the different knowledge in a coherent and meaningful way; therefore, it links the school with everyday reality. Likewise, (MEN, Calidad 2, 2016), transversality is to make possible the integration of the various knowledge for the development of life skills. In other words, it implies giving a new meaning to pedagogical practice towards the construction of knowledge capable of responding to the transformation of local, regional, and national contexts.

In the school environment, the need to involve new subjects in the different areas of knowledge has arisen; that is to say, working on various topics since this generates significant learning in students, as they are not exposed to complying with a curriculum based only on theories, which tend to generate boredom, stress or disinterest in classes; therefore, it is necessary to work in addition to the concepts, the praxis. This involves the attitude, which makes work more enjoyable for students; likewise, a particular rhythm is needed in the classroom to deal with topics from different angles, thus allowing the learner to take an interest in studying the content in-depth.

The fact of integrating new topics in the areas is known as “curricular transversality”. According to Tencio (2013),

> La transversalidad en el currículo, va más allá de ser un requisito curricular, es necesario antes visualizarla como parte de un proceso institucional de aprendizaje, que permite desarrollar los contenidos de las diferentes disciplinas desde una perspectiva interdisciplinar, funcional e integradora, que se ve fortalecida por propuestas curriculares que dan respuesta a las demandas o problemas sociales de algunas áreas que, desde el proceso educativo, se propone coadyuvar a minimizar.

The curricular transversality allows an easy contextualization with the rest of the areas, which are complemented in the didactic, it is the case of the educational and curricular projects where the transversality is manifested because common elements can be found and that complement all the subjects.

Being an essential aspect in the educational system, the theoretical information about transversality is important for this proposal due to, it creates favorable spaces, providing students with better training using an educational approach that is generated as an alternative to the limitations of traditional education, which leads to a meaningful learning from the connection of different areas of knowledge; in this case technology, art, social sciences, etc. areas that serve as support to generate a curricular transversality in this proposal.

The Colombian educational system has focused on improving the conditions of the social environment, with the aim of achieving better development conditions at an economic and cultural level; this is why it has focused on three base points that correspond to the expansion of educational coverage, the improvement of the quality of education and the improvement of the efficiency of the educational sector. As previously mentioned, in Colombia the Plan Nacional de Bilingüismo was renewed, which establishes the great significance of learning foreing languages due to they are links of communication, interaction and opportunities for children, adolescents and young people in the educational system, communities and regions. Also, it seeks to improve the quality of the educational system; for this, the MEN adapted the basic standards of competence in the area of English in accordance with the Common European Framework of References for Languages, which indicates the levels that students must achieve in communicative competence according to the level of schooling; in this way, it was determined that students of fifth grade should be able to understand short and simple texts related to daily

and literary topics, capture the information provided by the teacher in class and interact with them and other classmates through basic conversations.

Regarding oral expressions, the student must be able to talk about himself, the people around him, and his daily activities using simple, logical, and sometimes memorized phrases. The pronunciation is slow and understandable; however, it is still difficult for him to express ideas and topics that are outside his family or school context, because his vocabulary is limited to close contexts and familiar topics (MEN, 2006).

The above theoretical information about the Common European Framework of References for Languages is fundamental for this project because it seeks to promote bilingual education through natural sciences and mathematics in English and at the same time seeks innovative learning as suggested by el Plan Nacional de Bilingüismo.

Finally, the Virtual Learning Objects theoretical information is included, since being the support of this bilingual education proposal it becomes indispensable to know their theory, characteristics and elements to take into account in the design of the VLOs for this proposal.

In consideration to the VLOs, Feria and Zuñiga (2016) state that these elements have become innovative tools inside the classrooms; of course, based on the ICT to put them into operation. Wiley (1999) cited by Callejas, Hernández and Pinzón (2011a) claims that “La reusabilidad y granularidad representan las dos propiedades más importantes de los objetos de aprendizaje”. The concept of granularity refers to highlighting a conception of objects as small units, which can be coupled and / or added in various ways. South and Monson (2000) establish that “la reusabilidad es en gran parte una función del grado de granularidad de los objetos. La

reusabilidad del objeto de aprendizaje va a depender en gran medida del grado de granularidad del recurso (p.178).

Likewise, according to the authors such as Longmire, Latorre (as cited in Callejas, Hernández and Pinzón 2011b) suggest that the VLO must comply with certain characteristics:

Flexibility: the material is used to be used in multiple contexts, due to its ease of updating, content management and search, the latter thanks to the use of metadata.

Personalization: Possibility of changes in the sequences and other forms of contextualization of content, which allows a combination and recombination of VLOs tailored to the training needs of users.

Modularity: possibility of delivering them in modules, distribution and recombination.

Adaptability: can be adapted to the different learning styles of students.

Reuse: the object must have the ability to be used in different educational contexts and purposes, being able to be combined within new training sequences.

Durability: the objects must have a validity of the information, without the need for new designs.

5. Methodological Aspects

In this section, the approach, design, technique, and instruments that were used to develop the proposal will be presented and thus obtain the results of the evaluation carried out on the Bilingual Education Proposal and theVLOs.

5.1. Approach

For the development of this project, the researches considered the qualitative approach that is defined as an interpretive and naturalistic approach that studies in their natural setting situations, things or subjects, and seeks to give an answer or interpretation through the collection of a variety of empirical materials (Denzin, 1994). Besides, Cresswell (1994) claims that:

> Qualitative research is an inquiry process of understanding based on distinct methodological traditions of inquiry that explore a social or human problem. The researcher builds a complex, holistic picture, analyzes words, reports detailed views of informants, and conducts the study in a natural setting (p. 44).

Moreover, this research project is supported by the exploratory design which is defined by Burns and Grove (as it was cited in Research Design n.d) as "a research conducted to gain new insights and to increase knowledge regarding the topic investigated", since this proposal has not been developed at the municipal level, therefore Centro Docente Rafael Tello is now the first school in having a Bilingual Education Proposal.

Additionally, for this research the meeting or focus group as a research technique allows communication between researchers and participants since it is considered flexible and open. It consists of a technique that allows the researchers to be the moderators of the meeting and present in a detailed, clear and accurate way the products, goods and services or any work being carried out. These create open lines of communication between the participants and the

researchers, offering valuable information about the feelings, thoughts and perceptions; furthermore, it allows the participants to give suggestions and recommendations about the work.

5.2. Instruments

The researchers adapted a questionnaire for the evaluation of the Bilingual Education Proposal and the VLOs as support for it, for evaluating these last ones, the criteria of CODA were taken into account, it is defined by Fernandez, Romero and Ranero (2012) as an instrument that consists of a form in which 10 quality criteria are established (5 pedagogical and 5 technological) organized in a scale from 1 to 5 that is the highest value. With the use of CODA, the VLOs can be assessed by researchers and participants. It is considered a useful and effective tool when applying and evaluating; likewise, this instrument contributes to the improvement and creation of educational digital resources. It is necessary to clarify that for the design of this evaluation tool, the researchers took into account only the criteria proposed by CODA and adapted them to formulate and register the questionnaire, which according to Saul McLeod (2018), is an instrument that has a series of questions with the purpose of gathering information from participants. Also, they provide a relatively cheap, quick and efficient way of obtaining large amounts of information from a large sample of people. For this research, the questionnaire with open-ended questions allowed participants to express what they thoght, their perception, and gives their opinions in as much detail as they like.

5.3. Steps of Investigation

5.3.1. Identification of the topics

The first step to carry out this investigation was to present the bilingual education proposal to the coordinator of the Rafael Tello school in oral and written form **(Appendix A)**, which was accepted by her. This step allowed us to talk to the Mathematics and Natural Sciences teachers.

Then, they were given four informed consents (**Appendix B)** from the researchers group (one to the coordinator and three to each teacher). Those informed consents reflected the role of the teachers and the researchers in the project.

Posteriorly, the coordinator sent us the Natural Sciences and Mathematics curricula **(Appendix C)** to be reviewed; later, the researches scheduled a meeting with the teachers of these areas, in order to discuss the thematic contents that the fifth grader students were studying, it was agreed with the school teachers to choose topics from the two first periods due to, they enclose the topics seen during the fourth stages of primary school (feedback), and regarding standards and learning objectives of MEN, the curriculum for these subjects for the fifth grade was designed.

Considering the selected topics and according to the objectives and the standards of the MEN for these areas, the researchers proceeded to build the curricular plan for both subjects **(Table Nº 1 and 2);** the design of the institution was taken as an example due to it was suggested by the teachers. It was agreed to work in Natural Sciences the following topics and subtopics: the cell, the earth and living beings, parts of the cell, cell types (eukaryote and prokaryote) the earth and its parts, (layers and atmosphere), the kingdoms of nature.

In Mathematics, it was agreed to work the following topics and subtopics: natural number operations: addition, subtraction, and their properties; prime and compound numbers, multiplication and its properties and division; fractions, its terms and types; addition and subtraction of homogeneous and heterogeneous, multiplication and division of fractions.

The following tables are the Natural Sciences and Mathematics curricula.

Table 1. Natural Sciences Curricular Plan.

<table>
<tr><th colspan="4">Natural Sciences Curricular Plan</th></tr>
<tr><td>Subject</td><td>Natural Sciences</td><td rowspan="4">Teacher</td><td rowspan="4"></td></tr>
<tr><td>Hourly Intensity</td><td>2 hours</td></tr>
<tr><td>Grade</td><td>Fifth</td></tr>
<tr><td>Period</td><td>I and II</td></tr>
<tr><td>Problem Situation</td><td colspan="3">Period 1: How to induce students towards the knowledge of the kingdoms of nature, considering their characteristics and classification?

Period 2: How to bring students closer to the beginning of scientific processes through the study of the physical environment?</td></tr>
<tr><td>Objectives</td><td colspan="3">General
To develop a scientific thinking that allows to develop a theory of the natural world with the purpose of contributing to the constructions of environmental awareness in students inside of an active and equitable context.
Specifics
To design experiments that tests your hypotheses and theories.
To imagine new alternatives, new possibilities for solving a problem, formulating a hypothesis, or designing an experiment.
To make observations for solving problems.
To contribute with the advancement of a peaceful coexistence and harmonious relationship with others allowing the development of scientific, technological, and environmental projects.
To contribute with the construction of an environmental awareness in students that allow them to take an active and responsible role in all activities
To recognize the different theories about a natural world.
To apply the acquired knowledge in the resolution of daily problems
To contribute with the development of a conception in the student about technique and technology as cultural products this must be or can be used for human benefit inside a sustainable development in a context.</td></tr>
</table>

<table>
<tr><td>English Standards</td><td colspan="3">The student follows carefully what the teacher and classmates say during a game or activity
The student associates the drawing of the cell and living beings with their written description.
The student identifies the names of the characters and the main events of a story read by the teacher and supported by images, videos or any type of visual material.
The student looks for opportunities to use what he knows in English
The student keeps a simple conversation in English with a partner when the teacher develops a classroom activity.</td></tr>
<tr><td>Competence Standards</td><td colspan="3">To explain the importance of the cell as a basic unit of living beings.
To identify the structures of living beings that are allowed to develop in an environment and which can be used as classification criteria.
To classify the living beings in different taxonomic groups (plants, animals, microorganisms).</td></tr>
<tr><td>Period</td><td>Topics</td><td>Approach</td><td>Competences</td></tr>
<tr><td>Period 1</td><td>The cell and living beings
The Cell and its parts.
Cell classes and their vital functions.
The kingdoms of nature</td><td>Communicative
Humanistic</td><td>Scientific
Interpretive</td></tr>
<tr><td>Period 2</td><td>The earth
Parts of the earth and its layers.
Parts of the atmosphere and its layers.</td><td>Communicative
Humanistic</td><td>Scientific
Interpretive</td></tr>
<tr><td>Evaluation</td><td colspan="3">The evaluation model for Natural Sciences subject will be adjusted according to 1290 Decree established by the MEN (2009), in which the fifth article reads the following “cada establecimiento educativo definirá y adoptará su escala de valoración (...) cada escala deberá expresar su equivalencia con la escala de valoración nacional: Superior, Alto, Básico, Bajo” (p.2)

Taking into account the above, The Institución Educativa Instituto Técnico through Registro de Desempeño Estudiantil (REDES) has established the institutional evaluation scales according to the Ministry of education. REDES (2010) “la escala de evaluación institucional corresponderá de la siguiente forma: 1.0 a 2.9 nivel bajo, 3.0 a 3.9 nivel básico, 4.0 a 4.5 nivel alto y 4.6 a 5.0 nivel superior” (p.24). On the other hand, article 6 of REDES establishes that</td></tr>
</table>

	teachers can propose their own evaluation criteria for the subjects according to the norms established by the MEN and the institutional academic council. The following competences will be taking into account: Attitudinal and Behavioral • Class participation • Teamwork • Responsability Cognitive • Homework and workshops • Fieldworks. Self-assessment Co-evaluation

Table 2. Mathematics Curricular Plan.

Mathematics Curricular Plan			
Subject	Mathematics	Teacher	
Hourly Intensity	2 hours		
Grade	Fifth		
Period	I and II		
Problem Situation	**Period 1:** Why are natural numbers important in the student's life? **Period 2:** What is the importance of the concept of fractions in the educational process and its relationship with its environment in daily life?		
Objectives	**General** • To develop in students a comprehension of the concepts, process, and basic strategies of mathematics and also, the ability to use all of this in solving problems. **Specific** • To develop skills that allows them to reason critically, logically, and objectively. • To take advantage of the previous knowledge acquired by students in familiar, schoolar, social, environments etc… • To acquire independence in intellectual activities. • To develop the capacity in students for making generalizations and modulations.		

	• To develop skills in arithmetic and geometric procedures. • To acquire precision in verbal expression with language and symbolic expressions. • To use mathematics to interpret and solve problems in everyday life, technology, and science. • To exercise mental agility to find answers to the problems in different contexts. • To recognize and value the contributions of mathematics in the development of sciences.
English Standards	• The student follows carefully what the teacher and their classmates say during a game or activity • The student identifies who is he talking about according to their description • The student associates a drawing with its written description • The student links phrases and connectors that express sequence and addition • The student can talk about quantities and count objects to a thousand • The student asks to the teacher and classmates to clarify a question or explain what they are talking about
Competence Standards	• To solve and formulate problems whose solution strategy requires the relationships and properties of natural numbers and their operations. • To know the meaning of the fraction in everyday situations. • To answer short explanations based on the characteristics of fractional numbers.

Period	**Topics**	**Approach**	**Competences**

Period 1	**Operations with numbers** • Addition and subtraction of natural numbers. • Properties of addiction. • Properties of subtraction. • Prime and composite numbers. • Multiplication and division of natural numbers and their properties	• Communicative • Algorithmic	• Numerical Thinking • Interpretive
Period 2	**Fractions and their operations.** • Fractions and terms, equivalent fractions. • Types of fractions. • Addition and subtraction of homogeneous. • Addition and subtraction of heterogeneous fractions. • Multiplication and division of fractions.	• Communicative • Algorithmic • Logical	• Numerical • variational thinking. • Logical reasoning.
Evaluation	The formative evaluation must emphasize the permanent valoration of the different proceedings of the students, when they interpret or deal with mathematical situations and based on them, they formulate and solve problems. Those proceedings are enhanced when the teacher always keeps the requirements, so the students will be able to offer interpretations and conjectures, provide explanations and expansions, argue, prove and explain the procedures followed or the solutions proposed. The evaluation criteria are according to the institutional evaluation system and the classroom agreements. In the evaluative process, the conceptual, procedural and attitudinal percentages will be assigned. 1. Attitudinal and behavioral • Responsability • Collaborative work • Class Participation		

	2. Cognitive skills • Homework and workshops • Fieldworks

5.3.2. Elaboration of the Lesson Plans

Later, in the second step, considering the curricular plan designed, the researchers proceeded to build the lesson plans (eight for Natural Sciences and twelve for Mathematics; it is to say twenty in total), once they were finished, they were reviewed by the whole group.

The structure of the lesson plan contains information about the institution such as: its name, the headquarters, grade, week, teacher, subject, intensity, week and period, then it has the objectives; general and specifics. After, it contains all the information related to the English and competence standards, also the vocabulary approach and method. Besides, it has the activities to the development of the class as well as the materials and resources, which includes the VLO to use and other materials; in the end, the lesson plan has the evaluation of the topic. To plan the activities, everything related to the competences were taken into account as well as the objectives planted in the curricula. The lesson plans contain from four to six activities to teach each subtopic.

As the Centro Docente Rafael Tello does not have teachers with degrees in English, it was necessary to elaborate lesson plans in English and Spanish **(Appendix, D)** for the Natural Sciences and Mathematics teacher, and the coordinator of the headquarters so that they could learn about the different activities and tasks proposed by the investigators.

Natural Sciences

Table 3 Lesson Plan N° 1 - The Cell

Institution:	Instituto Técnico	**Headquarters:**	Centro Docente Rafael Tello	**Period**	1

Teacher:		**Grade:**	Fifth			**Week**	1
Subject:	Natural Sciences	**Date:**	D	M	YEAR	**Hourly Intensity**	2 hours

TOPIC: The Cell	
SUBTOPIC: Parts of the cell	
PROBLEM SITUATION: How to induce students towards the knowledge of the Kingdoms of nature, taking into account their characteristics and classification?	
WEEKLY OBJECTIVES:	
General: To know the cell as a structural and functional unit of all living beings	
Specifics: • To identify the main characteristics of a cell and its importance for each living being. • To identify the main parts of the cell.	
Competences:	**Vocabulary**
Scientific and Interpretive competences	Cell, the nucleus, plasma membrane, cytoplasm, cell wall, nuclear membrane, nucleolus, chromosomes, chromatin, cytoskeleton, organelles
English Standards	
Listening • The student identifies the names of the characters and the main events of a story read by the teacher and supported by images, videos or any other type of visual material. **Monologue** • The student looks for opportunities to use what he knows in English **Talking** • The student keeps a simple conversation in English with a partner when the teacher develops a classroom activity.	
Competences Standards	
• To explain the importance of the cell as a basic unit of living beings. • To actively listen to their classmates, the student recognizes different points of view and he compares them with others.	
Approach:	**Method:**
Communicative and humanistic approach	Audio visual and audio lingual.

CLASS DEVELOPMENT

Beginning	
Activity (ies)	**1.** The teacher will create a context in which to introduce the topic of the cell, and will also ask the students if they know what the cell is, its function and parts **2.** The teacher will show a short video about explanation of the cell, and also the main parts with flashcards
Middle	
Activity (ies)	**3.** In this activity, the teacher will give each student parts of the cell in disorder which they will have to locate according to the explanation of the video and the interaction with the flashcards **4.** Worksheet: The students will receive a document, where they must solve activities such as: crosswords, word search or relate terms about the cell and its functions
End	
Activity (ies)	**5.** Finally the students will make a model where the cell and its main parts are shaped, making use of recyclable materials or plasticine.

Materials and resources

VLO to use		**Description**
1	Natural Sciences VLO -The cell and its parts. https://naturalsciencesbilingualeducation.blogspot.com/	This VLO contains the tittle of the topic, the objective, the key words, the vocabulary, the English and Spanish version of the lesson plans, the theory, a video to reinforce the topic and finally the activities for the students about the cell and its parts.
Other resources:		
Flashcards, recyclable materials, plasticine.		

Evaluation of the topic.
The students will make a model of the Cell.

Table 4 Lesson Plan N° 2 - Types of cell and their vital functions. Eukaryotic Cell.

Institution:	Instituto Técnico	**Headquarters:**	Centro Docente Rafael Tello	**Period**	1

Teacher:		**Grade:**	Fifth	**Week**	2
Subject:	Natural Sciences	**Date:**	D M YEAR	**Hourly Intensity**	2 hours

TOPIC: The cell and living beings	
SUBTOPIC: Type of cells and their vital functions.	
PROBLEM SITUATION: How are living things organized?	
WEEKLY OBJECTIVES:	
General: To know the different type of cells and their classification.	
Specifics: • To arouse scientific curiosity and the desire to know through exploration and contact with the environment. • To identify and propose different solutions to environmental needs and problems. • To identify characteristics, differences and structures of living beings that allow them to develop in an environment and that can be used as classification criteria.	
Competences:	**Vocabulary:**
Scientific thinking	Prokaryotic and eukaryotic cells, Protozoa, fungi, plants, and animals.
English Standards	
• The student identifies the names of the characters and the main events of a story read by the teacher and supported in images, videos or any type of visual material. • The student looks for opportunities to use what he knows in English • The student keeps a simple conversation in English with a partner when the teacher develops a classroom activity.	
Competences Standards	
• To identify the levels of cellular organization of living beings. • To represent the various organ systems of the human being and explain their function. • To identify in the environment objects that perform similar functions to those of my organs perform and support the comparison.	
Approach:	**Method:**
Communicative and humanistic approach	Audio visual and audio lingual.

CLASS DEVELOPMENT

Beginning	
Activity (ies)	**1.** The teacher will start with an ice breaker which consists of a challenge, on the floor there will be some drawings of the parts of the body (feet and hands) but they will be disorganized. The student will have to jump following the patterns without making mistakes until reaching the goal. **2.** Then, the teacher will paste on the board a drawing of the cell, which each part will be marked with an arrow, and in a box, there will be some papers with the parts of the cell. In this activity each student has to go out to the board and take a piece of paper, read it, and place it in the cell according to its parts.
Middle	
Activity (ies)	**3.** On the other hand, the teacher will re-take to the topic of the cell and its parts, and then the students will present the classification of the cell (eukaryotic and prokaryotic) and their main characteristics. **4.** In the same vein, we will study the eukaryotic cell where they will learn its structure, the types of eukaryotic cells (animal and plant) to finally, observe some examples of organisms with this type of cell.
End	
Activity (ies)	**5.** Moreover, the teacher will present a drawing of the animal and plant cell to find out their differences. **6.** Through a short exercise, students will have some drawings where they can observe some living beings and they will have to relate each organism with its type of eukaryotic cell (animal or plant).

Materials and resources

VLO to use		**Description**
1	Natural Sciences VLO –Types of cells and their vital functions (Eukaryotic Cell) https://naturalsciencesbilingualeducation.blogspot.com/	This VLO contains the tittle of the topic, the objective, the key words, the vocabulary, the English and Spanish version of the lesson plans, the theory, a video to reinforce the topic and finally the activities for the students about the types of cells and their vital functions (Eukaryotic Cell).
Other resources:		
Board, flashcards, sciences book, notebook, pencil, pen, colors.		

Evaluation of the topic.
• The teacher assigns a type of eukaryotic cell (animal or plant) to each student who must make a model of the cell type using recyclable material and naming each part.

Table 5 Lesson Plan N° 3 - Types of cells and their vital functions. Prokaryotic Cell.

Institution:	Instituto Técnico	**Headquarters:**	Centro Docente Rafael Tello	**Period**	1

Teacher:		**Grade:**	Fifth			**Week**	3
Subject:	Natural Sciences	**Date:**	D	M	YEAR	**Hourly Intensity**	2 hours

TOPIC: The cell and living beings	
SUBTOPIC: Type of cells and their vital functions.	
PROBLEM SITUATION: How are living things organized?	
WEEKLY OBJECTIVES:	
General: To know the different type of cells and their classification.	
Specifics: • To arouse scientific curiosity and the desire to know through exploration and contact with the environment. • To identify and propose different solutions to environmental needs and problems. • To identify characteristics, differences and structures of living beings that allow them to develop in an environment and that can be used as classification criteria.	
Competences:	**Vocabulary:**
Scientific thinking	Prokaryotic and eukaryotic cells, Protozoa, fungi, plants, and animals.
English Standards	
• The student identifies the names of the characters and the main events of a story read by the teacher and supported in images, videos or any type of visual material. • The student looks for opportunities to use what they know in English • The student keeps a simple conversation in English with a partner when the teacher develop a classroom activity.	
Competences Standards	
• To identify the levels of cellular organization of living beings. • To represent the various organ systems of the human being and explain their function. • To identify in the environment objets that perform similar functions to those of my organs perform and support the comparison.	
Approach:	**Method:**
Communicative and humanistic approach	Audio visual and audio lingual.

CLASS DEVELOPMENT

Beginning	
Activity (ies)	**1.** The teacher will start with an ice breaker that consists of forming a circle between all the students, each one must say a word of the vocabulary related to the cell and finish by making a movement: e.g. plant cell and move the right foot; the next student must repeat the word and the movement made by his partner and he must add a new word plus a movement. **2.** Then, the students will present their models of the animal or plant cell indicating its parts and characteristics.
Middle	
Activity (ies)	**3.** Later, the teacher will present the topic "prokaryotic cell" where he will explain its characteristics, structure and examples of organisms with this type of cell. **4.** In the same way, the teacher will present two images of living beings (one prokaryotic and the other eukaryotic), the students must establish the differences between the two organisms taking into account the explanation of both types of cells and they must register them in their research sheet.
End	
Activity (ies)	**5.** Finally, the teacher will give feedback about the topic (cell types) taking as an example the two living beings from the previous exercise in order to clarify doubts.

Materials and resources

VLO to use		**Description**
1	Natural Sciences VLO –types of cells and their vital functions (prokaryotic cell). https://naturalsciencesbilingualeducation.blogspot.com/	This VLO contains the tittle of the topic, the objective, the key words, the vocabulary, the English and Spanish version of the lesson plans, the theory, a video to reinforce the topic and finally the activities for the students about the types of cells and their vital functions (prokaryotic cell).
Other resources:		
Board, flashcards, notebook, pencil,pen, colors, sciences book.		

Evaluation of the topic.
• Develop the workshop titled "cell types" where students will find some short application exercises.

Table 6 Lesson Plan N° 4 - The kingdoms of the nature. Part 1

Institution:	Instituto Técnico	**Headquarters:**	Centro Docente Rafael Tello	**Period**	1

Teacher:		**Grade:**	Fifth			**Week**	4
Subject:	Natural Sciences	**Date:**	D	M	YEAR	**Hourly Intensity**	2 hours

Topic: The living beings	
SUBTOPIC: The kingdoms of the nature	
PROBLEM SITUATION: How to induce students towards the knowledge of the kingdoms of the nature, considering their characteristics and classification?	
WEEKLY OBJECTIVES:	
General: To identify the characteristics and differences of living beings that make part of each one of kingdoms of nature.	
Specifics: • To describe the characteristics of each one of the kingdoms of the nature. • To classify the living beings in each kingdom considering their characteristics	
Competences :	**Vocabulary:**
• Scientific and interpretative competence	Moneran, Protist, Fungi, microorganisms yeast, mushrooms, moulds, algae, amoebas, and bacteria
English Standards	
• The Student follows carefully what the teacher and classmates say during a game or activity. • The student associates a drawing with their written description.	
Competences Standards.	
• Identify the structures of living beings that are allowed to develop in an environment and which can be used as classification criteria. • Classify the living beings in different taxonomic groups (plants, animals, microorganisms).	
Approach:	**Method:**
Communicative and humanistic approach	Audio visual and audio lingual.

CLASS DEVELOPMENT

Beginning	
Activity (ies)	**1.** Warm up: hot potato: to start the class the students will be asked to make a circle to play hot potato, so the students will be asked questions like have you ever heard about the kingdoms of nature? How many kingdoms do you think or do you know exist? To what kingdom of nature do you think that human beings belong to?
Middle	
Activity (ies)	**2.** To give a general introduction about this topic, teacher will use a video. Once the video is finished the students will be asked about the information they could get, what did they understand? **3.** To introduce the monera, protist and fungi kingdom, teacher will use the slides to identify the beings that belong to each one of them and their characteristics.
End	
Activity (ies)	**4.** On the board, there will be columns with the name of the three kingdoms, one by one, the students will paste the flashcards in their corresponding column. **5.** To reinforce the learning of the vocabulary an association game will be used, as the flashcard contain the images of the organisms some others flashcards will contain the name of the living beings presented in the images, in groups of seven people more or less they have to find the pairs, that is to say the flashcard with the image and the flashcard with the name of that image.

Materials and resources

VLO to use		**Description**
1	Natural Sciences VLO -Kingdoms of nature https://naturalsciencesbilingualeducation.blogspot.com/	This VLO contains the tittle of the topic, the objective, the key words, the vocabulary, the English and Spanish version of the lesson plans, the theory, a video to reinforce the topic and finally the activities for the students about the kingdoms of nature.
Other resources:		
Flashcards		

Evaluation of the topic.
• Students will be asked to look for images of the living beings, to cut them and paste them on their notebooks, classifying them in their respective kingdom.

Table 7 Lesson Plan N° 5 - The kingdoms of the nature. Part 2.

Institution:	Instituto Técnico	**Headquarters:**	Centro Docente Rafael Tello	**Period**	1

Teacher:		**Grade:**	Fifth			**Week**	5
Subject:	Natural Sciences	**Date:**	D	M	YEAR	**Hourly Intensity**	2 hours

TOPIC: The living beings	
SUBTOPIC: The kingdoms of the nature	
PROBLEM SITUATION: How to induce students towards the knowledge of the kingdoms of the nature, considering their characteristics and classification?	
WEEKLY OBJECTIVES.	
General: To identify the characteristics and differences of living beings that make part of each one of kingdoms of nature.	
Specifics: • To describe the characteristics of each one of the kingdoms of the nature. • To classify the living beings in each kingdom considering their characteristics.	
Competences:	**Vocabulary:**
Scientific and interpretative competences	Plantae, animalia, vertebrates, invertebrates
English Standards	
• The student follows carefully what the teacher and classmates say during a game or activity. • The student associates a drawing with their written description.	
Competences Standards.	
• Identify the structures of living beings that allowe them to develop in an environment and which can be used as classification criteria. • Classify the living beings in different taxonomic groups (plants, animals, microorganisms).	
Approach:	**Method:**
Communicative and humanistic approach	Audio visual and audio lingual.

CLASS DEVELOPMENT

Beginning	
Activity (ies)	**1.** Warm-up to review the previous kingdoms taught, teacher will give a paper to each student, each paper will have a name of an organism, in the classroom there will be three kingdoms the protist, the monera and the fungi, once each student has the paper, they will be asked to go to their kingdoms, to verify if each student is in their right kingdom, they will say for example " I am a algae and I belong to protist kingdom" if they are in the wrong kingdom, their classmates will help them to find the right one by given some clues, they can use the characteristics of each kingdom.
Middle	
Activity (ies)	**2.** Using a video teacher will show the characteristics of the animalia and plantae kingdoms. At the same time students will complete the worksheet that has the characteristics and some examples. **3.** Students will work in groups of five people an activity call "what kingdom do I belong in?" each group will get a what kingdom do I belong in worksheet and also a bag with images cards of living organisms, the students will read a little description of the picture, then they have to decide what kingdom the organisms belong.
End	
Activity (ies)	**4.** To give a general review students and teacher will play who wants to millionaire: by pairs students will start to play the one who wins continue on the game the other one will be not able to play and a new player will take that place, if both are not able to win, both will cede their position to two new players.

Materials and resources

VLO to use		**Description**
1	Natural Sciences VLO -The kingdoms of nature https://naturalsciencesbilingualeducation.blogspot.com/	This VLO contains the tittle of the topic, the objective, the key words, the vocabulary, the English and Spanish version of the lesson plans, the theory, a video to reinforce the topic and finally the activities for the students about the kingdoms of nature.
Other resources:		
Worksheets, pictures		

Evaluation of the topic.
• Students will draw and color beings belonging to animalia and plantae kingdom.

Table 8 Lesson Plan N° 6 - The earth.

Institution:	Instituto Técnico	**Headquarters:**	Centro Docente Rafael Tello	**Period**	2

Teacher:		**Grade:**	Fifth	**Week**	6
Subject:	Natural Sciences	**Date:**	D M YEAR	**Hourly Intensity**	2 hours

TOPIC: The earth	
SUBTOPIC: Layers of the Earth	
PROBLEM SITUATION: How to bring students closer to the beginning of scientific processes by studying the physical environment?	
WEEKLY GOALS.	
General: To know about our planet.	
Specifics: • To learn about structure and surface of Earth • To identify the different layers of the Earth	
Competences:	**Vocabulary:**
Scientific and interpretive competence	drought, equator, erosion, ocean, mantle, axis, ozone, rotation, terrain
English Standards.	
Listening • The student recognizes when they speak to the teacher in English and they react verbally and non-verbally. • The student understands short and simple descriptions of familiar objects and places. **Reading** • The student recognizes familiar words and phrases in immediate contexts	
Competence Standards	
• Locate myself in the universe and on Earth and identify characteristics of matter, physical phenomena and manifestations of energy in the environment. • Describe the physical characteristics of the Earth and its atmosphere. • Recognize characteristics of the Earth that make it a living planet.	
Approach:	**Method:**
Communicative and humanistic approach	Audio visual and audio lingual.

CLASS DEVELOPMENT

Beginning	
Activity (ies)	**1.** The teacher will present the topic, explaining to the students what the earth is; defining the concept of motion and recognizing that the Earth has rotational motion what it is composed of and explain earth´s layers.
Middle	
Activity (ies)	**2.** The teacher will use the students to model how the Earth revolves around the sun as it rotates on its axis and will explain that it takes the Earth 1 year or 365 days to make a complete trip around the sun, in order to help them understand this period of time saying that with each birthday, the Earth has made a more complete trip around the sun.
End	
Activity (ies)	**3.** To understand better the layers of the Earth, the teacher will do an activity that consists in create our planet with plasticine, creating and identifying each layers of the Earth. In this way, through the activity, the teacher will be able to evaluate the student's ability and their understanding of the topic presented. **4.** Team work Exercise: • In pairs, students will make a comparative chart between the characteristics of each of the layers of the earth.

Materials and resources

VLO to use		**Description**
1	Natural Sciences VLO -Layers of the earth. https://naturalsciencesbilingualeducation.blogspot.com/	This VLO contains the tittle of the topic, the objective, the key words, the vocabulary, the English and Spanish version of the lesson plans, the theory, a video to reinforce the topic and finally the activities for the students about the layers of the earth.
Other resources:		
Plasticine, Genially, Kahoot		

Evaluation of the topic.
To do the plasticine activity to create the planet earth To make the comparative chart

Table 9 Lesson Plan N° 7 - The parts of the earth and its layers.

Institution:	Instituto Técnico	**Headquarters:**	Centro Docente Rafael Tello	**Period**	2

Teacher:		**Grade:**	Fifth	**Week**	7
Subject:	Natural Sciences	**Date:**	D M YEAR	**Hourly Intensity**	2 hours

TOPIC: The earth	
SUBTOPIC: The parts of the earth and its layers	
PROBLEM SITUATION: How to bring students closer to the beginning of scientific processes through the study of the physical environment?	
WEEKLY GOALS	
General: To learn the layer of the earth.	
Specifics: To Identify the functions of each layer of the earth**.**	
Competences:	**Vocabulary:**
Scientific and interpretive competence.	Geosphere, asthenosphere, earth's crust, earth's mantle, core of the earth and lithosphere- biosphere and hydrosphere, the outer layers of the planet, the atmosphere -the exosphere, thermosphere, ionosphere, mesosphere, stratosphere and troposphere.

English Standards.

Listening

• The student recognizes when they speak to the teacher in English and they react verbally and non-verbally.

• The student understands short and simple descriptions of familiar objects and places.

Reading

• The student recognizes familiar words and phrases in immediate contexts.

Competence Standards.

- To understand that there are different types of ecosystems (terrestrial and aquatic) and that their characteristics (temperature, humidity, soil types, altitude) allow different living beings to inhabit them.

Conceptual:

- To understand the organization of the nature and relationships between beings alive within an ecosystem.
- To understand the need to take care of natural environment.

Procedural:

- To explore your environment and identify relationships between living beings in an ecosystem, recognizing its elements.
- To expose about environmental problems of their environment and propose possible solutions.
- To expose about protected areas in Colombia, its location and characteristics.

Attitudinal:

- To internalize the duty to care for the natural environment.

Approach:	**Method:**

Communicative, heuristic and humanistic approach.	Audio visual and audio lingual.

CLASS DEVELOPMENT

Beginning	
Activity (ies)	**1.** In continuity with the topic of the parts of the earth and its layers, the teacher will present an interactive image as an introductory way of the layers of the earth.
Middle	
Activity (ies)	**2.** The teacher will start projecting an interactive image created in Genially, which when clicking on it allows to know the description of the internal layers of the earth, among which is the Geosphere formed by the atmosphere, earth's crust, earth's mantle, core of the earth and lithosphere; then, it continues with the superficial layers of planet earth, in which the biosphere and hydrosphere are found.
End	
Activity (ies)	**3.** As an interactive activity, students solve crossword puzzles in order to associate the different layers of the earth with the correct description according to their function.

Materials and resources

VLO to use		**Description**
1	Natural Sciences VLO -The parts of the earth and its layers. https://naturalsciencesbilingualeducation.blogspot.com/	This VLO contains the tittle of the topic, the objective, the key words, the vocabulary, the English and Spanish version of the lesson plans, the theory, a video to reinforce the topic and finally the activities for the students about the parts of the earth and its layers.
Other resources:		
Pencil, notebooks, eraser, sharpener, colored pencils		

Evaluation of the topic.
To evaluate this topic, the teacher will make an individual workshop about the parts of the earth and its layers.

Table 10 Lesson Plan N° 8 - Parts of the atmosphere and its layers.

Institution:	Instituto Técnico	**Headquarters:**	Centro Docente Rafael Tello	**Period**	2

Teacher:		**Grade:**	Fifth			**Week**	8
Subject:	Natural Sciences	**Date:**	D	M	YEAR	**Hourly Intensity**	2 hours

TOPIC: The earth	
SUBTOPIC: Parts of the atmosphere and its layers	
PROLEM SITUATION: How to bring students closer to the beginning of scientific processes through the study of the physical environment?	
WEEKLY GOALS.	
Generals: To learn the function of the atmosphere.	
Specifics: To Identify the layers of the atmosphere.	
COMETENCES:	**Vocabulary:**
Scientific and interpretive.	The atmosphere, the exosphere, thermosphere, ionosphere, mesosphere, stratosphere and troposphere.
ENGLSH STANDARDS.	
Listening • The student recognizes when they speak to the teacher in English and they react verbally and non-verbally. • The student understands short and simple descriptions of familiar objects and places. **Reading** • The student recognizes familiar words and phrases in immediate contexts.	
COMPETENCES STANDARDS.	
To understand that there are different types of ecosystems (terrestrial and aquatic) and that their characteristics (temperature, humidity, soil types, altitude) allow different living beings to inhabit them. **Conceptual:** • To understand the organization of the nature and relationships between living beings within an ecosystem. • To understand the need to take care of natural environment. **Procedural:** • To explore your environment and identify relationships between living beings in an ecosystem, recognizing its elements. • To expose about environmental problems of their environment and propose possible solutions. • To expose about protected areas in Colombia, its location and characteristics. **Attitudinal:** • To internalize the duty to care for the natural environment.	
Approach:	**Method:**
Communicative, heuristic and humanistic approach.	Audio visual and audio lingual.

CLASS DEVELOPMENT

Beginning	
Activity (ies)	**1.** The teacher asks the students about the atmosphere in order to identify the previous knowledge they have about it, and thus give way to the introduction of the topic.
Middle	
Activity (ies)	**2.** Through the presentation of a video-type presentation, the teacher explains the function of the atmosphere that is part of the outer layers of the planet; in the same way, the layers of the atmosphere will be explained one by one, which consist of: the exosphere, thermosphere, ionosphere, mesosphere, stratosphere and troposphere.
End	
Activity (ies)	**3.** As a collective evaluation, the teacher will ask some students to come in front of their classmates. While one of them has his back to the board, the others will be able to see one of the projected images, which can belong to any of the layers of the atmosphere. The task of the other classmates will be to describe it according to its characteristics until the student guess the correct name.

Materials and resources

VLO to use		**Description**
1	Natural Sciences VLO -Parts of the atmosphere and its layers. https://naturalsciencesbilingualeducation.blogspot.com/	This VLO contains the tittle of the topic, the objective, the key words, the vocabulary, the English and Spanish version of the lesson plans, the theory, a video to reinforce the topic and finally the activities for the students about the parts of the atmosphere and its layers.
Other resources:		
Pencil, notebooks, eraser, sharpener, colored pencils		

Evaluation of the topic.
To evaluate this topic, the teacher will make an individual workshop about the parts of the atmosphere and its layers.

Mathematics

Table 11 Lesson Plan N° 1 - Addition and subtraction of natural numbers.

Institution:	Instituto Técnico	**Headquarters:**	Centro Docente Rafael Tello	**Period**	1

Teacher:		**Grade:**	Fifth	**Week**	1
Subject:	Mathematics	**Date:**	D M YEAR	**Hourly Intensity**	2 hours

TOPIC: Operations with numbers

SUBTOPIC: Addition and subtraction of natural numbers

PROBLEM SITUATION: Why are natural numbers important in the student's life?

WEEKLY GOALS:

General: Recognize and use natural numbers to solve mathematical operations in everyday life.

Specific:

- To solve and formulate problems whose solution strategy requires the relationships and properties of natural numbers and their operations
- To solve and formulate problems in additive situations of composition, transformation, comparison and equality
- To identify in the context, the need for a situation, the need for an exact or approximate calculation and the reasonableness of the results obtained

Competences:	**Vocabulary**
Numerical thinking	Natural numbers, set of add subtraction, composed numbers, infinite, successor

English Standards

Listening:

- the student follows carefully what the teacher and my classmates say during a game or activity
- the student identifies who they are talking about according to their description

Reading:

- the student associates a drawing with its written description

Writing

- the student links phrases and connectors that express sequence and addition

Monologues:

- the student can talk about quantities and count objects to a thousand

Talking:

- the student asks to the teacher and classmates to clarify a question or explain what they are talking about

Competences Standards

- To solve and formulate problems whose solution strategy requires the relationships and properties of natural numbers and their operations

Approach:	**Method:**
Communicative and algorithmic approach	Audio visual and audio lingual.

CLASS DEVELOPMENT

Beginning	
Activity (ies)	**1.** The teacher will introduce the topic with the presentation of a video, which explains in detail what natural numbers are. **2.** In relation to the video, the teacher will ask questions about the video to verify if the students understood what they wanted to explain in the video
Middle	
Activity (ies)	**3.** the teacher will explain through flashcards, (fruits, animals, etc). will be used to explain and identify which are and which are not natural numbers **4.** In the following activity each student will represent a natural number, the idea is to add or subtract with the assigned number
End	
Activity (ies)	**5.** To finish, a game will be played where a board containing addition and subtraction of natural numbers will be used , each student will throw a dice and depending on the number, run the card and perform the operation

Materials and resources

VLO to use		**Description**
1	Mathematics VLO -Addition and subtraction with natural numbers https://mathematicsbilingualeducation.blogspot.com/	This VLO contains the tittle of the topic, the objective, the key words, the vocabulary, the English and Spanish version of the lesson plans, the theory, a video to reinforce the topic and finally the activities for the students about addition and subtraction with natural numbers.
Other resources:		
Flashcards, board with a game.		

Evaluation of the topic:
To identify whether or not it is an operation with natural numbers, in addition the student will perform addition and subtraction with said numbers

Table 12 Lesson Plan N° 2 - Properties of addition.

Institution:	Instituto Técnico	**Headquarters:**	Centro Docente Rafael Tello	**Period**	1

Teacher:		**Grade:**	Fifth	**Week**	2
Subject:	Mathematics	**Date:**	D M YEAR	**Hourly Intensity**	2 hours

TOPIC: Operations with numbers
SUBTOPIC: Properties of addition
PROBLEM SITUATION: Why are natural numbers important in a student's life?
WEEKLY OBJECTIVES:
General: To know and learn about properties of addition

Specifics:

- To recognize and apply the properties of the addition

Competences:	**Vocabulary**
Numerical thinking	numbers, addition, difficulties, physical object

English Standards

Listening

- The student identifies the names of the characters and the main events of a story read by the teacher and supported in images, videos or any type of visual material.

Monologue

- The student looks for opportunities to use what he knows in English

Talking

- The student keeps a simple conversation in English with a partner when the teacher develops a classroom activity.

Competences Standards

- Use numbers, operations and their properties to solve everyday situations

Approach:	**Method:**
Communicative and algorithmic approach	Audio visual and audio lingual.

CLASS DEVELOPMENT

Beginning	
Activity (ies)	1. The teacher will make a presentation of the properties of addition, in this way they will explain to the students what the topic is about.
Middle	
Activity (ies)	2. To understand better the topic, students will know the properties of addition through a daily situation. An example is the preparation of the backpack for school. To start the game, the students have to look for an empty backpack and open it. First, they will put 3 large notebooks and then 6 small notebooks. How many notebooks are in the backpack? To solve this question, they only have to add the large notebooks plus the number of small notebooks. Would there still be 9 notebooks in the backpack if they had put the small notebooks first and then the large ones? The result of the add will be the same. The order of the factor does not alter the product. Teacher says students that this is the first addition property (COMMUTATIVE PROPERTY). To practice the second addition property, teacher asks their students to put 3 green pencils, 8 yellow pencils and 2 blue pencils inside the bag. The question will be how many pencils are in the case? To find out how many there are. Students must add 3 + 8 + 2 = How is this sum solved? asks the teacher Adding three plus eight first and adding two to the result? (3 + 8) + 2 = Or adding eight plus two first and adding three to the result? 3 + (8 + 2) The teacher explains to the students, it can be solved in either of the two ways and the result will be the same. When there are three or more addends, it is possible to start by adding the first two numbers and to the result add the third, or vice versa, start by adding the second and the third and to the result add the first. This is the second of the properties of the sum and we know it as ASSOCIATIVE PROPERTY.
End	
Activity (ies)	3. The sum of any number plus zero (0) equals the same number. Therefore, zero (0) is the neutral element of the sum. To put in practice, students will do an exercise; they will put 4 chocolate cookies and 0 oatmeal cookies in their backpack. they do not have oatmeal cookies! How many cookies are there in total in the backpack? There are 4 cookies in the backpack. The sum of any number plus zero (0) equals the same number. Therefore, zero (0) is the neutral element of the addition.

Materials and resources

VLO to use		**Description**
1	Mathematics VLO -Properties of addition https://mathematicsbilingualeducation.blogspot.com/	This VLO contains the tittle of the topic, the objective, the key words, the vocabulary, the English and Spanish version of the lesson plans, the theory, a video to reinforce the topic and finally the activities for the students about Properties of addition.
Other resources:		
Power Point, backpacks, notebooks, pencils.		

Evaluation of the topic.
To practice the three addition properties through described game

Table 13 Lesson Plan N° 3 - Properties of subtraction.

Institution:	Instituto Técnico	**Headquarters:**	Centro Docente Rafael Tello	**Period**	1

Teacher:		**Grade:**	Fifth			**Week**	3
Subject:	Mathematics	**Date:**	D	M	YEAR	**Hourly Intensity**	2 hours

TOPIC: Operations with natural numbers.	
SUBTOPIC: Properties of subtraction.	
PROBLEM SITUATION: why are natural numbers important in a student's life?"	
WEEKLY OBJECTIVES:	
General: To know and learn about properties of subtraction.	
Specifics: • To recognize and apply the properties subtraction.	
Competences:	**Vocabulary**
Numerical and variational thinking.	Numbers, subtraction,
English Standards	
Listening • The student recognizes when they speak to the teacher in English and they react verbally and non-verbally. • The student understands short and simple descriptions of familiar objects and places. **Reading** • The student recognizes familiar words and phrases in immediate contexts.	
Competences Standards	
• To use numbers, operations and their properties to solve everyday situations	
Approach:	**Method:**
Communicative and algorithmic approach	Audio visual and audio lingual.

CLASS DEVELOPMENT

Beginning	
Activity (ies)	**1.** The teacher will ask a question about what students know about the properties of subtraction, students will participate. To learn a little more about subtraction, teacher will show students a short video, in which the property subtraction will be explained.
Middle	
Activity (ies)	**2.** To apply this topic, teacher will give students some examples about the two first properties and then, they have to resolve some exercises designed by the professor according to the topic.

End	
Activity (ies)	**3.** To practice and test the knowledge of the students on identifying the different properties, teacher will do a last exercise, teacher will expose the last example about the last property and later, students will have to solve some exercises. Once students finish; the exercises will be socialized to clear doubts in case they have.

Materials and resources

VLO to use		**Description**
1	Mathematics VLO -Properties of subtraction https://mathematicsbilingualeducation.blogspot.com/	This VLO contains the tittle of the topic, the objective, the key words, the vocabulary, the English and Spanish version of the lesson plans, the theory, a video to reinforce the topic and finally the activities for the students about properties of subtraction.
Other resources:		
Video, flashcards.		

Evaluation of the topic.
To pay attention to each of the examples in order to complete the exercises about properties of subtraction

Table 14 Lesson Plan N° 4 - Prime and composite numbers.

Institution:	Instituto Técnico	**Headquarters:**	Centro Docente Rafael Tello	**Period**	1

Teacher:		**Grade:**	Fifth	**Week**	4
Subject:	Mathematics	**Date:**	D M YEAR	**Hourly Intensity**	2 hours

TOPIC: Operations with natural numbers.	
SUBTOPIC: Prime and composite numbers	
PROBLEM SITUATION: Why are natural numbers important in the student's life?	
WEEKLY GOALS:	
General: To learn the importance of prime and composite numbers	
Specifics: • To solve and formulate problems whose solution strategy requires the relationships and properties of natural numbers and their operations. • To solve and formulate problems in additive situations of composition, transformation, comparison and equalization. • To identify in the context of a situation, the need for an exact or approximate calculation and the reasonableness of the results obtained.	
COMPETENCES:	**VOCABULARY:**
Numerical thinking	Prime numbers, natural numbers, composite numbers.
ENGLISH STANDARDS	
• The student recognizes when they speak to the teacher in English and they react verbally and non-verbally. • The student understands short and simple descriptions of familiar objects and places. • The student recognizes familiar words and phrases in immediate contexts.	
Competences Standards	
• To use numbers, operations and their properties to solve everyday situations. • To carry out quick distribution calculations based on divisibility criteria. • To reconstruct or express numbers from the composition and decomposition of prime numbers	
Approach:	**Method:**
Communicative approach, heuristic and algorithmic approach	Audio visual and audio lingual.

CLASS DEVELOPMENT

Beginning	
Activity (ies)	**1.** By way of introduction, the teacher asks the students if they have any knowledge about prime and composite numbers, their use and how to identify them. Then, it will give the definition and concept with the intention of directing them on the subject.
Middle	
Activity (ies)	**2.** The teacher will draw on the board a table in which the prime numbers from 1 to 100 will be reflected, with the aim of showing the students how they should be selected. Example: it will start with the number 2 which is a prime number, but all the multiples of 2 will be composite numbers, since they will be divisible by 2, then all the multiples of 2 are crossed out ... and so on. Then, to explain the use of these numbers in a real context, the teacher will give the student a series of mathematical problems, which they will solve together. In this way, the student will be able to identify the divisors of the numbers. To identify composite numbers, the teacher will briefly explain that unlike prime numbers, they can be divided by more numbers apart from themselves and 1.
End	
Activity (ies)	**3.** By way of conclusion and group evaluation, the teacher will use a virtual roulette, which will contain certain numbers. The idea is that when any number is selected, the teacher will look at his list of students and whoever that number corresponds to, must decipher if the number is part of the group of compounds or primes.

Materials and resources

VLO to use		**Description**
1	Mathematics VLO -prime and composite numbers https://mathematicsbilingualeducation.blogspot.com/	This VLO contains the tittle of the topic, the objective, the key words, the vocabulary, the English and Spanish version of the lesson plans, the theory, a video to reinforce the topic and finally the activities for the students about prime and composite numbers.
Other resources:		
Pencil, notebooks, eraser, sharpener, colored pencils		

Evaluation of the topic:
To evaluate this topic, the teacher will make an individual workshop about the prime and composite numbers.

Table 15 Lesson Plan N° 5 - Properties of multiplication.

Institution:	Instituto Técnico	**Headquarters:**	Centro Docente Rafael Tello	**Period**	1

Teacher:		**Grade:**	**Fifth**	**Week**	5
Subject:	Mathematics	**Date:**	D M YEAR	**Hourly Intensity**	2 hours

TOPIC: Operations with natural numbers.	
SUBTOPIC: Properties of multiplication.	
PROBLEM SITUATION: why the natural numbers are important in the students' life?	
WEEKLY OBJECTIVES:	
General: To identify the properties of multiplication.	
Specifics: • To solve problems which solution strategies require the properties of multiplication and division of natural numbers. • To identify in a context or situation the need of using multiplication and division to get an exact calculation.	
Competences:	**Vocabulary**
Numerical, interpretive and variational thinking	Commutative, associative and distributive properties, quotient, equal.
English Standards	
• The student follows carefully what the teacher and classmates say during a game or activity. • The student associates a drawing with their written description.	
Competences Standards	
• To resolve and formulate problems which solution strategies require the relationship and properties of natural numbers and their operations. • To use various calculation strategies to solve problems in additive and multiplicative situations.	
Approach:	**Method:**
Communicative and algorithmic approach	Audio visual and audio lingual.

CLASS DEVELOPMENT

Beginning	
Activity (ies)	**1.** To introduce the multiplication properties by using slides. **2.** In a worksheet some multiplication problems will be given, the students will have to analyze to which property they belong to and then they will have to solve them.
Middle	
Activity (ies)	**3.** In a previous class the student will be asked to bring different things related to food, could be junk food, healthy food, they will open a store and will buy once everyone buy something they will have to make a list and use the multiplication to know how much they spent, for example, 3 chocolates x 300= 900
End	
Activity (ies)	**4.** Finally the teacher will do a feedback exercise with examples of application to clarify doubts and strengthen the concepts developed in class.

Materials and resources

VLO to use		**Description**
1	Mathematics VLO –Properties of multiplication and division with natural numbers. https://mathematicsbilingualeducation.blogspot.com/	This VLO contains the tittle of the topic, the objective, the key words, the vocabulary, the English and Spanish version of the lesson plans, the theory, a video to reinforce the topic and finally the activities for the students about properties of multiplication and division with natural numbers.
Other resources:		
Worksheet, pencil, eraser		

Evaluation of the topic.
To develop the worksheet about multiplication properties

Table 16 Lesson N° 6 - Division of natural numbers.

Institution:	Instituto Técnico	**Headquarters:**	Centro Docente Rafael Tello	**Period**	1

Teacher:		**Grade:**	**Fifth**			**Week**	6
Subject:	Mathematics	**Date:**	D	M	YEAR	**Hourly Intensity**	2 hours

TOPIC: Operations with natural numbers.	
SUBTOPIC: Division of natural numbers.	
PROBLEM SITUATION: why the natural numbers are important in the students' life?	
WEEKLY OBJECTIVES:	
General: To learn about divisions with natural numbers.	
Specifics: • To solve problems which solution strategies require the properties of multiplication and division of natural numbers. • To identify in a context or situation the need of using multiplication and division to get an exact calculation.	
Competences:	**Vocabulary**
Numerical, interpretive and variational thinking	Division, dividend, divisor, remainder, quotient, equal.
English Standards	
• The student follows carefully what the teacher and classmates say during a game or activity. • The student associates a drawing with their written description.	
Competences Standards	
• To resolve and formulate problems which solution strategies require the relationship and properties of natural numbers and their operations. • To use various calculation strategies to solve problems in additive and multiplicative situations.	
Approach:	**Method:**
Communicative and algorithmic approach	Audio visual and audio lingual.

CLASS DEVELOPMENT

Beginning	
Activity (ies)	**1.** To make a review of multiplication and application exercises to practice this operation. **2.** A presentation of the topic will be done in order to know the terms of the division.
Middle	
Activity (ies)	**3.** It will be explained to them by means of examples of how to do divisions of one, two, and three figures to later do some practical exercises applying the division. **4.** Students will have some situations with a series of questions that they will have to solve through division.
End	
Activity (ies)	**5.** Then students will be taught the division with natural numbers, they will be taught when we can use this mathematical operation. **6.** In a worksheet they will be given some problems like "Ana bought 10 apples and each one cost $500 how much did the 10 apples cost? "Gabriel has 50 hens each one put 1 egg per day. How many eggs Gabriel collected in 3 days? Knowing that he has 6 children, how many eggs can Gabriel give to them each 3 days?

Materials and resources

VLO to use		Description
1	Mathematics VLO –Properties of multiplication and division with natural numbers. https://mathematicsbilingualeducation.blogspot.com/	This VLO contains the tittle of the topic, the objective, the key words, the vocabulary, the English and Spanish version of the lesson plans, the theory, a video to reinforce the topic and finally the activities for the students about properties of multiplication and division with natural numbers.
Other resources:		
Worksheet, pencil, eraser		

Evaluation of the topic.
To develop the worksheet about division

Table 17 Lesson Plan N° 7 - Fractions, and their terms.

Institution:	Instituto Técnico	**Headquarters:**	Centro Docente Rafael Tello	**Period**	2

Teacher:		**Grade:**	Fifth	**Week**	7
Subject:	Mathematics	**Date:**	D M YEAR	**Hourly Intensity**	2 hours

TOPIC: Fractions and their operations	
SUBTOPIC: Fractions, and their terms.	
PROBLEM SITUATION: What is the importance of the concept of fractions in the educational process and its relationship with its environment in daily life?	
WEEKLY OBJECTIVES:	
General: To compare and order fractional numbers through various interpretations, resources, and representations.	
Specifics: • To interpret fractions in different contexts: measurement situations, part-whole relationship, quotient, ratios, and proportions. • To identify in the context of a situation, the need for an exact or approximate calculation, and the reasonable of the results obtained.	
Competences:	**Vocabulary**
Numerical thinking	Fractions, numerator, denominator, and number line.
English Standards	
• The student reads, writes and represents halves or fourths as parts of a set using symbols, words, and models. • The student follows carefully what the teacher and classmates say during a game or activity. • The student associates a drawing with their written description.	
Competences Standards	
• To know the meaning of the fraction in everyday situation assess of fractions as a form of expression of quantities • To answer to short explanations based on the characteristics of fractional numbers.	
Approach:	**Method:**
Communicative and algorithmic approach	Audio visual and audio lingual.

CLASS DEVELOPMENT

Beginning	
Activity (ies)	**1.** The teacher will start with a brief review of the operations with natural numbers such as addition, subtraction, multiplication, and division, in order to prepare the students got develop the new topic (fractions) where these operations will be very present. **2.** Then, the teacher will address the terms of a fraction (numerator and denominator), in addition to learn what is its function as a mathematical operation and the types of fractions.
Middle	
Activity (ies)	**3.** On the other hand, the teacher will explain by means of examples how to locate a fraction on the number line paying attention to the numerator and the denominator given by the teacher. **4.** Later, the teacher will show an image with a pizza divided into 2/8 parts. Then he will locate that fraction on a number line explaining step by step how it should be done.
End	
Activity (ies)	**5.** Workshop: for this activity, students will have the fractions represented graphically. They must write the fraction they identify and then locate it on the number line. **6.** Conclusion: the teacher will give a final feedback with a final graphic representation of a fraction to clarify possible doubts and will assign the task for the next class.

Materials and resources

VLO to use		**Description**
1	Mathematics VLO –Fractions https://mathematicsbilingualeducation.blogspot.com/	This VLO contains the tittle of the topic, the objective, the key words, the vocabulary, the English and Spanish version of the lesson plans, the theory, a video to reinforce the topic and finally the activities for the students about fractions.
Other resources:		
Board, notebook, pencil, pen, flashcards.		

Evaluation of the topic.
To develop the workshop “Equivalent Fractions”

Table 18 Lesson Plan N° 8 - Equivalent fractions.

Institution:	Instituto Técnico	**Headquarters:**	Centro Docente Rafael Tello	**Period**	2

Teacher:		**Grade:**	Fifth	**Week**	8
Subject:	Mathematics	**Date:**	D M YEAR	**Hourly Intensity**	2 hours

TOPIC: Fractions and their operations	
SUBTOPIC: Equivalent fractions.	
PROBLEM SITUATION: What is the importance of the concept of fractions in the educational process and its relationship with its environment in daily life?	
WEEKLY OBJECTIVES:	
General: To compare and order fractional numbers through various interpretations, resources, and representations.	
Specifics: • To interpret fractions in different contexts: measurement situations, part-whole relationship, quotient, ratios, and proportions. • To identify in the context of a situation, the need for an exact or approximate calculation, and the reasonable of the results obtained.	
Competences:	**Vocabulary**
Numerical thinking	Fractions, numerator, denominator, and equivalent fractions.
English Standards	
• The student reads, writes and represents halves or fourths as parts of a set using symbols, words, and models. • The student follows carefully what the teacher and classmates say during a game or activity. • The student associates a drawing with their written description.	
Competences Standards	
• To know the meaning of the fraction in everyday situation assess of fractions as a form of expression of quantities • To answer to short explanations based on the characteristics of fractional numbers.	
Approach:	**Method:**
Communicative and algorithmic approach	Audio visual and audio lingual.

CLASS DEVELOPMENT

Beginning	
Activity (ies)	**1.** The teacher will begin with a brief review of fractions and their terms, and will also present a fraction graphically for students to identify the numerator and denominator. **2.** Then, the teacher will write three fractions on the board, and the students will have to locate them on the number line to finally give a short feedback with one of the examples.
Middle	
Activity (ies)	**3.** On the other hand, the teacher will explain what it is an equivalent fraction and how through multiplication and division, we can find fractions of this type. **4.** Later, the teacher will take some examples to deepen the explanation and will assign some short examples so that the students can put the topic into practice and then the teacher will make a review and clarify doubts.
End	
Activity (ies)	**5.** Workshop: for this activity, students will have the fractions represented graphically. They must write the fraction they identify and then locate it on the number line and find its equivalent fractions. **6.** Conclusion: the teacher will give a final feedback with a final graphic representation of a fraction to clarify possible doubts and will assign the task for the next class.

Materials and resources

VLO to use		**Description**
1	Mathematics VLO –Fractions https://mathematicsbilingualeducation.blogspot.com/	This VLO contains the tittle of the topic, the objective, the key words, the vocabulary, the English and Spanish version of the lesson plans, the theory, a video to reinforce the topic and finally the activities for the students about fractions.
Other resources:		
Board, notebook, pencil, pen, flashcards.		

Evaluation of the topic.
To develop the workshop “Equivalent Fractions”

Table 19 Lesson Plan N° 9 - Types of fractions.

Institution:	Instituto Técnico	**Headquarters:**	Centro Docente Rafael Tello	**Period**	2

Teacher:		**Grade:**	Fifth	**Week**	9
Subject:	Mathematics	**Date:**	D M YEAR	**Hourly Intensity**	2 hours

TOPIC: Fractions and their operations	
SUBTOPIC: Types of fractions.	
PROBLEM SITUATION: What is the importance of the concept of fractions in the educational process and its relationship with its environment in daily life?	
WEEKLY OBJECTIVES:	
General: To know the different types of fractions and their graphic representations.	
Specifics: • To identify types of fractions. • To compare and contrast different types of fractions. • To represent fractions on a number line.	
Competences:	**Vocabulary**
Numerical and variational thinking	Fractions, numerator, denominator, proper, improper and mixed fractions.
English Standards	
• The student reads, writes and represents halves or fourths as parts of a set using symbols, words, and models. • The student follows carefully what the teacher and classmates say during a game or activity. • The student associates a drawing with their written description.	
Competences Standards	
• To know the meaning of the fraction in everyday situations. • To assess the topic of fractions as a form of expression of quantities • To answer to short explanations based on the characteristics of fractional numbers.	
Approach:	**Method:**
Communicative and algorithmic approach	Audio visual and audio lingual.

CLASS DEVELOPMENT

Beginning	
Activity (ies)	**1.** The teacher will start with an ice breaker where each student must select the multiples of a number in the shortest possible time and without making mistakes: example the multiples of the number 3, and each student will quickly say a number that is a multiple of three. (the number can change at any time) **2.** Then, there will be a review of the previous topic, where the teacher will present several fractions graphically and the students must relate the fraction to the correct graphic representation, and they must also find their respective equivalent fractions by means of amplification.
Middle	
Activity (ies)	**3.** On the other hand, the teacher will introduce the topic, through a series of graphic representations to take into account each part of a fraction (numerator and denominator), and will also explain each of the three types of fractions (proper, improper, and mixed) through illustrations and short examples. Likewise, the steps to convert a mixed fraction into improper and vice versa will be studied. **4.** In the same way, the teacher will present some interpretation and analysis problems where the students must use the fractions to solve them. The purpose of the previous exercise is to clarify the doubts that can exist in the group.
End	
Activity (ies)	**5.** Through a workshop, students will have exercises related to the topic where they must use the types of fractions to find the solution to the problems raised. **6.** Conclusion: the teacher will give final feedback where the students will be able to answer some questions about the topic addressed in order to clarify doubts.

Materials and resources

VLO to use		**Description**
1	Mathematics VLO –types of fraction https://mathematicsbilingualeducation.blogspot.com/	This VLO contains the tittle of the topic, the objective, the key words, the vocabulary, the English and Spanish version of the lesson plans, the theory, a video to reinforce the topic and finally the activities for the students about types of fraction.
Other resources:		
Board, multiples flashcards, flashcards, math book, notebook, pencil, pen, colors.		

Evaluation of the topic.
• Develop the homework titled “types of fractions” for the next class.

Table 20 Lesson Plan N° 10 - Addition of homogeneous and heterogeneous fractions.

Institution:	Instituto Técnico	**Headquarters:**	Centro Docente Rafael Tello	**Period**	2

Teacher:		**Grade:**	Fifth	**Week**	10
Subject:	Mathematics	**Date:**	D M YEAR	**Hourly Intensity**	2 hours

TOPIC: Fractions and their operations	
SUBTOPIC: Addition of homogeneous and heterogeneous fractions.	
PROBLEM SITUATION: What is the importance of the concept of fractions in the educational process and its relationship with its environment in daily life?	
WEEKLY OBJECTIVES:	
General: To learn to add homogenous and heterogeneous fractions	
Specifics: • To know what homogeneous and heterogeneous fractions are. • To compare and contrast different types of fractions. • To add homogeneous and heterogeneous fractions.	
Competences:	**Vocabulary**
Numerical and variational thinking	Homogeneous and heterogeneous fractions, numerator, denominator, least common multiple, addition.
English Standards	
• The student identifies the names of the characters and the main events a story read by the teacher and supported in images, videos or any type of visual material. • The student looks for opportunities to use what they know in English • The student keeps a simple conversation in English with a partner when the teacher develop a classroom activity.	
Competences Standards	
• To assess of fractions as a form of expression of quantities. • To answer to short explanations based on the characteristics of fractional numbers	
Approach:	**Method:**
Communicative and algorithmic approach	Audio visual and audio lingual.

CLASS DEVELOPMENT

Beginning	
Activity (ies)	✓ The teacher will start with an ICE BREAKER named Simon Says… Math version! This game consists of students representing geometric shapes such as a triangle or circle using their body or answering questions such as how much is 2 + 2 or 3x7?, the teacher can increase the speed of the challenges to see if the students can keep up. ✓ Then, the teacher will make a review of the previous topic, where he will write three fractions and the students must classify them according to their type (mixed, proper or improper), they must also convert the mixed fraction to improper and vice versa.
Middle	
Activity (ies)	✓ On the other hand, the teacher will introduce the topic, starting with an explanation of what a homogeneous fraction is, to later explain how to add this type of fractions through several examples, and then give them two exercises for them to develop individually to clarify doubts. ✓ Then, we will work the definition of a heterogeneous fraction and explain the rules and steps to add this type of fractions through some examples using the least common multiple.
End	
Activity (ies)	✓ In the same way, through a workshop, students will have some exercises related to the topic where they must solve additions of the homogeneous and heterogeneous fractions, taking into account each of the steps explained by the teacher. ✓ Conclusion: the teacher will present some numbers, and the students will select what is the least common multiple of each given number.

Materials and resources

OVAs to use		Description
1	Mathematics VLO –Fractions https://mathematicsbilingualeducation.blogspot.com/	This VLO contains the title of the topic, the objective, the key words, the vocabulary, the English and Spanish version of the lesson plans, the theory, a video to reinforce the topic and finally the activities for the students about fractions.
Other resources:		
Board, math book, pen, pencil, flashcards, colors.		

Evaluation of the topic.
• Develop the homework titled "Addition of fractions" where there will be some practical exercises.

Table 21 Lesson Plan N° 11 - Subtraction of homogeneous and heterogeneous fractions.

Institution:	Instituto Técnico	**Headquarters:**	Centro Docente Rafael Tello	**Period**	2

Teacher:		**Grade:**	Fifth	**Week**	11
Subject:	Mathematics	**Date:**	D M YEAR	**Hourly Intensity**	2 hours

TOPIC: Fractions and their operations	
SUBTOPIC: Subtraction of homogeneous and heterogeneous fractions.	
PROBLEM SITUATION: What is the importance of the concept of fractions in the educational process and its relationship with its environment in daily life?	
WEEKLY OBJECTIVES:	
General: To learn to add homogenous and heterogeneous fractions	
Specifics: • To know what homogeneous and heterogeneous fractions are. • To compare and contrast different types of fractions. • To add homogeneous and heterogeneous fractions.	
Competences:	**Vocabulary**
Numerical and variational thinking	Homogeneous and heterogeneous fractions, numerator, denominator, least common multiple, addition.
English Standards	
• The student identifies the names of the characters and the main events of a story read by the teacher and supported in images, videos or any type of visual material. • The student looks for opportunities to use what they know in English • The student keeps a simple conversation in English with a partner when the teacher develops a classroom activity.	
Competences Standards	
• To assess of fractions as a form of expression of quantities. • To answer to short explanations based on the characteristics of fractional numbers	
Approach:	**Method:**
Communicative and algorithmic approach	Audio visual and audio lingual.

CLASS DEVELOPMENT

Beginning	
Activity (ies)	✓ The teacher will start with an ICE BREAKER named Simon Says… Math version! This game consists of students representing geometric shapes such as a triangle or circle using their body or answering questions such as how much is 2 + 2 or 3x7?, the teacher can increase the speed of the challenges to see if the students can keep up. ✓ Then, the teacher will make a review of the previous topic, where he will write three additions and the students must solve them according to the explanation given to the teacher.
Middle	
Activity (ies)	✓ On the other hand, the teacher makes a review of what is a homogeneous fraction, to later explain how to subtract this type of fractions through several examples, and then give them two exercises for them to develop. Individually to clarify doubts. ✓ Then, we will review the definition of a heterogeneous fraction and explain the rules and steps to restar this type of fractions through some examples using the least common multiple.
End	
Activity (ies)	✓ In the same way, through a workshop, students will have some exercises related to the topic where they must solve subtractions of the homogeneous and heterogeneous fractions, taking into account each of the steps explained by the teacher. ✓ Conclusion: the teacher will present some numbers, and the students will select what is the least common multiple of each given number.

Materials and resources

OVAs to use		Description
1	Mathematics VLO –Fractions https://mathematicsbilingualeducation.blogspot.com/	This VLO contains the title of the topic, the objective, the key words, the vocabulary, the English and Spanish version of the lesson plans, the theory, a video to reinforce the topic and finally the activities for the students about fractions.
Other resources:		
Board, notebook, pencil, pen, flashcards.		

Evaluation of the topic.
• Develop the homework titled "Subtraction of fractions" where there will be some practical exercises.

Table 22 Lesson Plan N° 12 - Multiplication and division of fractions.

Institution:	Instituto Técnico	**Headquarters:**	Centro Docente Rafael Tello	**Period**	2

Teacher:		**Grade:**	Fifth			**Week**	12
Subject:	Mathematics	**Date:**	D	M	YEAR	**Hourly Intensity**	2 hours

TOPIC: Fractions and their operations	
SUBTOPIC: Multiplication and division of fractions.	
PROBLEM SITUATION: What is the importance of the concept of fractions in the educational process and its relationship with its environment in daily life?	
WEEKLY OBJECTIVES:	
General: To learn to add and subtract homogenous and heterogeneous fractions	
Specifics: • To know the steps of doing a multiplication of a fraction. • To know the steps of doing a division of a fraction • To do exercises to apply multiplication and division of fractions.	
Competences:	**Vocabulary**
Numerical and variational thinking	Fractions, numerator, denominator, least common multiple, multiplication, division.
English Standards	
• The student reads, writes and represents halves or fourths as parts of a set using symbols, words, and models. • The student follows carefully what the teacher and classmates say during a game or activity. • The student associates a drawing with their written description.	
Competences Standards	
• To know the meaning of the fraction in everyday situations. • To assess the topic of fractions as a form of expression of quantities • To answer to short explanations based on the characteristics of fractional numbers.	
Approach:	**Method:**
Communicative and algorithmic approach	Audio visual and audio lingual.

CLASS DEVELOPMENT

Beginning	
Activity (ies)	✓ The teacher will start with an ice breaker where students will have one or two figures with the measurements of their sides, they must quickly (without using pencil and paper) find the perimeter of both figures in the shortest time possible. The first three who solve the exercise without making any mistake will be the winners. ✓ Then, the teacher will review multiplication and division (operations necessary to advance to the next topic). The teacher will give them a sheet of two 4 operations where students will solve 4 mathematical problems.
Middle	
Activity (ies)	✓ Later, the teacher will explain the process to multiply fractions, for developing some exemplification exercises to reinforce the explanation. ✓ In the same way, the teacher explains the steps to solve division of fractions which will be presented through examples and which will be developed with the help of the teacher.
End	
Activity (ies)	✓ Workshop: the students will have a short workshop where there will be some practical exercises, which will be developed in pairs, and taking into account the examples given by the teacher. ✓ Finally, the teacher will make a feedback to clarify doubts and assign the task

Materials and resources

VLO to use		**Description**
1	Mathematics VLO –Multiplication and division of fractions. https://mathematicsbilingualeducation.blogspot.com/	This VLO contains the tittle of the topic, the objective, the key words, the vocabulary, the English and Spanish version of the lesson plans, the theory, a video to reinforce the topic and finally the activities for the students about multiplication and division of fractions.
Other resources:		
Board, colors, pen, pencil, math book, flashcards.		

Evaluation of the topic.
Solve the homework titled "multiplication and division of fractions" which will have practical exercises to be developed at home

5.3.3. Design of Virtual Learning Objects (VLOs)

Subsequently, taking into account the lesson plans done for every session, it was preceded to the elaboration of a document which was named as “Format for the design of the videos” **(Tables N° 23 to 40).** In this document, each video was designed for both subjects (Natural Sciences and Mathematics). In order to design the videos, the lesson plans were taken into consideration as they are divided into three parts (Beginning, middle, end). The researchers just focused on the second part of the class development (middle) since on this part, teachers present and explain the topic proposed for that session. It is worth noting that the videos are tools to complement the presentation of the topic.

The structure of the format for the design of the videos is divided into four parts. The first part contains the general information such as title of the video, designer’s name, and name of the degree project advisor, type of technological tools, subject, approach, competences, institution, headquarters and course. The second part is the content which includes the following sections: topic, subtopic, objective, problem situation, vocabulary and theories and concepts.

The third part has the procedure that is divided into three parts: introduction, where there is a short presentation of the topic. In some cases, there will be a review of a previous topic that is needed to address the new one, then it has the develop where there is a brief explanation through short and didactic examples, finally the last part (end) where there is a summary of the topic and some practice exercises for students to work in class. The format design of the videos end with the fourth part that includes: the references where researchers added the bibliographic references of the theories and concepts taken to address each topic.

Later, the researchers designed a series of interactive activities in the Educaplay and liveworksheets (which are web platforms that allow teachers to create and share different types of multimedia educational activities for free) at the end of each topic; they are: word searches, crossword puzzles, matching words and/or images, among others; therefore, they could serve as a form of application evaluation of the knowledge acquired during each class. These activities are also available in printed version **(Appendix, D)**, so that the teacher can always have the facility to work in different spaces, according to the needs of both the institution and the students.

Finally, the researchers created two VLO-blogs (In Blogger which is a web platform offered by Google in which people can publish online contents), one for natural sciences and another for mathematics **(Appendix, E)** in order to put all the information of each topic. The structure for both is the same. They contain the number of the lesson, the title of the topic, the objective, the key words, the vocabulary, the lesson plans in English and Spanish version, the theory, (which is the same information taken to make the videos but it was expanded with more images, illustrations, and examples), the video (they were previously created) and the activities. **(Appendix, F)**

It is necessary to clarify that the creation of the VLOs it was all a new experience since none of the researchers had a previous and deep knowledge about virtual platforms management ,but also, it was interesting and exciting because the researchers had to investigate in depth about the distinct virtual programs and web platforms regarding their advantages, dynamism, reusability, innovation, ease of interaction and access to gather up the creativity in the development of each topic, in order to create an interactive material that students enjoy while learning.

Table 23 – Design N° 1 "Addition and subtraction of natural numbers"

Bilingual Education Proposal supported by the design of Virtual Learning Objects (VLO)

Format for the design of the videos

General Information

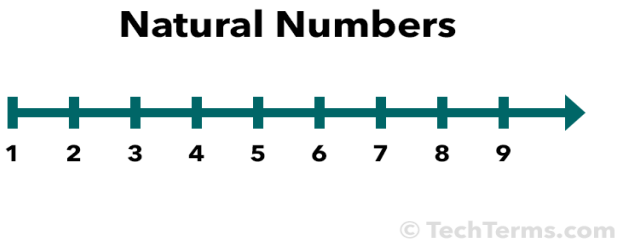
Tittle	Operations with natural numbers
Designed by:	Carolina Córdoba Alvear Yineth Lorena Gaón Mosquera Natalia Mulcue Hurtado Juan Pablo Lara Cuetia Lizeth Ramos Viafara
Adviser:	Mg. Adriana Idrobo Hurtado
Type of technological tools:	Images, Animaker
Subject:	Mathematics
Approach:	Communicative and algorithmic approach
Competences	Numerical Thinking
Institution:	Institución Educativa Instituto Técnico Sede Centro Docente Rafael Tello.
Course:	Fifth

Content

Topic:	Operations with numbers
Subtopic:	Addition and subtraction of natural numbers
Objective:	To recognize and use natural numbers to solve mathematical operations in everyday life.
Problem situation:	Why are natural numbers important in the student's life?
Vocabulary:	Natural numbers, addition, addends, product subtraction, infinite numbers, minuend, subtracted ,difference, number line
Theories and concepts:	**Natural number** is a part of the number system which includes all the positive integers from 1 till infinity and is also used for counting purpose. It does not include zero (0). **Subtraction** is to subtract; it means to take away a number of things from a group. When we subtract, the number of things in the group reduce or become less. **Minuend** is the first number in a subtraction sentence. We subtract subtrahend from the minuend to get the difference **Subtrahend** is the second number in a subtraction sentence. It is subtracted from the minuend to get the difference. **Difference** The result when one number is deducted from another

	Addition is taking two or more numbers and adding them together, that is, it is the total sum of 2 or more numbers **Addends** can be defined as the numbers or terms added together to form the sum. **Product** The result of two or more numbers when multiplied together

Procedure

Introduction:	Operations with natural natural numbers Addition and subtraction Hi guys, today we are going to learn the addition and subtract with natural numbers. First, I will define what a natural number is Then, I would explain addition and subtract with natural numbers and finally, we will do some exercise. Ok, Let's stars **The natural number is** a part of the number system which includes all the positive numbers from 1 to infinity and are also used for counting. It does not include zero (0). As we know already, natural numbers start with 1 to infinity and are positive numbers. But when we combine 0 with a positive number such as 10, 20, etc. it becomes a natural number. This is the number line where we find the first natural numbers  **Image 1 – Number Line** The addition of two or more natural numbers will always give a natural number as result. In the case of **subtraction of natural numbers, we do not always find a natural number as a result,** Addition Speaking about the addition with this number is very important to know, what addition is and its parts. The parts of the addition are addends are the numbers that we use to

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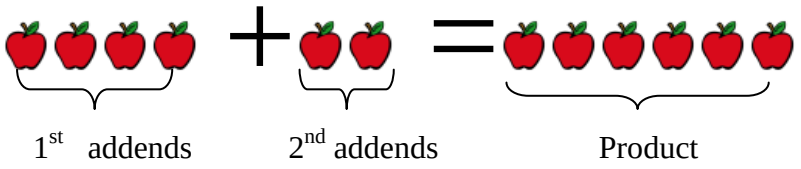
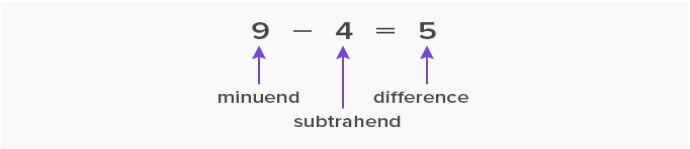
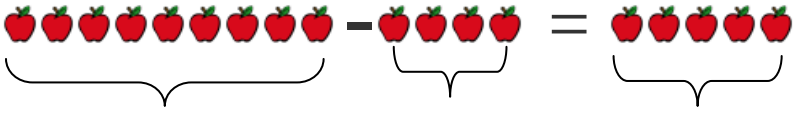
	make the sum, it is to say that the number than we sum And the product is the result of the sum. Well, addition is taking two or more numbers and adding them together, that is, it is the total sum of 2 or more numbers When we add things is the same process the first contend is the first addend and the second content is the second addend symbol 4 → 1st addends plus ← + 2 → 2nd addends 6 → Product  1st addends 2nd addends Product The subtraction, to subtract means to take away from a group or a number of things. When we subtract, the number of things in the group reduce or become less. The parts of the subtract are the minuend, subtracted and the difference  **Image 2 – Parts of the subtraction**  minuend subtrahend difference
Examples:	• **Addition:** • 1 + 2 = 3 • 3 + 4 = 7

	• 10 + 6= 16 • • **Subtraction:** • 10 – 5 = 5 • 5 – 3= 2 • 10 –7 = 3
Summary:	In conclusion All numbers are not natural numbers. The number 0 does not belong to the natural numbers. The numbers ending in 0 without are natural numbers Ok guys, see you later Bye bye **Extra exercises** **1.** Sort out the natural numbers from the following list: • 20, 1555, 63,99, 5/2, 6.0, −78, 0, −2, −3/2 **2.** What are the first 10 natural numbers? **3.** Is the number 0 a natural number?
References	https://byjus.com/maths/natural-numbers/ https://techterms.com/img/lg/natural_number_1335.png https://cdn-skill.splashmath.com/panel-uploads/GlossaryTerm/fb0f753567e24b299630db777997faf0/1561224608_subtrahend.png

Table 24 – Design N° 2 "Properties of addition"

Bilingual Education Proposal supported by the design of Virtual Learning Objects (VLO)

Format for the design of the videos

General Information

Title:	Properties of addition
Designed by:	Carolina Córdoba Alvear Yineth Lorena Gaón Mosquera Natalia Mulcué Hurtado Juan Pablo Lara Cuetia Lizeth Ramos Viáfara
Adviser:	Mg. Adriana Idrobo Hurtado
Type of technological tools:	Filmora and Canva
Subject:	Mathematics
Approach:	Communicative and algorithmic approach
Competences	Numerical thinking
Institution:	Institución Educativa Instituto Técnico sede Centro Docente Rafael Tello.
Course:	Fifth

Content

Topic:	Natural Operations
Subtopic:	Properties of addition
Objective:	To compare and order fractional numbers through various interpretations, resources and representation.
Problem situation:	Why are natural numbers important in a student's life?
Vocabulary:	Number, addition, commutative property, associative, element neutral.
Theories and concepts:	**Number:** A number is a mathematical concept that expresses quantity. **Addition:** It consists of combining or adding two or more numbers to obtain a final or total quantity. **Commutative:** The order of the addends does not change the sum**.** **Associative:** The way of grouping the addends does not change the result. **Element neutral:** 0 is the neutral element of addition because every number added to it gives the same number.

Procedure

Introduction:	Hello guys! and welcome. Today is mathematics session; I hope you be very active. The topic of today is the properties of addition. In this class, I will explain what properties of addition are.

	Well, the sum has three properties: commutative, associative and element neutral. **The commutative property** is when we add two numbers and the result is the same regardless of the order of the addends. For example, if we add 6 + 4 what is the result, guys? Of course 10. And if we add 4+ 6. What is the result? Yes, it is 10 too. This is called the commutative property. The next property is… **the associative property.** Sometimes we must add three numbers or more. If we must do the sum 9 + 4 + 6, the associative property assures us that we can perform this operation in two different ways obtaining the same result, let's see: One of the ways is the following: (9 + 4) + 6. In this case, the parentheses tell us that we must add the numbers first: (9 + 4), then the result of this sum is operated with the third number, 13 +6. Here we see the sum in this way 9 + 4 + 6 = (9 + 4) +6 = 13 + 6 = 19 The other way is like this: 9 + (4 + 6) Now the parentheses tell us that we must first do the sum (4 + 6), once this is done we can add the first number with the result obtained in the parentheses: 9 + 10. Here we can see the complete operation 9 + 4 + 6 = 9 + (4 + 6) = 9 + 10 = 19 The last property is **the element neutral property**, this is the sum of any number and zero is equal to the original number. For example 5 + 0 equal = 5.
Examples:	Now to understand better this topic, we are going to do some examples. We are going to practice the properties of addition through a daily situation. An example like the preparation of the backpack for school.

To start the game, we look for an empty backpack and open it. First, we put 3 large notebooks and then 6 small notebooks.

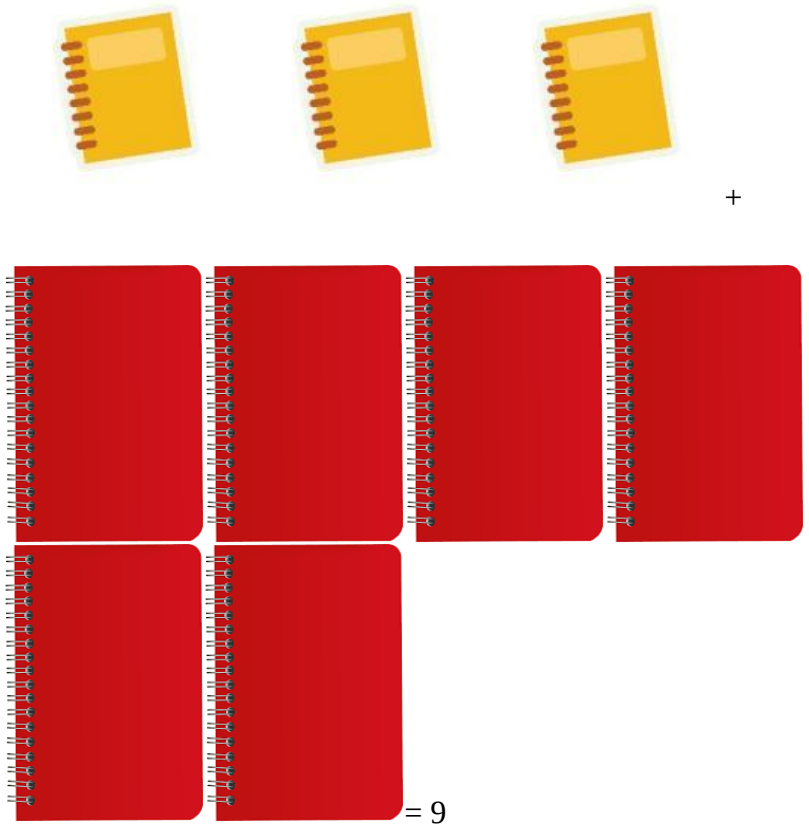


Image 3 – Properties of addition

How many notebooks are in the backpack?
To solve this question, we have to add the large notebooks plus the number of small notebooks.
Would there still be 9 notebooks in the backpack if we had put the small notebooks first and then the large ones? Yes! The result of the add will be the same, because you can reverse the terms in a sum left-to-right, and the result will be the same. So, what property is this? Yes! (COMMUTATIVE PROPERTY)

Now, we are going to put in practice the second addition property, ok, you are going to put 3 green pencils, 8 yellow pencils and 2 blue pencils inside the bag.

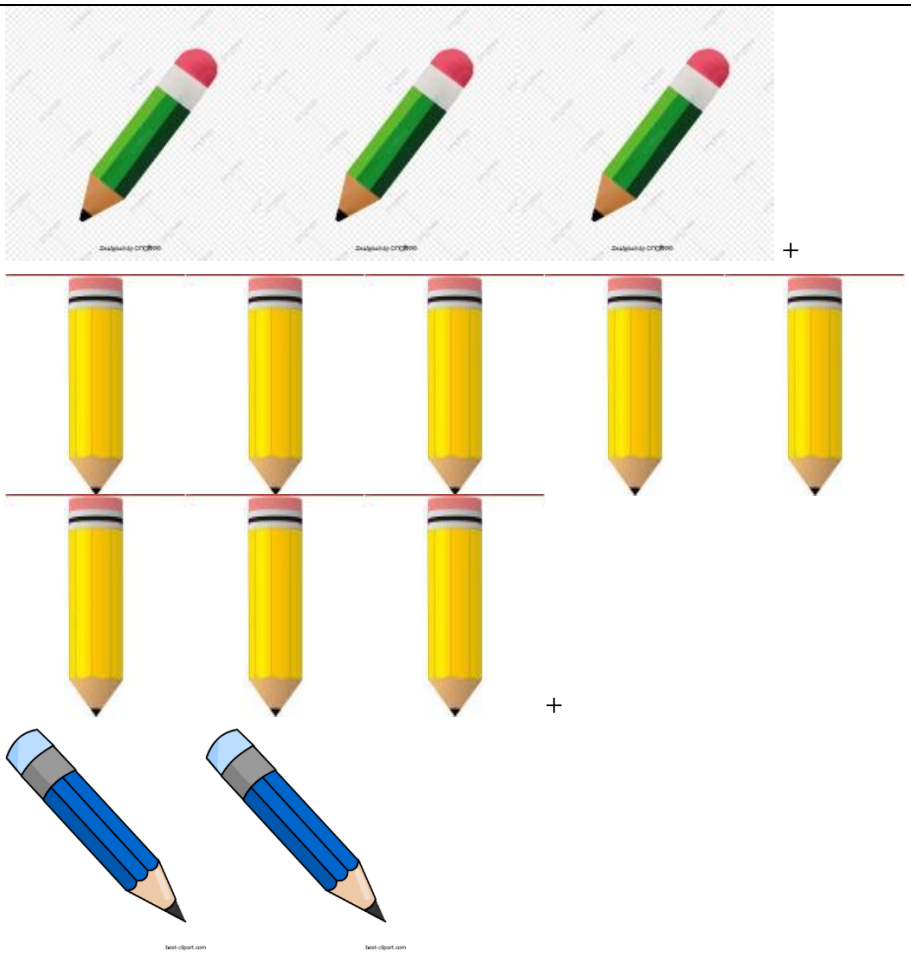


Image 4 – Properties of addition

The question will be how many pencils are in the case?
To find out how many there are. You must add 3 + 8 + 2 =
How this sum is solved, guys?

We can add three plus eight first and adding two to the result
(3 + 8) + 2 =

Or adding eight plus two first and adding three to the result
3 + (8 + 2)

In these operations, the two ways and the result will be the same. When we have three or more addends, it is possible to start by adding the first two numbers and to the result add the third, or vice versa, start by adding the second and the third and to the result add the first.

	This is the second of the properties of the sum and we know it as ASSOCIATIVE PROPERTY. Well, the next example is about the element neutral property. Let´s practice! We are going to do an exercise; we put 4 chocolate cookies and 0 oatmeal cookies in our backpack.  **+ 0 oatmeal cookies** **Image 5 – Neutral element, example.** We do not have oatmeal cookies! How many cookies are there in total in the backpack? There are 4 cookies in the backpack. The sum of any number plus zero (0) equal the same number. Therefore, zero (0) is the NEUTRAL ELEMENT of the sum.
Summary:	**Remember:** ✓ If we add two numbers, the result is the same regardless of the order of the addends. (Commutative property) ✓ If we add three or more numbers, the result is the same regardless of the order in which we add the addends. (associative property) ✓ The sum of any number and zero is equal to the original number. (Element neutral property) That's all for today I hope it has helped you to better understand the properties of addition. Go ahead and put everything you have learned into practice!
References	http://www.aaamath.com/pro74ax2.htm https://classace.io/learn/math/3rdgrade/properties-of-addition https://www.google.com/search?q=chocolate+cookies+animated&tbm=isch&ved=2ahUKEwi4gZ2q2fHuAhWHpp4KHbQbAh0Q2-cCegQIABAA&oq=chocolate+cookies+animated&gs_lcp=CgNpbWcQDDIGCAAQCBAeMgYIABAIEB4yBggAEAgQHjIGCAAQCBAeOgQ

	IABBDOgIIADoGCAAQBxAeUOn-N1jkgTlgypE5aAJwAHgBgAHWEYgBwrwBkgEKNi0xMC4zLjIuNJgBAKABAaoBC2d3cy13aXotaW1nwAEB&sclient=img&ei=ZHQtYLi_MYfN-gS0t4joAQ&safe=strict#imgrc=a3bbdyV-N8ijtM https://www.google.com/url?sa=i&url=https%3A%2F%2Ftwitter.com%2Fkidahateam%2Fstatus%2F970699859048067072%3Flang%3Dgl&psig=AOvVaw3vEskkKNJUgG7XdOfmPNUe&ust=1613678052811000&source=images&cd=vfe&ved=0CAIQjRxqFwoTCKjm_6Xe8e4CFQAAAAAdAAAAABAD https://www.google.com/url?sa=i&url=http%3A%2F%2Fclipart-library.com%2Fyellow-pencil-cliparts.html&psig=AOvVaw30y4w5rPTJk2LWMesG1opK&ust=1613677913612000&source=images&cd=vfe&ved=0CAIQjRxqFwoTCIDcprze8e4CFQAAAAAdAAAAABAD https://www.google.com/url?sa=i&url=https%3A%2F%2Fpngtree.com%2Ffreepng%2Fhand-painted-cartoon-green-pencil_4183204.html&psig=AOvVaw1xR2Z7RdOb8rlBfPKQVL9A&ust=1613679661627000&source=images&cd=vfe&ved=0CAIQjRxqFwoTCKDXwbTf8e4CFQAAAAAdAAAAABAD https://www.google.com/url?sa=i&url=http%3A%2F%2Fclipart-library.com%2Ffree%2Fpencil-clipart-transparent-background.html&psig=AOvVaw1Ryp-Fzjt7oIQC_bRKg-pq&ust=1613679742384000&source=images&cd=vfe&ved=0CAIQjRxqFwoTCLjO_Njf8e4CFQAAAAAdAAAAABAD https://www.google.com/url?sa=i&url=https%3A%2F%2Fgallery.yopriceville.com%2FFree-Clipart-Pictures%2FSchool-Clipart%2FRed_Notebook_PNG_Clip_Art_Image&psig=AOvVaw0LrtYvzlTYkFii_TUN2nzS&ust=1613681818293000&source=images&cd=vfe&ved=0CAIQjRxqFwoTCNjwt63n8e4CFQAAAAAdAAAAABAE

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Table 25 – Design N° 3 "Properties of subtraction"

Bilingual Education Proposal supported by the design of Virtual Learning Objects (VLO)

Format for the design of the videos

General Information

Title:	Properties of subtraction
Designed by:	Carolina Córdoba Alvear Yineth Lorena Gaón Mosquera Natalia Mulcué Hurtado Juan Pablo Lara Cuetia Lizeth Ramos Viáfara
Adviser:	Mg. Adriana Idrobo Hurtado
Type of technological tools:	Filmora and Canva
Subject:	Mathematics
Approach:	Communicative and algorithmic approach
Competences	Numerical thinking
Institution:	Institución Educativa Instituto Técnico sede Centro Docente Rafael Tello.
Course:	Fifth

Content

Topic:	Natural Operations
Subtopic:	Properties of subtraction
Objective:	To know and learn about properties of subtraction. To recognize and apply the properties of subtraction.
Problem situation:	Why are natural numbers important in a student's life?
Vocabulary:	Number, subtraction, minuend, subtrahend, difference, operations.
Theories and concepts:	**Number:** A number is a mathematical concept that expresses quantity. **Subtraction:** subtraction is an operation that consists of reducing or separating something from a whole. **Minuend:** The minuend, in a subtraction, is the first of the two numbers involved and is the quantity from which another must be subtracted. **Difference:** The difference is the result of the subtraction. **Operations:** A mathematical process. The most common are addition, subtraction, multiplication and division.

Procedure

Introduction:	Hello guys! And welcome. Today is mathematics session; I hope you be very active. The topic of today is the properties of subtraction. In this class, I will explain what properties subtraction are Well, to start talking about this topic it is important to know that properties of subtraction as well as addition, subtraction has special characteristics that will be of great help. Let's see what they consist of: Subtraction is NOT commutative: This means that we CANNOT change the position of the minuend with the subtrahend, because we would have a different answer. Subtraction is NOT associative: By NOT being able to exchange the value of the minuend with the subtrahend, we cannot associate the values in a subtraction. Now, subtraction has fundamental properties, but first we are going to distinguish the terms of subtraction. **9 ⟶ Minuend** **-** **3 ⟶ Subtrahend** **6 ⟶ Difference** Well, the minuend is the number with the greatest quantity. The subtrahend is the digit or number that we are going to subtract. Finally, we have the difference that is the result of the operation, in this case the subtraction. Now guys, we already know the terms of subtraction and we know how to differentiate them, we are going to talk about the properties of subtraction. The first property is: **SUBTRAHEND + DIFFERENCE + MINUEND**

8 ⟶ Minuend
-
3 ⟶ Subtrahend
5 ⟶ Difference

If we want to know if this operation has been done correctly with this property, we are going to take the terms of the subtraction and perform the addition. Subtrahend plus difference equal minuend Let's check!

3 ⟶ Subtrahend
+
5 ⟶ Difference
8 ⟶ Minuend

The second one is:

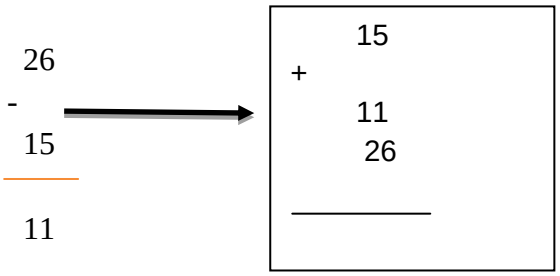
MINUEND - DIFFRENCE - SUBTRAHEND

Now we are going to see the second property that tells us that the minuend less difference is equal to subtrahend

8 ⟶ Minuend
-
3 ⟶ Subtrahend
5 ⟶ Difference

Now we are going to look at subtraction and its terms. Then, we take the terms of the minuend and the difference and do the subtraction.

8 ⟶ Minuend
-
5 ⟶ Difference
3 ⟶ Subtrahend

	We can see that the result is the subtrahend. The third property is: **Neutral element** This property tells us that the subtraction of any number and zero (0) equal the same number. So **11 - 0 = 11.**
Examples:	To understand better this topic, I have an example and some exercises, which you have to resolve. Let's practice the first property • **1 SUBTRAHEND + DIFFERENCE + MINUEND** Remember, if we add the subtrahend with the difference, the result will be the minuend. Let's see an example  Now, it is your turn! 16 - 12

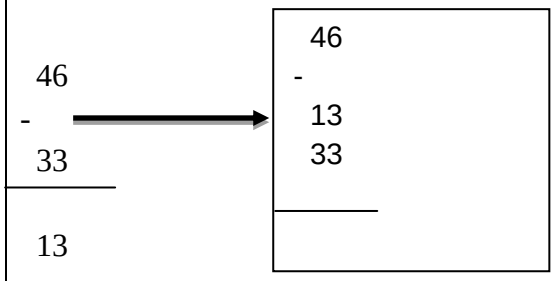
34
-
22

52
-
20

Now, let's practice the second property
MINUEND - DIFFERENCE - SUBTRAHEND

Remember if we less the minuend with the difference, the result will be the subtrahend

Let's see an example



Now, solve these exercises!

18
-
12

50
-
30

68
-

	36 — Finally, I have a simple example of the third property Remember, if the neutral element of the subtraction is the number zero (0), any number less 0 will give the same number. 28 - 0 — 28 Now, you can practice the following exercises at home 38 - 0 — 49 - 0 — 26 - 0 —
Summary:	**Remember:** Remember guys! Don't forget to use the properties of subtraction to check if an operation is done correctly. Thank you so much for your attention and see you in the next session. Bye-bye.
References:	https://www.math-only-math.com/Properties-of-Subtraction.html https://www.splashlearn.com/math-vocabulary/subtraction/subtract#:~:text=The%20minuend%2C%20subtrahend%20and%20difference,number%204%20is%20the%20difference.

Table 26 – Design N° 4 "Prime and Composite numbers"

Bilingual Education Proposal supported by the design of Virtual Learning Objects (VLO)

Format for the design of the videos

General Information

Title:	Prime and composite numbers
Designed by:	Carolina Córdoba Alvear Yineth Lorena Gaón Mosquera Natalia Mulcué Hurtado Juan Pablo Lara Cuetia Lizeth Ramos Viáfara
Adviser:	Mg. Adriana Idrobo Hurtado
Type of technological tools:	Genially (interactive image) and Animatron Pro
Subject:	Mathematics
Approach:	Communicative and algorithmic approach
Competences	Numerical thinking
Institution:	Institución Educativa Instituto Técnico sede Centro Docente Rafael Tello.
Course:	Fifth

Content

Topic:	Natural numbers
Subtopic:	Prime and composite numbers
Objective:	To learn the importance of prime and composite numbers
Problem situation:	Why are natural numbers important in the student's life?
Vocabulary:	Prime numbers, natural numbers, composite numbers
Theories and concepts:	**Prime numbers** are those that have 2 divisors, the same number and the unit. **Composite numbers** are those that have 3 or more divisors. Natural numbers. **Multiplication tables**: A multiplication table is a list of the multiplications of numbers between one and twelve. **Natural numbers** are a part of the number system which includes all the positive integers from 1 till infinity and are also used for counting purpose. It does not include zero (0). In fact, 1, 2, 3, 4, 5, 6, 7, 8, 9…., are also called counting numbers.

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Procedure

Introduction:	Hi guys! Welcome to your math class. Today, we're going to talk about "Prime and composite numbers ". In this class, I will explain you each type: Prime and composite. We have to know that the **Prime numbers** are those that have 2 divisors, the same number and the unit and the **Composite numbers** are those that have 3 or more divisors. And the **Natural numbers** are all the numbers; except the number 0. Since 1 until infinite…
Examples:	**To understand it let's do it the next examples:** **Prime numbers:** they can be… **2, 3, 5, 7, 9, 11, 13, 17, 19, 21…** **ATTENTION!** **We don't include the number 1 because it divides itself just in the Multiplication table number 1.** How to identify the **prime numbers**? By using the **multiplication tables** **For example:** • we can find the number **2** in the **table 1** and **2**

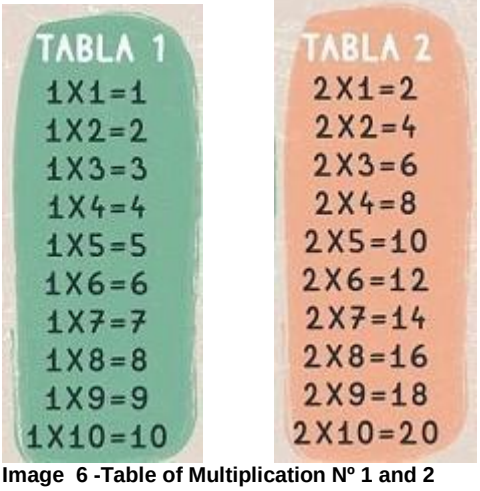

Image 6 -Table of Multiplication Nº 1 and 2

1 x 2 =2 **2 x 1 = 2**

- We can find the **9** in the **table 1** and **9**

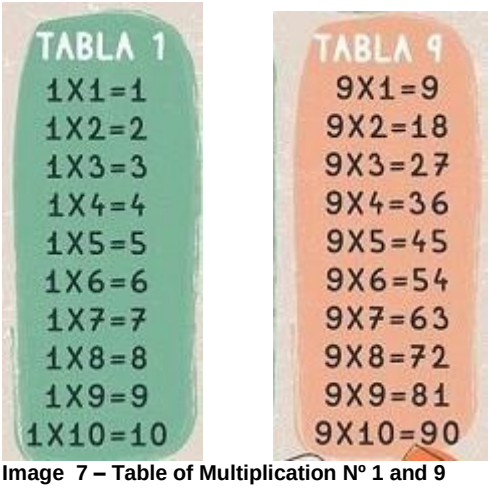

Image 7 – Table of Multiplication Nº 1 and 9

1 x 9 = 9 **9 x 1 = 9**

Composite numbers: they can be…

4, 6, 8, 10, 12, 14, 15, 16, 18, 20…

How to identify the **composite numbers**?
By using the **multiplication tables**
For example:

<table>
<tr>
<td></td>
<td>

We can find the number 6 in the table 1, 2, 3, and 6

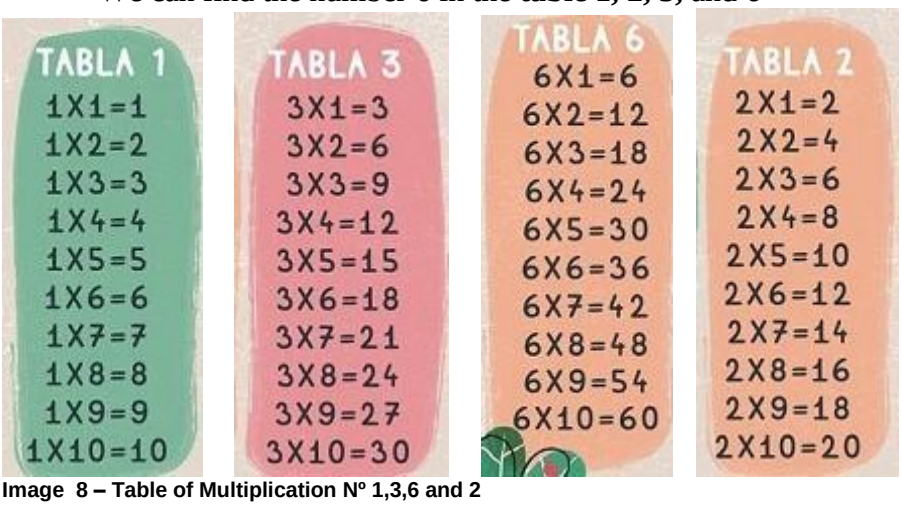

Image 8 – Table of Multiplication Nº 1,3,6 and 2
1 x 6 = 6 3 x 2 = 6 6 x 1 = 6 2 x 3 = 6

We can find the number 15 in the table 1, 3, 5 and 15

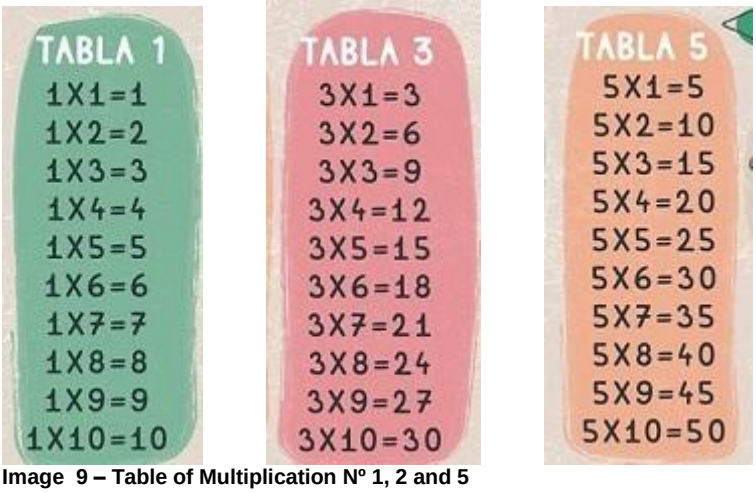

Image 9 – Table of Multiplication Nº 1, 2 and 5
1 x 15 = 15 3 x 5 = 15 5 x 3 =15
15 x 1=15
</td>
</tr>
<tr>
<td>Summary:</td>
<td>To conclude, don’t forget that…

…the Prime numbers are those that have 2 divisors, the same number and the unit and the Composite numbers are those that have 3 or more divisors. And the Natural numbers are all the numbers. And the easier way to identify it is checking the multiplication tables.

Activity 1
Let’s identify the prime numbers with the next DIY (do it yourself)! Take a paper and write the multiplication tables from the table 1 to the</td>
</tr>
</table>

table 12; then, circle with a colored pencil all the prime numbers and with a different colored pencil circle the composite numbers. Be sure to select your favorite colors before starting with the activity. This activity facilitates you, not only to identify the prime and composite numbers, but also to learn the multiplication tables.

Activity 2

Point out the prime numbers in the next table of numbers, taking into account the multiplication tables. The idea is that you try to remember the multiplication tables and identify both, composite and prime numbers.

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

Image 10 – Multiplication Tables

You can do either of these activities! These activities facilitate you not only to identify the prime and composite numbers, but also to learn the multiplication tables.

I hope that you have understood this topic.
See you soon!

References

https://www.collinsdictionary.com/dictionary/english/multiplication-table
https://www.youtube.com/watch?v=MDTTSwkY79c&t=26s
https://byjus.com/maths/natural-numbers/
https://www.collinsdictionary.com/dictionary/english/multiplication-table
https://www.youtube.com/watch?v=MDTTSwkY79c&t=26s
https://byjus.com/maths/natural-numbers/
https://png.pngtree.com/thumb_back/fw800/background/20200530/pngtree-cute-hand-drawn-style-mathematics-education-pink-background-image_337359.jpg
Psd de Fondo creado por freepik - www.freepik.es

	https://www.freepik.com/premium-photo/colourful-math-numbers-with-compass-ruler-top-view_6625065.htm https://www.freepik.com/premium-photo/colourful-numbers-white-copy-space-background_6621901.htm https://www.tuexperto.com/wp-content/uploads/2017/11/tablas-multiplicar.jpg https://1.bp.blogspot.com/-x25GMEIExPs/WO4tHw-4tlI/AAAAAAAAIFY/Idnivi92WuoYaJeg3R1o75xwW2AM2Aa9QCLcB/s1600/TABLA%2B100.jpg https://media.giphy.com/media/UTY86vQCvsehK5Wjp2/giphy.gif https://media.giphy.com/media/YqQ3SQzAuag3fX8EN3/giphy.gif https://media.giphy.com/media/VDNQ900gSbkldEGERS/giphy.gif https://media.giphy.com/media/MYDPwMZHP4v6UAaspu/giphy.gif https://www.ilikesticker.com/LineStickerAnimation/S0006297-Mochi-Mochi-Peach-Cat-Friend-2/en https://media.giphy.com/media/co5qzx0xT7i2bEFQm4/giphy.gif

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Table 27 – Design N° 5 "Properties of Multiplication"

Bilingual Education Proposal supported by the design of Virtual Learning Objects (VLO)

Format for the design of the videos

General Information

Title:	Properties of Multiplication.
Designed by:	Carolina Córdoba Alvear Yineth Lorena Gaón Mosquera Natalia Mulcué Hurtado Juan Pablo Lara Cuetia Lizeth Ramos Viáfara
Adviser:	Mg. Adriana Idrobo Hurtado
Type of technological tools:	Power Point, bitmoji
Subject:	Mathematics
Approach:	Communicative and algorithmic approach
Competences	Numerical thinking
Institution:	Institución Educativa Instituto Técnico sede Centro Docente Rafael Tello.
Course:	Fifth

Content

Topic:	Operations with natural numbers.
Subtopic:	Properties of multiplication.
Objective:	To identify the properties of multiplication of natural numbers
Problem situation:	Why are natural numbers important in the student's life?
Vocabulary:	Commutative, associative, and distributive property.
Theories and concepts:	**Multiplication:** Multiplication, one of the four basic operations of arithmetic, gives the result of combining groups of equal sizes. **Properties of multiplication** **Distributive property:** The distributive property of multiplication states that when a number is multiplied by the sum of two numbers, the first number can be distributed to both of those numbers and multiplied by each of them separately, then adding the two products together for the same result as multiplying the first number by the sum. **Commutative property:** The order of the factors does not change the product. **Associative property:** The mode of grouping the factors does not change the result of multiplication.

Procedure

Introduction:	Welcome to the world of mathematics. Today we're going to learn about "the multiplication properties". The multiplication properties are: Associative, distributive and commutative property. But, before beginning let's see what multiplication is. It the process of calculating the total of one number multiplied by another. Example: 4 x 2 = 8 is that same of write 2 + 2 + 2 + 2 = 8 Multiplication has the following parts: (X) is the symbol 4 x 2 = 8 ⟶ (8) is the product or result. (4) and (2) are factors. With this short review, let's start talking about the multiplication properties.
Examples:	The first one is **A. Distributive property** It's the multiplication of a number by a sum which is equal to the sum of the multiplication of this number by each one of the amounts to be added. Let' see this example: 2 X (3 + 5) 2 X 8 **16** we'll solve (3 + 5) which is equal to 8. Then, we take 2 X and add the result of addition and the multiplication will be: 2 X 8 = 16. Or you can make first the multiplication and then the sum: 2 X (3 + 5) 2 X 3 + 2 X 5 **6 + 10** **16**

	B. Commutative property. In this multiplication, the order of the factors doesn't change the product. Let's see this example: Factors Factors **10** X **3** = **3** X **10** **30** = **30** Products. Pay attention, the result of multiplying 10 X 3 will be equal to the multiplication 3 X 10; in that case will be 30 **C. Associative property.** It's the mode of grouping the factors without change the result of the multiplication. Let's see this example: (3 X 2) X 5 = 3 X (2 X 5) First, we solve the operations that are in parentheses. 6 X 5 = 3 X 10 Then, take the result and multiplying to the other factor. **30 = 30** Finally, we obtain the same result in both operations.
Summary:	**Remember: Distributive property:** The multiplication of a number by a sum is equal to the sum of the multiplications of this number multiplied by each one of the amounts to be added. 3 X (4 + 2) or 3 X (4 + 2) = 3 X 4 + 3 X 2 3 X 6 = 12 + 6 **18** = **18**

	Commutative property: The order of the factors doesn't change the product. 8 X 4 = 4 X 8 **32 = 32** **Associative property:** The mode of grouping the factors does not change the result of the multiplication. (2 X 8) X 6 = 2 X (8 X 6) 16 X 6 = 2 X 48 **96 = 96** Now it's your turn, look at the following multiplications, identify their property and solve them. Can you do it? • 5 X (6 + 3) • 10 X 2 = 2 X 10 • 3 X 9 = 9 X 3 • (4 X 9) X 7 = 4 X (9 X 7) • 6 X (1 + 2) • (3 X 3) X 6 = 3 X (3 X 6) That's it guys, I hope that you have understood this topic. Bye, bye
References	https://www.aaamath.com/pro74bx2.htm

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Table 28 – Design N° 6 "Division of natural numbers"

Bilingual Education Proposal supported by the design of Virtual Learning Objects (VLO)

Format for the design of the videos

General Information

Title:	Division of natural numbers.
Designed by:	Carolina Córdoba Alvear Yineth Lorena Gaón Mosquera Natalia Mulcué Hurtado Juan Pablo Lara Cuetia Lizeth Ramos Viáfara
Adviser:	Mg. Adriana Idrobo Hurtado
Type of technological tools:	Power Point, bitmoji
Subject:	Mathematics
Approach:	Communicative and algorithmic approach
Competences	Numerical thinking
Institution:	Institución Educativa Instituto Técnico sede Centro Docente Rafael Tello.
Course:	Fifth

Content

Topic:	Operations with natural numbers.
Subtopic:	Division of natural numbers.
Objective:	To know what is division and identify its parts.
Problem situation:	Why are natural numbers important in the student's life?
Vocabulary:	Division, dividend, divisor, quotient, remainder.
Theories and concepts:	**Division:** The division is a method of distributing a group of things into equal parts. It is one of the four basic operations of arithmetic, which gives a fair result of sharing. The division is an operation inverse of multiplication. Its parts are: dividend, divisor, quotient and remainder.

Procedure

Introduction:	Hello students! Welcome to the mathematics world. Today, we're going to learn about "Division. Now, let’s pay attention and let’s learn more about this topic

Examples:

A. What is division?

It's splitting into equal parts or groups.

we use this symbol ÷, or sometimes these symbols /, ⟌ to make a division:

÷ / ⟌

The division also has its parts or terms.
example: **22 divided by 5**.

Dividend 22 ⟌ 5 **Divisor**
-20 **4** **Quotient**
02 **Remainder**

For making a division, it is important that you know the multiplication tables since they will help you solve a division.

Let's see this example: There are 12 chocolates, and 3 friends want to share them, how do they divide the chocolates?

Image 11 – Division, Example
12 chocolates

In this case, we take 12 chocolates, and we divide it by 3 friends

Dividend 12 ⟌ 3 **Divisor**

First, we're going to look for a number in the table of 3 whose result is 12 or is close to this number.

Image 12 – Division, Example

Dividend 12 | 3 **Divisor**
-12 **4**
00

In this case, **4** is the number because **3** x **4** = **12** and **4** will be the **quotient**

So, **12** ÷ **3** = **4** that means that each person must take **4 chocolates**

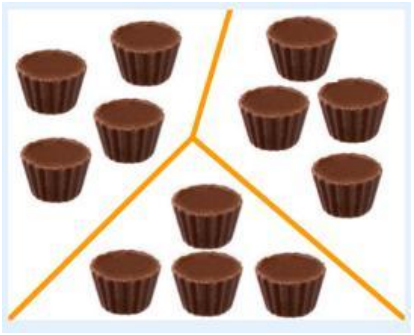


Image 13 – Division, Example

Summary:

Remember for making a division, it is important that you know the multiplication tables.

The division also has its terms.

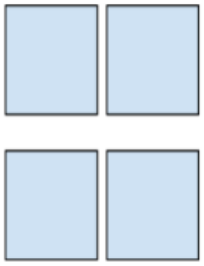
Dividend 22 | 5 **Divisor**
-20 **4** **Quotient**
02 **Remainder**

Now, it's your turn

There are 16 balls and 4 boxes, how to put 16 balls into four boxes? Do you know what is the answer?

Image 14 – Division, Example

16 balls

<table>
<tr><td></td><td> 
4 boxes
Image 15 – Division, Example

I hope that you have understood this topic.
See you in the next class!
Bye, bye!</td></tr>
<tr><td>References</td><td>https://www.splashlearn.com/math-vocabulary/division/division
https://www.toppr.com/guides/maths/ways-to-multiply-and-divide/multiplication-methods/
https://www.mathemania.com/lesson/division/#:~:text=Division%20is%20one%20of%20the%20four%20basic%20arithmetic%20operations%20in%20mathematics.&text=The%20first%20number%20is%20called,by%20any%20number%20except%20zero.</td></tr>
</table>

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Table 29 – Design N° 7 "Fractions and terms"

Bilingual Education Proposal supported by the design of Virtual Learning Objects (VLO)

Format for the design of the videos

General Information

Title:	Fractions and terms.
Designed by:	Carolina Córdoba Alvear Yineth Lorena Gaón Mosquera Natalia Mulcué Hurtado Juan Pablo Lara Cuetia Lizeth Ramos Viáfara
Adviser:	Mg. Adriana Idrobo Hurtado
Type of technological tools:	Powtoon
Subject:	Mathematics
Approach:	Communicative and algorithmic approach
Competences	Numerical thinking
Institution:	Institución Educativa Instituto Técnico sede Centro Docente Rafael Tello.
Course:	Fifth

Content

Topic:	Fractions and their operations
Subtopic:	Fractions, and terms.
Objective:	To compare and order fractional numbers through various interpretations, resources and representations.
Problem situation:	What is the importance of the concept of fractions in the educational process and its relationship with its environment in daily life?
Vocabulary:	Fractions, numerator, denominator, equivalent fraction.
Theories and concepts:	**Fractions:** A fraction is a representation of a part of a whole or, more generally, any number of equal parts **Numerator:** it is the top number; the numerator is the number of parts we have. **Denominator:** it is the bottom number, the denominator it is the number of parts the whole is divided into.

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Procedure

Introduction:	Hey guys! Welcome once again to your math class. Let's start with the new topic "fractions". And today, I'm going to explain you the general concepts: What a fraction is, its terms and its graphical representation. Are you ready? Come on ….
Examples:	**A. What is fraction?** A fraction represents a part of a whole or, more generally, any number of equal parts. It describes how many parts of a certain size there are, for example: $\frac{1}{2}$ $\frac{3}{5}$ $\frac{2}{4}$ These are fractions and what are its parts? The terms that we use for fractions are the "*numerator*" and the "*denominator*." $\frac{2 \rightarrow \text{N}}{4 \rightarrow \text{D}}$ Denominator is the total number of parts that make up the whole. Numerator is the total number of parts that we take. In that case, four is the denominator and two is the numerator. There is another way to represent a fraction. Pay attention to this part: **B. Graphical representation.** For representing a fraction, you must take into account the terms of the fraction: Numerator and Denominator. Let's look at an example:

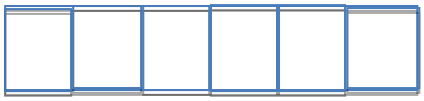
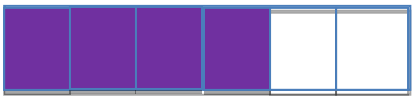
	$\frac{4}{6}$  We have 6 parts / D  We take 4 parts/N In that case, denominator (number 6) are the parts that make up the whole; and the numerator (number 4) are the parts that we take and that part will be colored.
Summary:	Now it's your turn, watch the following fractions represent them graphically $\frac{4}{6}$ $\frac{10}{20}$ $\frac{5}{10}$ That's it for today; I hope that you have understood this topic. See you the next class! Bye, bye
References	https://www.mathsisfun.com/equivalent_fractions.html https://www.calculatorsoup.com/calculators/math/fractionsequivalent.php https://www.ipracticemath.com/learn/fraction/fraction_def

Table 30 – Design N° 8 "Equivalent fractions"

Bilingual Education Proposal supported by the design of Virtual Learning Objects (VLO)

Format for the design of the videos

General Information

Title:	Equivalent fractions.
Designed by:	Carolina Córdoba Alvear Yineth Lorena Gaón Mosquera Natalia Mulcué Hurtado Juan Pablo Lara Cuetia Lizeth Ramos Viáfara
Adviser:	Mg. Adriana Idrobo Hurtado
Type of technological tools:	Powtoon
Subject:	Mathematics
Approach:	Communicative and algorithmic approach
Competences	Numerical thinking
Institution:	Institución Educativa Instituto Técnico sede Centro Docente Rafael Tello.
Course:	Fifth

Content

Topic:	Fractions and their operations
Subtopic:	Equivalent fractions.
Objective:	To compare and order fractional numbers through various interpretations, resources and representations.
Problem situation:	What is the importance of the concept of fractions in the educational process and its relationship with its environment in daily life?
Vocabulary:	Fractions, numerator, denominator, equivalent fraction.
Theories and concepts:	**Fractions:** A fraction is a representation of a part of a whole or, more generally, any number of equal parts **Numerator:** it is the top number; the numerator is the number of parts we have. **Denominator:** it is the bottom number; the denominator is the number of parts the whole is divided into. **Equivalent fraction:** Equivalent fractions are fractions with different numbers representing the same part of a whole. They have different numerators and denominators, but their fractional values are the same.

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Procedure

Introduction:	Hello students! welcome to your math class Last class, we started with a new topic "fractions", and today, I am going to talk about equivalent fractions taking into account the explanation given the last class. Remember that the terms that we use for fractions are the "*numerator*" and the "*denominator*." $\frac{Numerator}{Denominator}$ for example: $\frac{4}{8}$ or $\frac{2}{4}$ According to this review, let's learn about equivalent fractions. Are you ready? Come on ….
Examples:	**C. Equivalent fraction.** Equivalent fractions are fractions with different numbers representing the same part of a whole. Pay attention to this example: We have a pizza  **Image 16 – Equivalent Fractions**

Here, it's half a pizza

Image 17 – it's half a pizza

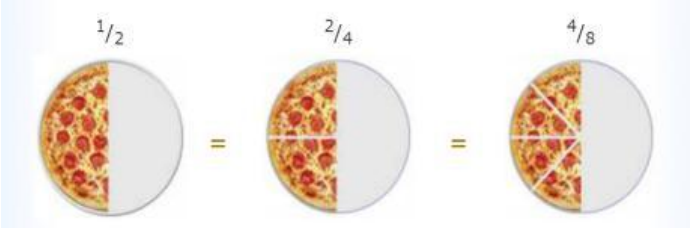
This is 2/4 pizza

Image 18 – it's 2/4 pizza

It's 4/8 pizza

Image 19 – it's 4/8 pizza

How do I identify an equivalent fraction?

	There are two ways to find when two or more fractions are equivalents: Multiplying or dividing the numerator and denominator by the same number: For example: x2 x2 $\frac{1}{2} = \frac{2}{4} = \frac{4}{8}$ x2 x2 and visually, it looks like this.  **Image 20 – Equivalent Fractions represent graphically** Now, we're going to simplify through division to find equivalent fractions: Pay attention, we have this fraction ÷ 3 ÷ 6 $\frac{18}{36} = \frac{6}{12} = \frac{1}{2}$ ÷ 3 ÷ 6 **Pay attention:** Choose the number you divide by carefully, so that the results (numerator and denominator) stay whole numbers.
Summary:	**Remember:** • You can make equivalent fractions by multiplying or

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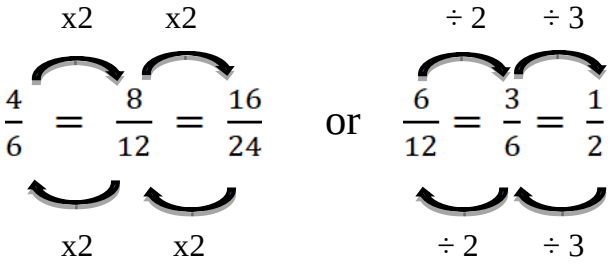
	dividing **numerator and denominator** by the same number.  • You only multiply or divide, **never add or subtract**, to get an equivalent fraction. • Only divide when the top and bottom stay as whole numbers. Now it's your turn, watch the following fractions and find their equivalent fraction. $\frac{3}{4}$ = $\frac{15}{18}$ = $\frac{24}{32}$= Thank you for your attention See you the next class! Bye, bye
References	https://www.mathsisfun.com/equivalent_fractions.html https://www.calculatorsoup.com/calculators/math/fractionsequivalent.php

Table 31 – Design N° 9 "Types of fractions"

Bilingual Education Proposal supported by the design of Virtual Learning Objects (VLO)

Format for the design of the videos

General Information

Title:	Types of fractions.
Designed by:	Carolina Córdoba Alvear Yineth Lorena Gaón Mosquera Natalia Mulcué Hurtado Juan Pablo Lara Cuetia Lizeth Ramos Viáfara
Adviser:	Mg. Adriana Idrobo Hurtado
Type of technological tools:	Powtoon
Subject:	Mathematics
Approach:	Communicative and algorithmic approach
Competences	Numerical thinking
Institution:	Institución Educativa Instituto Técnico sede Centro Docente Rafael Tello.
Course:	Fifth

Content

Topic:	Fractions and their operations
Subtopic:	Types of fractions.
Objective:	To compare and order fractional numbers through various interpretations, resources and representations.
Problem situation:	What is the importance of the concept of fractions in the educational process and its relationship with its environment in daily life?
Vocabulary:	Fractions, numerator, denominator, proper, improper and mixed fractions.
Theories and concepts:	**Proper fraction**: Type of fraction where the numerator (the top number) is less than the denominator (the bottom number). **Improper fraction.** An improper fraction is a fraction in which the numerator (top number) is greater than or equal to the denominator (bottom number). **Mixed fraction:** A Mixed Fraction is a whole number and a proper fraction combined. Such as $1\frac{3}{4}$

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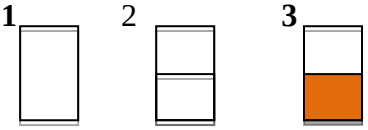
Procedure

Introduction:	Hi guys! I hope that you are having an excellent day. Welcome once again to your math class. Today, we're going to talk about "Types of fractions". In this class, I will explain you each type: Proper, improper and mixed fraction. But, before beginning, remember that a fraction simply tells us how many parts of a whole we have, and it is made up of two parts: Numerator and denominator $\frac{3-Numerator}{4-Denominator}$ $\frac{6}{8}$ it is a fraction. Remember: Denominator is the total number of equal parts in a whole or collection. Numerator is the number or equal parts taken. Now, let's know the types of fractions Are you ready? ……. Let's start.
Examples:	**A. Proper fraction.** This is a type of fraction where the numerator is less than the denominator. Now, look this example: I have here. $\frac{1}{2}$ As we can observe, the numerator (number 1) is less than the denominator (number 2).

If we represent it graphically, it tells that we have a whole **(1)** and the denominator tells us to divide it into two equal parts **(2)**; the numerator says to us which of these two parts we take, which one will be colored **(3)**.

1 2 **3**



This is a proper fraction because the numerator is less than denominator

These are examples of proper fractions.

$\frac{3}{5}$ $\frac{6}{9}$ $\frac{4(N)-smaller}{10\ (D)-larger}$

Remember: Numerator (N) is less than denominator (D)

B. Improper fraction.

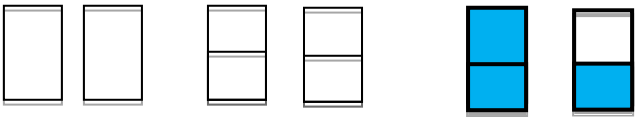
It's a fraction in which the numerator is greater than the denominator.

Now, let's go to watch some examples:

$\frac{3-larger}{2-smaller}$ How we can watch, 3 is greater than 2.

If we represent it graphically, we need two whole because we must take three parts **(1),** then, we divide them in two parts **(2).** Finally, we take 3 parts which will be colored **(3)**.

1 **2** **3**



This is an improper fraction because the numerator is greater than denominator

Watch these examples about improper fractions.

	$\frac{7}{5}$ $\frac{9}{2}$ $\frac{8-Larger}{1-smaller}$ Numerator is greater than denominator. **C. Mixed Fraction.** It is a whole number and a fraction combined into one "mixed" number. Pay attention to these examples $1\frac{5}{7}$ $3\frac{4}{5}$ $6\frac{1-Numerator}{2-Denominator}$ ↓ Whole number
Summary:	**Remember:** A proper fraction is when the numerator is less than denominator $\frac{N-Smaller}{D-\ larger}$ $\frac{6}{12}$ An improper fraction is when the numerator is greater than denominator $\frac{N-greater}{D-\ smaller}$ $\frac{6}{12}$ A mixed fraction is when there is a whole number and a fraction combined into one $whole\ number\frac{N}{D}$ $6\frac{14}{7}$

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	Now it's your turn, watch the following fractions and write their type: Will you be able to do it? $7\frac{4}{8}$ $\frac{10}{3}$ $\frac{8}{2}$ $\frac{4}{9}$ $1\frac{7}{5}$ $\frac{3}{13}$ $\frac{14}{8}$ $\frac{2}{4}$ $6\frac{15}{5}$ I hope that you have understood this topic. See you soon! Bye, bye
References	https://www.mathsisfun.com/equivalent_fractions.html https://www.calculatorsoup.com/calculators/math/fractionsequivalent.php https://www.ipracticemath.com/learn/fraction/fraction_def

Table 32 – Design N° 10 "Addition and subtraction of homogeneous and heterogeneous fractions"

Bilingual Education Proposal supported by the design of Virtual Learning Objects (VLO)

Format for the design of the videos

General Information

Title:	Addition and subtraction of homogeneous and heterogeneous fractions.
Designed by:	Carolina Córdoba Alvear Yineth Lorena Gaón Mosquera Natalia Mulcué Hurtado Juan Pablo Lara Cuetia Lizeth Ramos Viáfara
Adviser:	Mg. Adriana Idrobo Hurtado
Type of technological tools:	Powtoon
Subject:	Mathematics
Approach:	Communicative and algorithmic approach
Competences	Numerical thinking
Institution:	Institución Educativa Instituto Técnico sede Centro Docente Rafael Tello.
Course:	Fifth

Content

Topic:	Fractions and their operations
Subtopic:	Addition and subtraction of homogeneous and heterogeneous fractions.
Objective:	To compare and order fractional numbers through various interpretations, resources and representations.
Problem situation:	What is the importance of the concept of fractions in the educational process and its relationship with its environment in daily life?
Vocabulary:	Homogeneous and heterogeneous fractions, numerator, denominator, least common multiple, addition and subtraction.
Theories and concepts:	**Fractions:** A fraction is a representation of a part of a whole or, more generally, any number of equal parts **Homogeneous fraction:** it is the top number; the numerator is the number of parts we have. **Heterogeneous fraction:** it is the bottom number, the denominator it is the number of parts the whole is divided into.

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Procedure

Introduction:	Hi! It's time to the mathematics class. For me, it's a pleasure to be here with you. I'm your math teacher and today, we're going to continue with our topic "fractions". In this class, we'll learn to add homogeneous and heterogeneous fraction. But… remember that the terms that we use for fractions are the "*numerator*" and the "*denominator*." Example: $\frac{Numerator}{Denominaotr}$ $\frac{5}{10}$ Before beginning, I'll explain you what a homogeneous and heterogeneous fractions are. Fractions are homogeneous when they have the same denominator. Example: $\frac{2}{5}$ $\frac{4}{5}$ As you can watch, these fractions have the same denominator. (5) Fractions are heterogeneous when the unit of each one is divided into a different number of parts and therefore, their denominators are different. For example: These fractions have different denominator. (6 and 2) $\frac{4}{6}$ $\frac{1}{2}$ Now, taking into account the last explanation, we're going to add and subtract homogeneous and heterogeneous fractions. Are you ready? Let's go….

Examples:

A. Addition of homogeneous fraction.

To add homogeneous fractions, we add the numerators and keep the same denominator.

For example:

$$\frac{3}{8} + \frac{7}{8} = \frac{3+7}{8} = \frac{10}{8}$$

B. Addition of heterogeneous fraction.

To add heterogeneous fractions, we take the denominators, and we must find the least common multiple.

$$\frac{1}{3} + \frac{7}{5} =$$

L. C.M 3 = (3, 6, 9, 12, **15**, 18, 21, 24, 27, 30…)
L. C.M 5 = (5, 10, **15**, 20, 25, 30, 35, 40, 45, 50…)

The least common multiple of 3 and 5 is **15**. We take this number and write the new denominator.

$$\frac{1}{3} + \frac{7}{5} = \frac{\quad}{15}$$

Then, we multiply the numerator with the denominator crosswise.

$$\frac{1}{3} \times \frac{7}{5} = \frac{5+21}{15} = \frac{\quad}{15}$$

Finally, we add the numerator and keep the denominator.

$$\frac{1}{3} + \frac{7}{5} = \frac{5+21}{15} = \frac{26}{15}$$

C. Subtraction of homogeneous fractions.

To subtract homogeneous fractions, we subtract the numerator and keep the same denominator.

Pay attention to this example:

$$\frac{14}{6} - \frac{9}{6} = \frac{14-9}{6} = \frac{5}{6}$$

D. Subtraction of heterogeneous fractions.

To subtract heterogeneous fractions, we take the denominators, and we must find the least common multiple.

Example:

$$\frac{4}{5} + \frac{1}{2} =$$

L. C.M 5 = (5, **10**, 15, 20, 25, 30, 35, 40, 45, 50…)
L. C.M 2 = (2, 4, 6, 8, **10**, 12, 14, 16, 18, 20…)

The least common multiple of 5 and 2 is **10**. We take this number and write the new denominator.

$$\frac{4}{5} - \frac{1}{2} = \frac{}{10}$$

Then, we multiply the numerators with the denominator crosswise.

$$\frac{4}{5} \times \frac{1}{2} = \frac{8-5}{10} =$$

Finally, we add the numerator and keep the denominator.

$$\frac{4}{5} - \frac{1}{2} = \frac{8-5}{10} = \frac{3}{10}$$

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Summary:	In conclusion, to add and subtract homogeneous fractions, you must keep the same denominator and add or subtract (according to case) the numerators. $\frac{13}{30} + \frac{6}{30} = \frac{13+6}{30} = \frac{19}{30}$ $\frac{13}{30} - \frac{5}{30} = \frac{13+5}{30} = \frac{8}{30}$ And to add and subtract heterogeneous fractions, you take the denominator and find the least common multiple. Then, you must multiply the numerator with the denominator crosswise and finally, you must add or subtract the results obtained. $\frac{1}{3} + \frac{7}{5} = \frac{5+21}{15} = \frac{26}{15}$ $\frac{4}{5} - \frac{1}{2} = \frac{8-5}{10} = \frac{3}{10}$ That's it for today; I hope that you have understood this topic. See you the next time! Bye, bye
References	https://www.smartickmethod.com/blog/math/number-and-operations-fractions/heterogeneous-fractions/#:~:text=For%20two%20fractions%20to%20be,4%2F5%20are%20homogeneous%20fractions.

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Table 33 – Design N° 11 "Multiplication and division of fractions"

Bilingual Education Proposal supported by the design of Virtual Learning Objects (VLO)

Format for the design of the videos

General Information

Title:	Multiplication and division of fractions.
Designed by:	Carolina Córdoba Alvear Yineth Lorena Gaón Mosquera Natalia Mulcué Hurtado Juan Pablo Lara Cuetia Lizeth Ramos Viáfara
Adviser:	Mg. Adriana Idrobo Hurtado
Type of technological tools:	Powtoon
Subject:	Mathematics
Approach:	Communicative and algorithmic approach
Competences	Numerical thinking
Institution:	Institución Educativa Instituto Técnico sede Centro Docente Rafael Tello.
Course:	Fifth

Content

Topic:	Fractions and their operations
Subtopic:	Fractions, terms and equivalent fractions.
Objective:	To compare and order fractional numbers through various interpretations, resources and representations.
Problem situation:	What is the importance of the concept of fractions in the educational process and its relationship with its environment in daily life?
Vocabulary:	Fractions, numerator, denominator, least common multiple, multiplication, division.
Theories and concepts:	**Fractions:** A fraction is a representation of a part of a whole or, more generally, any number of equal parts **Numerator:** it is the top number; the numerator is the number of parts we have. **Denominator:** it is the bottom number, the denominator it is the number of parts the whole is divided into.

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Procedure

Introduction:	Hi kids! Welcome once again to your math class. Today, we'll talk about multiplication and division of fractions. But first, we're going to make a little review about what fraction is. Remember that a fraction describes how many parts of a certain size there are, and the terms that we use for fractions are the "*numerator*" and the "*denominator*." $\frac{2 \rightarrow \text{Numerator}}{4 \rightarrow \text{Denominator}}$ So, let's learn to multiply and divide fractions: Are you ready? Go ahead…
Examples:	**A. Multiplication of fractions** To multiply fractions, we must multiply the numerators. Then, we multiply the denominators. Pay attention to this example: $\frac{4}{5} * \frac{2}{3} = \frac{4*2}{5*3} = \frac{8}{15}$ Another example: $\frac{3}{6} * \frac{4}{1} = \frac{3*4}{6*1} = \frac{12}{6}$ **B. Division of fractions** To divide fractions, we must multiply the numerator with the denominator crosswise. For example:

	$\frac{15}{3} \div \frac{2}{6} = \frac{15*6}{3*2} = \frac{90}{6}$ $\frac{3}{4} \div \frac{1}{32} = \frac{3*32}{4*1} = \frac{96}{4}$ **It's very easy.**
Summary:	Let's do a review For multiplying fractions, you must multiply the numerators. Then, you multiply the denominators. $\mathbf{\frac{2}{5} * \frac{2}{3} = \frac{2*2}{5*3} = \frac{4}{15}}$ And for dividing fractions, you must multiply the numerator with the denominator crosswise. $\frac{3}{4} \div \frac{1}{32} = \frac{3*32}{4*1} = \frac{96}{4}$ Now is your turn! Multiply and divide the following fractions. Can you do it? $\mathbf{\frac{5}{7} * \frac{2}{1} =}$ $\mathbf{\frac{5}{3} * \frac{4}{5} =}$ Okay guys, that's it for today Thank you for your attention See you soon! Bye, bye
References	https://www.ducksters.com/kidsmath/fractions_multiplying_dividing.php https://www.k5learning.com/free-math-worksheets/fifth-grade-5/fractions-multiplication-division

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Table 34 – Design N° 1 "Introducing the cell"

Bilingual Education Proposal supported by the design of Virtual Learning Objects (VLO)

Format for the design of the videos

General Information

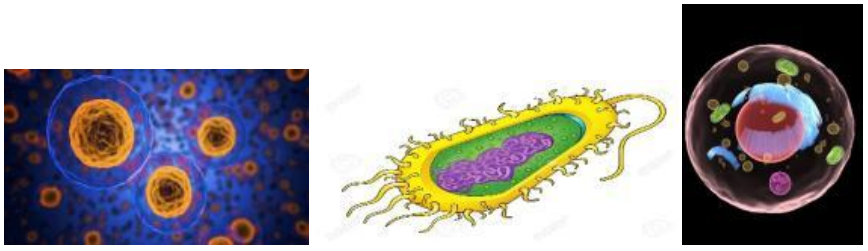
Tittle	The cell
Designed by:	Carolina Cordoba Alvear Yineth Lorena Gaón Mosquera Natalia Mulcué Hurtado Juan Pablo Lara Cuetia Lizeth Ramos Viáfara
Adviser:	Mg. Adriana Idrobo Hurtado
Type of technological tools:	Images, Animaker
Subject:	Natural sciences
Approach:	Communicative and Humanistic Approch
Competences	Scientific and Interpretive competences
Institution:	Institución Educativa Instituto Técnico Sede Centro Docente Rafael Tello
Course:	Fifth

Content

Topic:	The cell
Subtopic:	Parts of the cell
Objective:	To know the cell as a structural and functional unit of all living beings
Problem situation:	How to induce students towards the knowledge of the Kingdoms of nature, taking into account their characteristics and classification?
Vocabulary:	Cell, the nucleus, plasma membrane, cytoplasm, cell wall, nuclear membrane, nucleolus, chromosomes, chromatin, cytoskeleton, organelles, vacuoles, Chloroplasts, mitochondria
Theories and Concepts:	**Cell** is the basic unit of life. All living organisms are composed of one (unicellular) or more (multicellular) cells. **Unicellular:** Some plants and animals are so small and simple that they are made up of only one cell **Multicellular:** Most of the plants and animals we are familiar with are made up of many cells **The Nucleus** controls all of the cell's functions and contains the genetic material (chromosomes) needed for the cell to reproduce. **Plasma Membrane i**s a semi-permeable film that holds the cell

	together, keeping the cytoplasm apart from the outside environment. **Cytoplasm** is a viscous liquid that surrounds the organelles and acts as a site for many important chemical reactions to take place. **Cell Wall** is a rigid exterior of plant cells, and is made primarily of cellulose. **Nuclear Membrane** is the coating of the nucleus**.** **Nucleolus** its function is to program the formation of ribosomes that are then transported outside the nucleus and assembled in the cytoplasm. **Chromosome** a structure that contains an organism's genetic information (DNA), which is the blueprint for reproduction **Organelles** all the microscopic structures found in the cytoplasm of a cell, each one with a special function **Vacuoles** are essentially membrane-enclosed compartments used for storage and regulation of internal pressure in plant cells. **Chloroplasts**, only found in plant cells, are bright green because of the chlorophyll they use to generate sugar from light. **mitochondria** is the site of cellular respiration (energy production for the cell)

Procedure

Introduction:	The cell  **Image 21 – The Cell** Hi everyone. Today we are going to talk about the cell and its parts. Wherever you look, there are living things such as trees, 

birds 

Image 22 – Living beings

and many other living beings  . All things have different sizes, shapes and characteristics, but they have one thing in common,

Yes, they are all made of cells, 

Image 23 – All the Living beings are Cells

but this cells are so tiny that you cannot see them with your eyes for this process we need to use a microscope to see cells.

Cell is the basic unit of life. All living organisms are composed of one (unicellular) or more (multicellular) cells.

Unicellular: Some plants and animals are so small and simple that they are made up of only one cell

Multicellular: Most of the plants and animals we are familiar with are made up of many cells

Image 24 – Unicelular and Multicelular Beings

Not all cells are the same. A plant cell and an animal cell are shown below

The differences are:

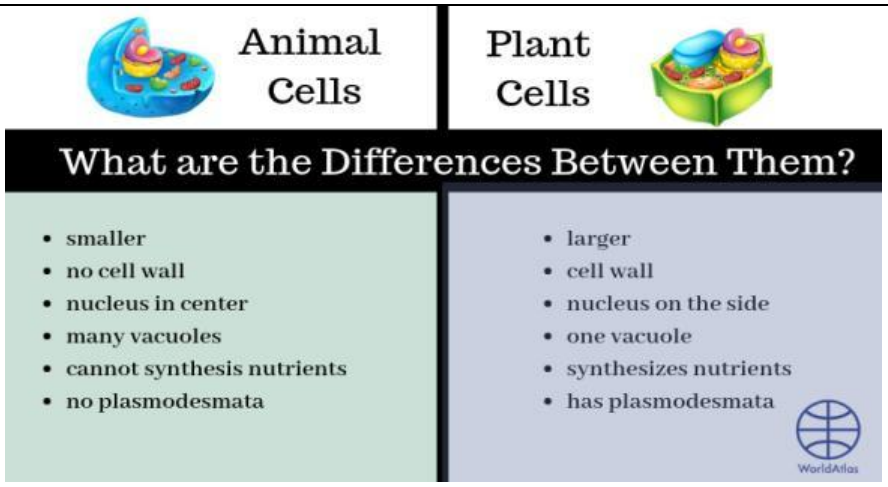


Image 25 – Animal and Plant Cells

The animal cell is smaller than the plant cell

The first one does not have cell wall, the second one does and many others characteristics.

these are the parts that both cells have in common

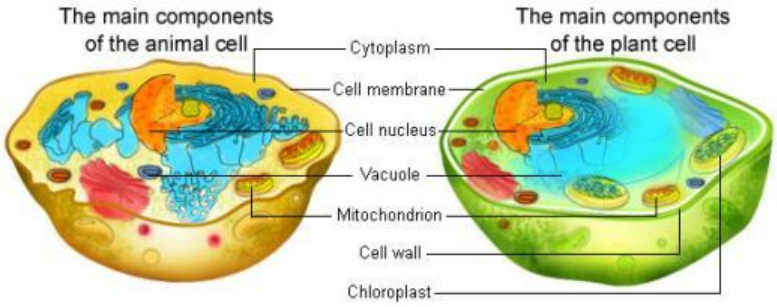


Image 26 – Parts of the Cell

Cytoplasm is a viscous liquid that surrounds the organelles and acts as a site for many important chemical reactions to take place

Membrane is a semi-permeable film that holds the cell together, keeping the cytoplasm apart from the outside environment.

Vacuoles are essentially membrane-enclosed compartments used for storage and regulation of internal pressure in plant cells.

mitochondria are the site of cellular respiration (energy production for the cell)

The Nucleus controls all of the cell's functions and contains the genetic material (chromosomes) needed for the cell to reproduce

Cell Wall is a rigid exterior of plant cells, and is made primarily of cellulose.

Chloroplasts, only found in plant cells, are bright green because of the chlorophyll they use to generate sugar from light.

Examples:	Circle the letter of the CORRECT answer. **1**. All living things are made of these. They are the smallest units of life on Earth: **a**. cells **b**. molecules **c**. embryones **d.** chromosomes **2**. The nucleus and all the organelles in a cell float in this: **a**. vacuole **b**. blood **c**. cytoplasm **d**. plasma
Summary:	Remember that all living things have one or more cells The main part of a cell is the nucleus. The cell is the smallest unit of life. The cell of plants is different from the one of animals. **Extra exercises** **1.** What is the genetic material that is present in the nucleus? **a.** Blood **b.** Water **c.** Chromosomes **d.** Cells **2.** What is the substance present only in the plants? **a.** Water **b.** Blood **c.** Chloroplast **d.** Molecules Bye, bye
References	https://cdn.todamateria.com/imagenes/celula-og.jpg https://cerebriti.b-cdn.net/uploads/365e721d788651f051eb7f2203e29846.jpg https://www.multidudas.com/wp-content/uploads/2019/05/funci%C3%B3n-del-lisosoma-4-pp.jpg

	https://fhernanb.github.io/libro_mod_pred/images/arbol.jpg https://seo.org/wp-content/uploads/2013/11/F400_Foto_01.jpg https://www.pictoeduca.com/config/timthumb-alt.php?src=https://www.pictoeduca.com/uploads/2017/06/cuerpo.png&w=847 https://i.pinimg.com/originals/ba/81/e3/ba81e3c926f76203652f1508d0dcea07.jpg https://happylearning.tv/wp-content/uploads/2020/05/unicellular-and-multicellular-beings.jpg http://media.openschool.bc.ca/osbcmedia/bi12/etext/All_About_Cells.pdf http://www.most.org/wp-content/uploads/2016/04/What_Are_CellsHS.pdf https://www.worldatlas.com/upload/c2/27/05/animal-cells-2.png

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Table 35 – Design N° 2 "Type of cells and their vital functions - Eukaryotic Cells"

Bilingual Education Proposal supported by the design of Virtual Learning Objects (VLO)

Format for the design of the videos

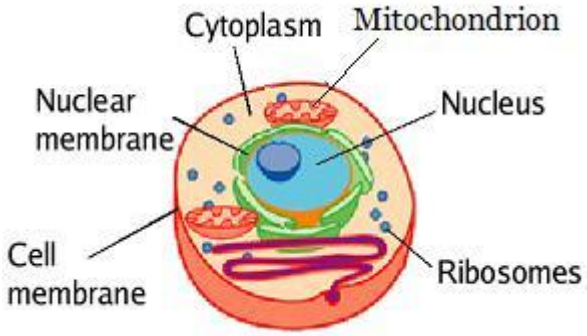
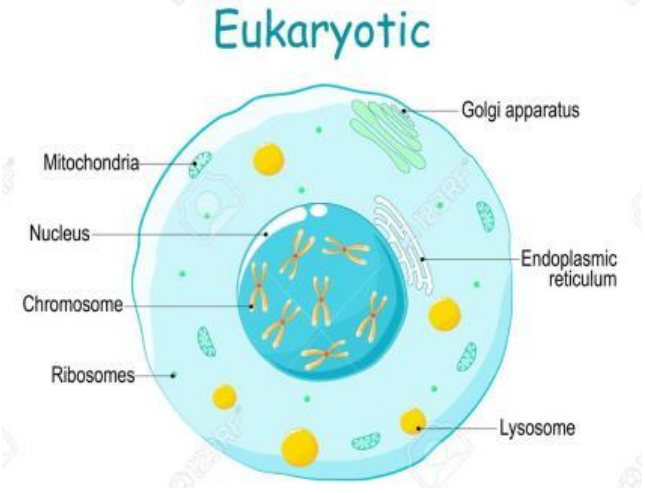
General Information

Title:	Type of cells and their vital functions - Eukaryotic Cells
Designed by:	Carolina Córdoba Alvear Yineth Lorena Gaón Mosquera Natalia Mulcué Hurtado Juan Pablo Lara Cuetia Lizeth Ramos Viáfara
Adviser:	Adriana Idrobo Hurtado
Type of technological tools:	Power Point, bitmoji
Subject:	Natural Sciences
Approach:	Communicative and Humanistic
Competences	Scientific and Interpretive
Institution:	Institución Educativa Instituto Técnico sede Centro Docente Rafael Tello
Course:	Fifth

Content

Topic:	The cell and living beings
Subtopic:	Type of cells and their vital functions.
Objective:	To know the different type of cells and their classification.
Problem situation:	How are living beings organized?
Vocabulary:	Prokaryotic and eukaryotic cells, Protozoa, fungi, plants, and animals all have eukaryotic cells.
Theories and concepts:	**Cell:** Cells are the basic unit of a living organism and where all life processes are carried out. **Eukaryotic cell** are organisms whose cells have a nucleus enclosed within a nuclear envelope **Animal cells:** Animal cells are the basic unit of life in organisms of the animalia Kingdom. They are eukaryotic cells, meaning that they have a true nucleus and specialized structures called organelles that carry out different functions. **Plant cell:** Plant cells are the basic unit of life in organisms of the plantae kingdom. They are eukaryotic cells, which have a true nucleus along with specialized structures called organelles that carry out different functions.

Procedure

Introduction:	Hello students, welcome to the world of natural sciences. Today, We're going to continue with topic about cell What are the cells? the cells are the basic unit of a living organism and where all life processes are carried out.  **Image 27 – The Cell** The question is: Do all living beings have the same cellular composition? The answer is no, animal cells and plant cells share the common components like: a **nucleus**, **cytoplasm**, **mitochondria** and a **cell membrane** but plant cells have three extra components: a **vacuole, chloroplast** and a **cell wall.**
Examples:	There are countless differences between the types of cells. Here we will look at the two major types of cells:  **Image 28 – Eukaryotic Cell**

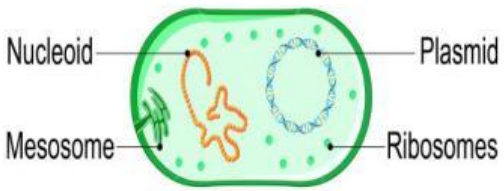


Image 29 - Prokaryotic Cell

Eukaryotic cells are thought to be the most modern major cell type. All multicellular organisms,


including you, , your cat

Image 30 – Beings with eukaryotic cells

the plants in your house, have eukaryotic cells

Image 31 – Plants has eukaryotic cells.

Eukaryotic cells usually have more than one chromosome

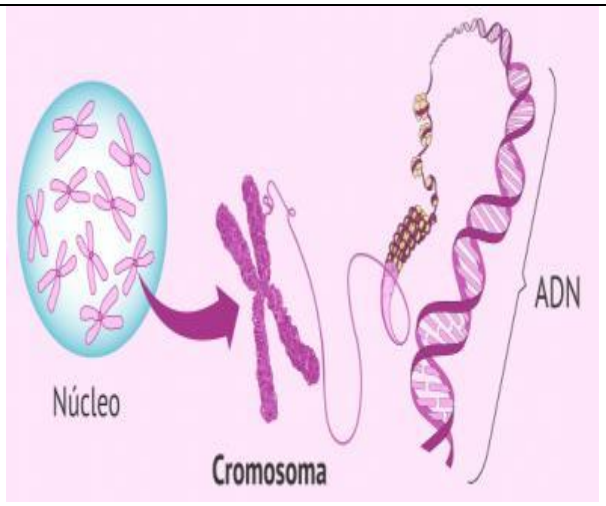


Image 32 - Chromosome

which contains large amounts of genetic information.
All eukaryotic cells have

a nucleus , mitochondria

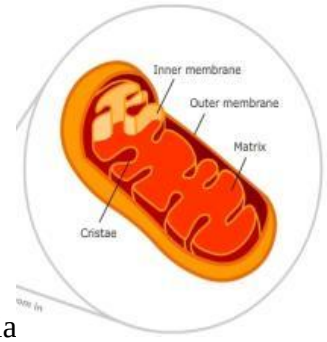
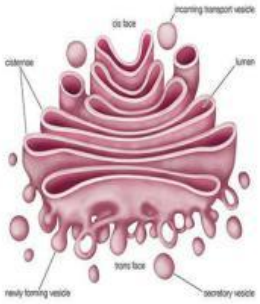


Image 33 – Nucleus and Mitochondria



Golgi body , vesicles and

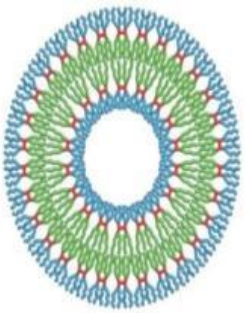


Image 34 – Golgy Body and Vesicles

endoplasmic reticulum

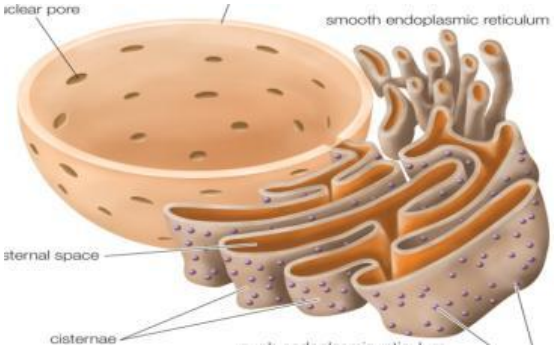


Image 35 – Endoplasmatic Reticulum

There are two types of eukaryotic cells: animal and plant cells which can reproduce sexually or asexually.

Animals are made up of millions of cells. Animal cells have an irregular structure and are made up of four key parts:

Nucleus – This contains genetic material (DNA), and controls the cell's activity.

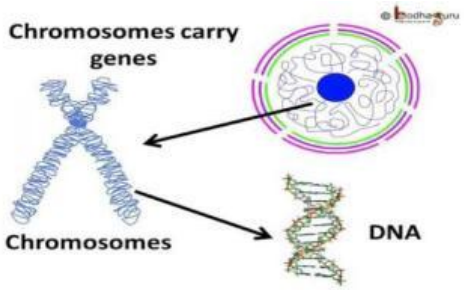


Image 36 – Nucleus

Cell membrane – A flexible layer that surrounds the cell and controls the substances that enter and exit.

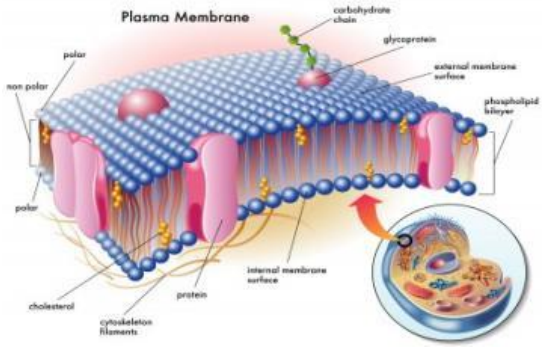


Image 37 – Cell membrane

Cytoplasm – A jelly-like substance where the chemical reactions happen.

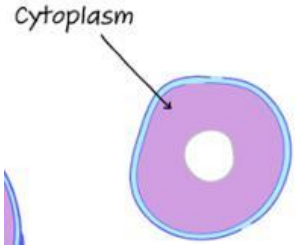


Image 38 - Cytoplasm

Mitochondria – This is where energy is released from the food molecules.

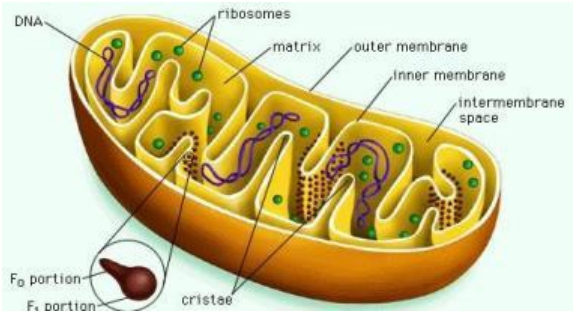
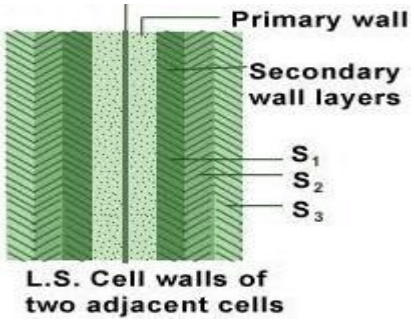
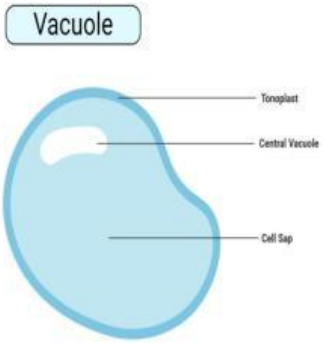


Image 39 - Mitochondria

And Plants are also made up of millions of cells. Plant cells have a nucleus, cell membrane, cytoplasm and mitochondria too, but they also contain the following structures:

Cell wall – A hard layer outside the cell membrane, containing

	cellulose to provide strength to the plant.  **Image 40 – Cell Wall** **Vacuole** – A space inside the cell that is used to store substances and help the cell keep its shape.  **Image 41 - Vacuole** **Chloroplasts** – Structures that contain the green pigment **chlorophyll,** which is a key part of **photosynthesis.**  **Image 42 - Chloroplasts**
Summary:	As conclusion, animals and plants have a eukaryotic cellular structure.

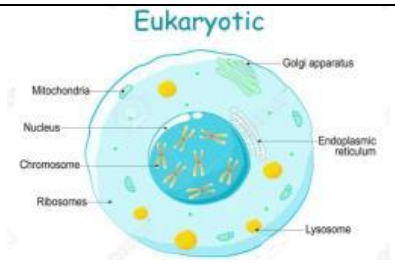


Image 43 – Eukaryotic cell

Animal Plant

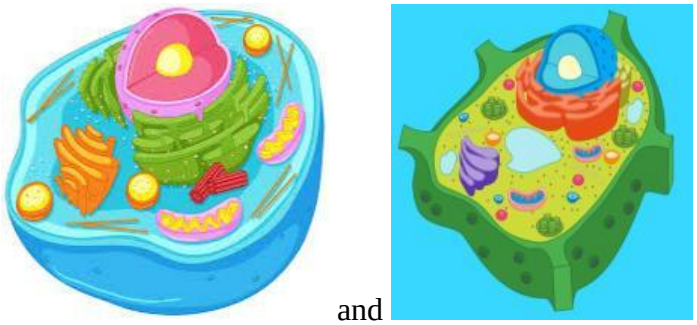


Image 44 - Animal and Plant Cells

Now, it's your turn: watch the following pictures and identify what type of eukaryotic cell do they have?

Image 45 – Animals and Plants

Thank you for attention and I hope that you have understood this topic
See you!
Bye, bye.

References

https://biologydictionary.net/eukaryote/
https://biologydictionary.net/cell/
http://biologymad.com/ASrevisionmaterials/cellsnotes.pdf
https://www.bbc.co.uk/bitesize/topics/znyycdm/articles/zmrtng8#:~:text=Animal%20cells%20and%20plant%20cells,chloroplast%20and%20a%20cell%20wall.

Table 36 – Design N° 3 "Type of cells and their vital functions - Prokaryotic Cells"

Bilingual Education Proposal supported by the design of Virtual Learning Objects (VLO)

Format for the design of the videos

General Information

Title:	Type of cells and their vital functions - Prokaryotic Cells
Designed by:	Carolina Córdoba Alvear Yineth Lorena Gaón Mosquera

	Natalia Mulcué Hurtado Juan Pablo Lara Cuetia Lizeth Ramos Viáfara
Adviser:	Adriana Idrobo Hurtado
Type of technological tools:	Power Point, Voki
Subject:	Natural Sciences
Approach:	Communicative and Humanistic
Competences	Scientific and Interpretive
Institution:	Institución Educativa Instituto Técnico sede Centro Docente Rafael Tello
Course:	Fifth

Content

Topic:	The cell and living beings
Subtopic:	Type of cells and their vital functions.
Objective:	To know the different type of cells and their classification.
Problem situation:	How are living beings organized?
Vocabulary:	Prokaryotic and eukaryotic cells, Protozoa, fungi, plants, and animals all have eukaryotic cells.
Theories and concepts:	**Cell:** Cells are the basic unit of a living organism and where all life processes are carried out. **Prokaryotic cells** are the simpler and older of the two major types of cells. Prokaryotes are single-celled organisms. **Archaebacteria:** Archaebacteria are a type of single-cell organism which are so different from other modern life-forms that they have challenged the way scientists classify life. **Eubacteria:** Eubacteria, or "true" bacteria, are single-celled prokaryotic microorganisms that have a range of characteristics and are found in various conditions throughout all parts of the world.

Procedure

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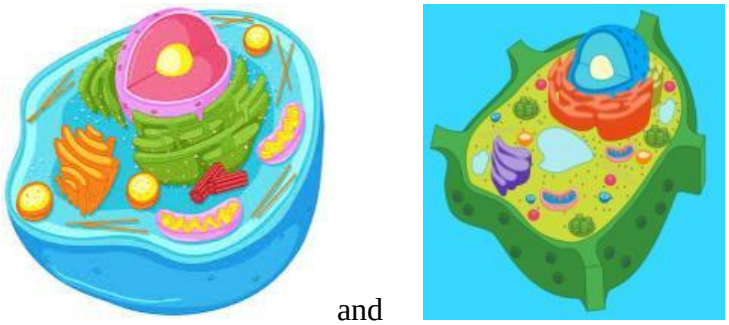
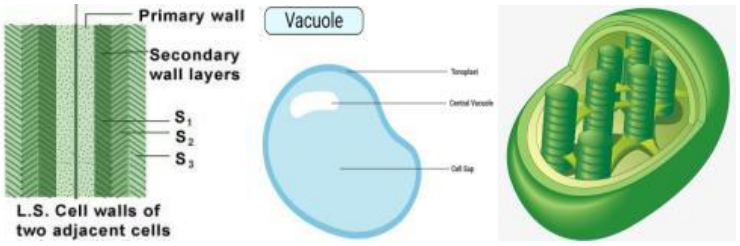
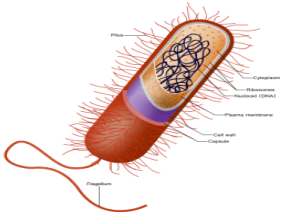
Introduction:	Welcome to the world of natural sciences. Hi students, welcome once again to the natural sciences class. Are you ready for a new natural sciences class? Today, We're going to continue talking about the types of cells. Last class, we knew the eukaryotic cell and its types Animal and Plant  **Image 46 - Animal and Plant Cells** We learned that animals and plants have a eukaryotic cellular structure, and both cells have the same structure although the plant cell has a cell wall, vacuole, and chloroplast.  **Image 47 – Cell Wall, Vacuole and Chloeoplaast** Now, we're going to know about the prokaryotic cell. Listen up and pay attention.
Examples:	 **Image 48 – Prokaryotic Cell** Prokaryotes are the simpler and older of the two major types of cells. Prokaryotic cells have a cell membrane, and one or more layers of

additional protection from the outside environment.

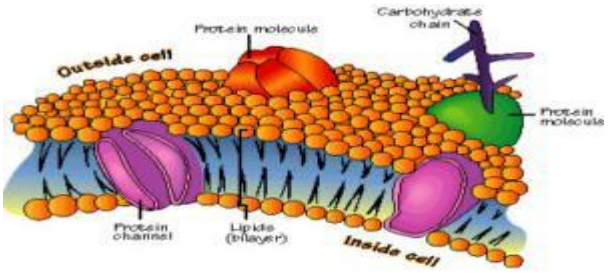
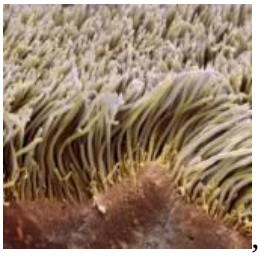


Image 49 – Cell Membrane

Many prokaryotic cells also have



cilia, tails

, or other ways in which the cell can control its movement.

Image 50 – Cilia and Tails

Prokaryotes have no nucleolus – the DNA is in the cytoplasm, and it comes from small circular strands of DNA called plasmids.

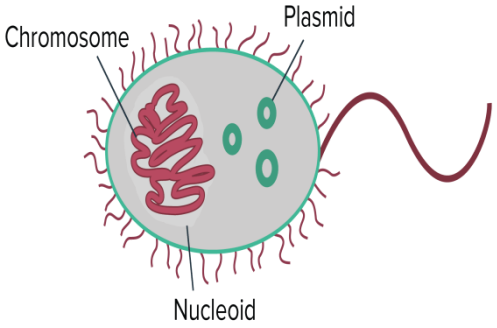


Image 51 – Prokaryotic Cell

There are two major types of prokaryotes known by scientists today: archaebacteria,

which are a very old lineage of life with some biochemical differences from bacteria and eukaryotes

Image 52 - Archaebacteria

And bacteria, sometimes called "eubacteria," or "true bacteria" to differentiate them from archaebacteria.

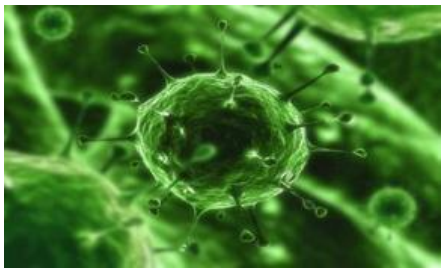


Image 53 - Eubatceria

What are the differences between Prokaryotic and Eukaryotic cell?

While eukaryotes are complex, usually multicellular organisms that have eukaryotic cells, prokaryotes are usually single-celled organisms that have simpler prokaryotic cells.

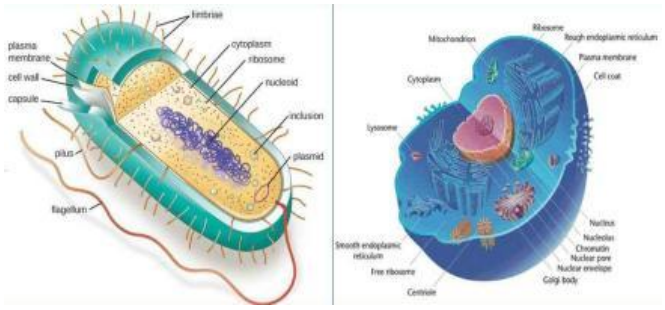


Image 54 – Prokaryotic and Eukariotic Cells

Eukaryotes include all complex life forms including protozoa, fungi, plants and animals,

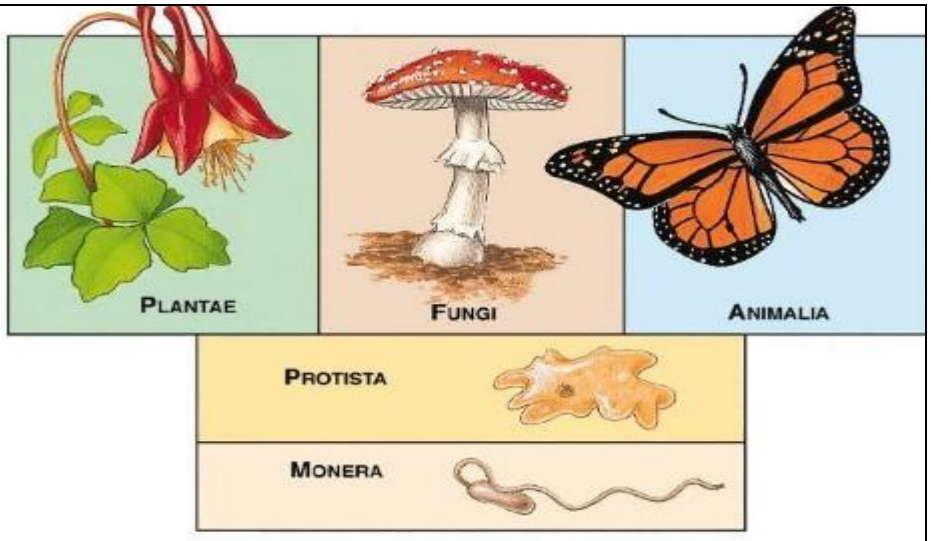


Image 55 – Animal Kingdom

While prokaryotes are microscopic, mostly single-celled life forms, either archaea or bacteria.

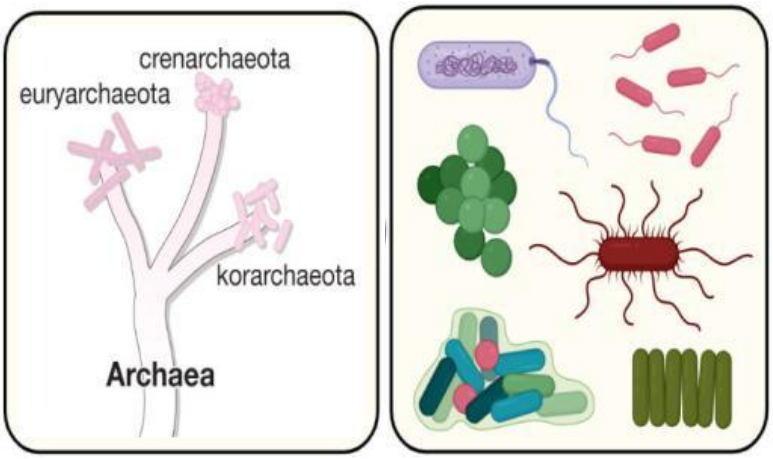


Image 56 - Archaea

Summary:

Remember a prokaryotic cell has no nucleolus – the DNA is in the cytoplasm, and it comes from small circular strands of DNA called plasmids.

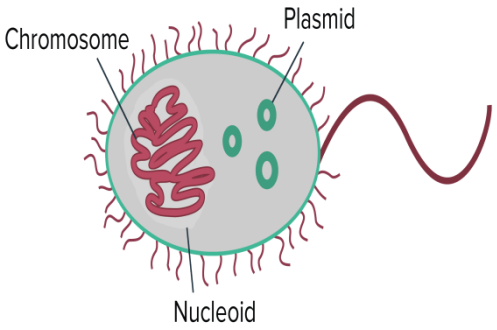


Image 57 – Prokaryotic Cell

Prokaryotic cells all have small ribosomes, whereas eukaryotic all have larger ribosomes.

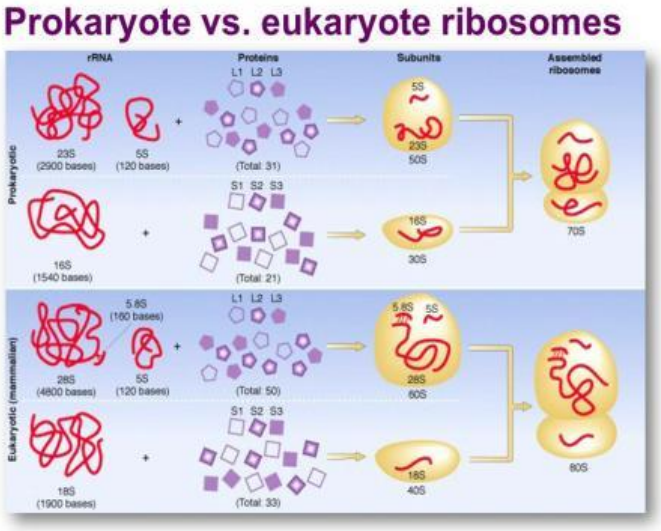


Image 58 - Ribosomes

Now, it's your turn: watch the following images and identify what type of cell do they have?

	 **Image 59 – Prokaryotic and Eukaryotic Cells** I hope that you have understood this topic. Thank you for your attention. See you the next time. Bye, bye.
References	https://biologydictionary.net/cell/#bacteria https://biologydictionary.net/eukaryote/#differences-between-eukaryotes-and-prokaryotes https://biologydictionary.net/plant-cell/ https://biologydictionary.net/archaebacteria/

Table 37 – Design N° 4 "Kingdoms of nature"

Bilingual Education Proposal supported by the design of Virtual Learning Objects (VLO)

Format for the design of the videos

General Information

Title:	Kingdoms of nature
Designed by:	Carolina Córdoba Alvear Yineth Lorena Gaón Mosquera Natalia Mulcué Hurtado Juan Pablo Lara Cuetia Lizeth Ramos Viáfara
Adviser:	Mg. Adriana Idrobo Hurtado
Type of technological tools:	Powtoon
Subject:	Natural sciences
Approach:	Communicative and humanistic approach
Competences	Scientific and interpretative competence
Institution:	Institución Educativa Instituto Técnico sede Centro Docente Rafael Tello.
Course:	Fifth

Content

Topic:	The living beings
Subtopic:	The kingdom of the nature
Objective:	To identify the characteristics and differences of living beings that make part of each one of kingdoms of nature.
Problem situation:	How to induce students towards the knowledge of the kingdoms of the nature, considering their characteristics and classification?
Vocabulary:	Moneran, Protist, Fungi, microorganisms Yeast, mushrooms, algae, amoebas, bacteria, vertebrates, invertebrates, unicellular, multi-celled.
Theories and concepts:	**Kingdoms of nature:** Kingdoms are a way that scientists have developed to divide all living things. These divisions are based on what living things have in common and how they differ. Currently there are five kingdoms in which all living things are divided: Moneran kingdom, Protist Kingdom, Fungi Kingdom, Plantae Kingdom and Animalia Kingdom. **Moneran:** The Monera Kingdom consists of organisms that are made up of one cell. These organisms are called unicellular. These unicellular organisms are made of a very simple cell that often lacks many cell parts, such as a nucleus, that are commonly found in other cells.

	Protist: Protists are similar to moneran in that they are unicellular. Protists are a bit more complex because they contain a nucleus. They also have moving parts and can move around within their environment. **Fungi:** Fungi have their own kingdom because there is no other organism like them. Fungi has multicellular eukaryote organisms and cannot make their own food. **Plantae:** one of the oldest, and characterized by its immobile, multicellular and eukaryotic nature. These plantae, whose cells contain cellulose and chlorophyll are essential for life on Earth since they release oxygen through photosynthesis. **Animal:** is the most evolved and is divided into two large groups - vertebrates and invertebrates. These animals are multi-celled, they have sexual reproduction and the ability to move. This kingdom is one of the most diverse and comprises mammals, fish, birds, reptiles, among others**.**

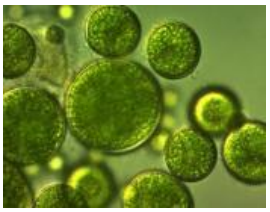
Procedure

Introduction:	Hi students, I hope you're doing well, today we are going to learn about the fantastic world of the kingdoms of nature.  **Image 60 – Animal kingdom** Kingdoms are a way that scientists have developed to divide all living things. These divisions are based on what living things have in common and how they differ. Currently there are five kingdoms in which all living things are divided: Moneran kingdom, Protist Kingdom, Fungi Kingdom, Plantae Kingdom and Animalia Kingdom. Now take a look in the following characteristics and examples of each one of the kingdoms.
Examples:	**Moneran:** The Monera Kingdom consists of organisms that are made up of one cell. These organisms are called unicellular. These unicellular organisms are made of a very simple cell that often lacks many cell parts, such as a nucleus, that are commonly found in other cells. One example of an organism belonging to this kingdom is

the bacteria

Image 61 - Bacteria

Protist: Protists are similar to moneran in that they are unicellular. Protists are a bit more complex because they contain a nucleus. They also have moving parts and can move around within their environment. the examples of the organisms belonging to this kingdom are



the algae

Image 63 - Algae

the amoeba

Image 62 - Amoeba

Fungi: Fungi have their own kingdom because there is no other organism like them. Fungi has multicellular eukaryote organisms and cannot make their own food. For example

mushrooms

Image 65 - Mushrooms

Image 64 - Plantae

Plantae: one of the oldest, and characterized

by its immobile, multicellular and eukaryotic nature. These plantae, whose cells contain cellulose and chlorophyll are essential for life on Earth since they release oxygen through photosynthesis. The examples of the living beings of this kingdom are

Trees

And plants

Image 67 - Plants

Animalia: is the most evolved and is divided into two large groups - vertebrates and invertebrates. These animals are multi-celled, they have sexual reproduction and the ability to move. This kingdom is one of the most diverse and comprises mammals,

fish

Image 66 - Fish

birds,

Image 68 - Birds

	 Reptiles **Image 69 - Reptiles** among others. Human beings also belong to this kingdom**.** That's it students, I hope you have learned and enjoyed it. Thank you!
Summary:	Let's summarize what we have learnt, monera is present in all habitats and is made up of single-cell things with no defined nucleus. For example, the bacteria. Protists contain a nucleus. They also have moving parts and can move around within their environment for example the algae and the amebae. Fungi has multicellular eukaryote organisms and they cannot make their own food, for example mushrooms and yeast. Plantae kingdoms includes trees, plants and other species of vegetation it is characterized by its immobile, multicellular and eukaryotic nature. Finally, Animalia kingdom The living beings are multi-celled, with aerobic respiration, sexual reproduction and the ability to move. It comprises mammals, fish, birds, reptiles, amphibians, insects, among others including human beings. Now let's do the following activities True or False 1. Do the mushrooms belong to monera kingdom? 2. Do the fungi multicellular eukaryote organisms? 3. Do the organisms of Animalia kingdom have aerobic respiration? Multiple choice 1. The bacteria belong to A. Monera kingdom B. Animalia kingdom C. Fungi kingdom 2. The amoeba belongs to A. Plantae kingdom B. Monera kingdom C. Protist kingdom

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	3. The trees belong to A. Fungi kingdom B. Animalia kingdom C. Plantae kingdom
References	https://www.softschools.com/science/biology/the_five_kingdoms/ https://www.iberdrola.com/sustainability/biology-kingdoms-living-things-classification

Table 38 – Design N° 5 "The earth"

Bilingual Education Proposal supported by the design of Virtual Learning Objects (VLO)

Format for the design of the videos

General Information

Ttile:	The Earth
Designed by:	Carolina Córdoba Alvear Yineth Lorena Gaón Mosquera Natalia Mulcué Hurtado Juan Pablo Lara Cuetia Lizeth Ramos Viáfara
Adviser:	Adriana Idrobo Hurtado
Type of technological tools:	Filmora and Canva
Subject:	Natural Sciences
Approach:	Communicative and Humanistic
Competences	Scientific and Interpretive
Institution:	Institución Educativa Instituto Técnico sede Centro Docente Rafael Tello
Course:	Fifth

Content

Topic:	The earth
Subtopic:	The layers of the Earth
Objective:	To learn about structure and surface of Earth and Identify the different layers of the Earth
Problem situation:	How to bring students closer to the beginning of scientific processes by studying the physical environment?
Vocabulary:	ocean, mantle, axis, ozone, rotation, terrain, Earth
Theories and concepts:	**Ocean:** Mass of salty water that covers approximately three-quarters of the earth's surface. **Mantle:** The mantle is the thickest hot, solid rock layer on Earth**.** **Ozone:** Ozone is a gas that occurs naturally in the atmosphere and forms the ozone layer. **Rotation:** turning a thing around its own axis. **Earth:** Planet of the Solar System, third in proximity to the Sun, between Venus and Mars, inhabited by man.

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Procedure

Introduction:	Hello everybody and welcome to this Natural Sciences session. In this occasion, we are going to learn about our planet. Do you know what is our planet? Awesome! The Earth.  **Image 70 – The Earth** So, to introduce you this topic I am going to explain you what the earth is. The Earth is our home; Earth is a rocky and terrestrial planet. It has a solid and active surface,  **Image 71 – The earth, our planet** with mountains, valleys, canyons, plains and much more.

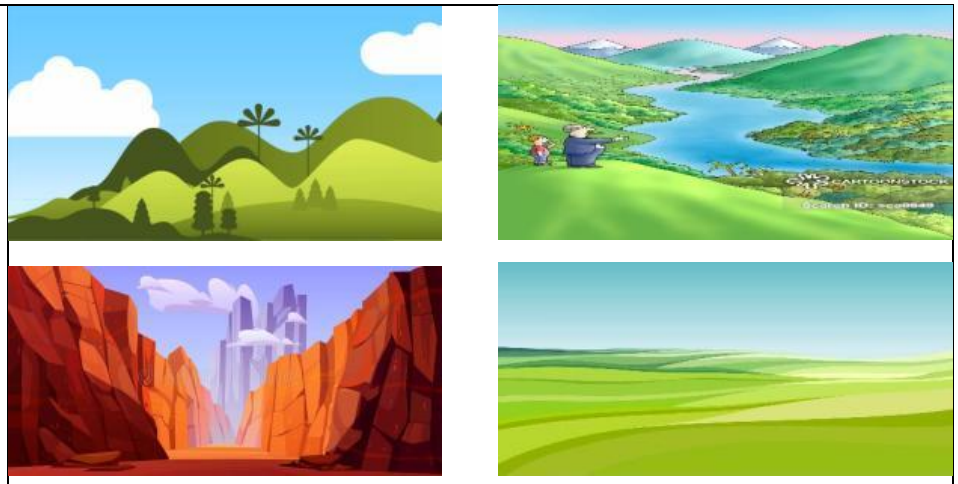

Image 72 – Mountains, valleys, cannons and plains.

Earth is special because it is an ocean planet, since water covers 70% of its surface.

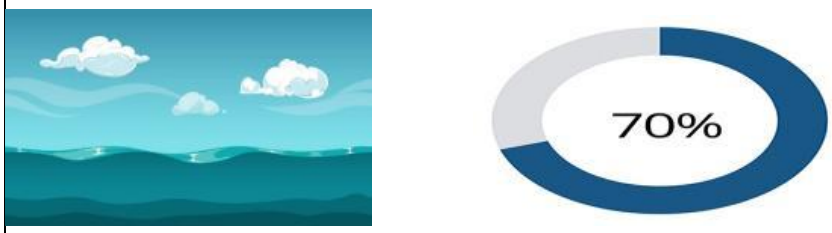

Image 73 – Waters covers 70% of its surface

Now, The Earth is in constant motion, and what is motion? Well, it is a change of place or position of a body in space.
Ok, the Earth has two movements, the first is **revolution**

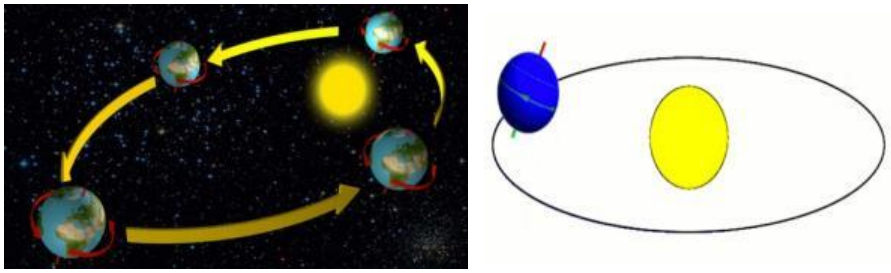

Image 74 – Earth's revolution

the translational motion of the Earth moves around the Sun, driven by gravitation, in 365 days, 5 hours and 57 minutes), and the second one is **rotation**

Image 75 – Earth's rotation

(which is the one in which the Earth rotates on itself ... causes day and night ... and lasts exactly 24 hours, the same as a day). These movements determine the length of days and years and it moves with the rest of the planets and bodies of the Solar System, rotating around the center of our galaxy.
The movement that describes its orbit around the Sun, since it determines the year and the change of seasons. And, even more, the rotation of the Earth around its own axis, which causes day and night, which determines our schedules, in short, is part of our lives.
Now, let's learn about structure Earth!

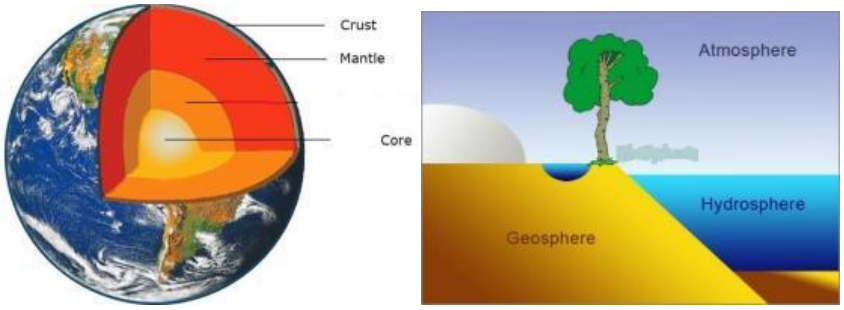

Image 76 – Structure of earth

What elements make up our planet? The earth is made up of three physical elements: **The geosphere** (solid element) (It is the solid part of the earth and is divided into three layers: **the core, the mantle, and the crust**)
So guys, the core are the innermost layer of the earth. It is made up of metals and its temperature is very high.
The mantle is the thickest layer in the geosphere and is between the crust and the core.
As for the crust, it is the outermost layer of the geosphere. It is composed of rocks and in it are the continents, islands and the bottom

	of the oceans and seas. **The hydrosphere** (liquid element) It is the set of all the water that exists on Earth and occupies three quarters of the earth's surface **The atmosphere** (gaseous element). It is the layer of air that covers the Earth and is made up of a mixture of gases and water vapor. **The atmosphere** is divided into two layers, the troposphere which is the closest to the earth and the stratosphere which is where the ozone layer is located and is the layer furthest from the earth.  **Image 77 – The atmosphere** The combination of these three elements is what makes life possible on our planet.  **Image 78 - Ecosystem**
Examples:	Guys, we are going to do a simple example, I'm going to choose one of you to model how the Earth revolves around the sun as it rotates on its axis and that it takes the Earth 1 year or 365 days to make a complete trip around the sun, so, in this period of time, in each birthday, the Earth has made a more complete trip around the sun. You got it?

Image 79 – Earth's revolution

Another clear example to understand more about the layers of the earth is to do an exercise with plasticine.

- First, we are going to model a small ball of yellow plasticine. This ball will represent the core of the Earth.

Image 80 – The Earth and its layers

- Second, we will cover that first ball with a thick layer of Orange plasticine, which will represent the mantle.

Image 81 - The Earth and its layers

- Third, we cover orange ball with a thick layer of red plasticine, it will represent the crust.

Image 82 - The Earth and its layers

- Fourth, we cover the ball with blue clay and add islands and Continents with green or brown plasticine.

Image 83 - The Earth and its layers

	• Finally, you are going to cut the sphere in two.   **Image 84 - The Earth and its layers** What you see? Write down what you have observed in the notebook. Use the correct words. For example, when you talk about the yellow ball, use the word core.
Summary:	So guys. don't forget that ✓ The atmosphere is the layer of air that surrounds the Earth.  **Image 85 - The atmosphere**

- ✓ The hydrosphere is the layer of water on the earth's surface.

Image 86 - Hydrosphere

- ✓ The geosphere is the solid layer of rocks on the planet.

Image 87 – The geosphere

- ✓ The Earth's crust is the outermost and thinnest part. People and many living beings live in it.
- ✓ The mantle is an intermediate part, the thickest of all.
- ✓ The core is the inner part. It is the hottest

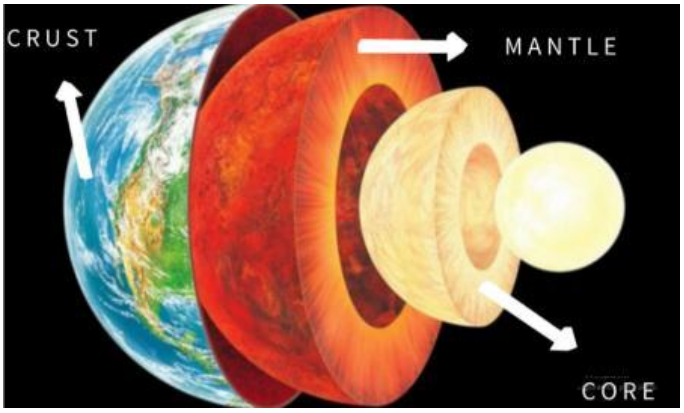

Image 88 – Structure of earth

Students, to put in practice this topic, we´re going to work in pairs. We are going to make a comparative chart between the characteristics of each of the layers of the earth.

Here, we can see an example

The core	The mantle	The crust
The core is solid.	The mantle is a large layer of liquid rock 2,900km in size.	The crust is a solid rock that floats above the liquid mantle
It is a dense, hot solid ball of iron and nickel.	70% of earth's interior mostly made of Oxygen, Silicon, and Magnesium.	It is made up of large tectonic plates that separate one another, creating trenches and mountains.

Image 89 – Characteristics of the structure of earth

Ok my students, that is all for today, I hope you really have enjoyed this topic and see you in the next session. Bye!

References

https://www.space.com/54-earth-history-composition-and-atmosphere.html
https://www.sciencenewsforstudents.org/article/explainer-earth-layer-layer
https://www.zmescience.com/other/science-abc/layers-earth-structure/
https://www.google.com/url?sa=i&url=https%3A%2F%2Fes.pngtree.com%2Ffreepng%2Fbeautiful-earth-elements_3704319.html&psig=AOvVaw2IuXFZJaElcUxML3AJF9pA&ust=1613681423138000&source=images&cd=vfe&ved=0CAIQjRxqFwoTCKj40PHl8e4CFQAAAAAdAAAAABAD

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Table 39 – Design N° 6 "The parts of the earth and its layers"

Bilingual Education Proposal supported by the design of Virtual Learning Objects (VLO)

Format for the design of the videos

General Information

Title:	The parts of the earth and its layers
Designed by:	Carolina Córdoba Alvear Yineth Lorena Gaón Mosquera Natalia Mulcué Hurtado Juan Pablo Lara Cuetia Lizeth Ramos Viáfara
Adviser:	Mg. Adriana Idrobo Hurtado
Type of technological tools:	Genially (interactive image) and Animatron Pro
Subject:	Natural sciences
Approach:	Biological approach
Competences	Interpretive, Scientific.
Institution:	Institución Educativa Instituto Técnico sede Centro Docente Rafael Tello.
Course:	Fifth

Content

Topic:	The earth
Subtopic:	The parts of the earth and its layers
Objective:	To learn the layers of the earth.
Problem situation:	How to bring students closer to the beginning of scientific processes through the study of the physical environment?
Vocabulary:	Geosphere, Atmosphere, Hydrosphere, Biosphere and Magnetosphere.
Theories and concepts:	**Geosphere:** the geosphere is the earth itself: the rocks, minerals, and landforms of the surface and interior. **Atmosphere:** the atmosphere is the thin veil of gas molecules that separates the Earth from the cold void of space. **Hydrosphere:** the hydrosphere is the sum of all the water on the earth and the water cycle that distributes it around the planet. The earth is the unique in the solar system for its abundant surface waters. **Biosphere:** the biosphere is the layer of the planet in the earth, where life exists. **Magnetosphere:** the magnetosphere is the magnetic field that extends from the interior of the earth into the space**.**

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Procedure

Introduction:	Hi guys, I'm Liz! Welcome to your natural sciences class! Today, we're going to talk about "the parts of the earth and its layers ". In this class, I will explain you each part of the earth and its functions, such as: the geosphere, the hydrosphere, the biosphere, the magnetosphere and the atmosphere. But, before starting, remember that the earth is the planet we live on, the third of eight planets in our solar system and the only known place in the universe to support life. It is composed of six layers that you can know below.
Examples:	The **Geosphere** is the solid inner part of the earth; that is to say the rocks, minerals, and landforms of the surface and interior. Without the geosphere, human beings could not live on the planet, as there would be no solid ground. The geosphere is made up of three concentric layers, called: **the core, the mantle, and the earth's crust**.  **Image 90 – The geosphere** The geosphere was generated from the earth formation, 4.6 billion years ago, when the initial temperature of the planet was extremely high; due to the constant collisions during its formation, everything was molten matter, but during the next phase of the earth's formation, there was a cooling and differentiation of the earth's layers.  The dense materials sank in the center, forming a **Core** rich in iron and nickel. **Image 91 – Core of the earth**

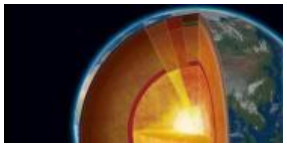

Image 92 - Mantle

The lighter magma rose to the surface, forming the thickest layer on Earth called the **mantle**.

Image 93 - Crust

Eventually, the outermost magma cooled to form the thin layer that we call, the **earth's crust**.

The **hydrosphere** is the totality of the water of our planet; including the groundwater, surface water and the vapor of water circulating through the air.

The origin of the hydrosphere is due to at the beginning, the earth was extremely hot and the volcanoes emitted gases among which was water vapor; however, as time passed the planet cooled and the water vapor began to condense.

Image 94 - Lava

It was just as the oceans formed, where the first form of aquatic life emerged millions of years later.

The water is constantly moving in the atmosphere and the surface of the earth and its state (solid, liquid or gas) can change; This is known as the water cycle, which consists of four components such as: **precipitation, collection, evaporation** and **condensation**.

Image 95 – Water cycle

- **Precipitation** occurs when the cloud's waterfalls on the grounds as rain, snow, sleet or hail.
- **Collection** occurs when the roots in the soil attract the water of the plant through the stem; and then, the plant uses it for its metabolic processes until it releases part of it as a vapor through the leaves.

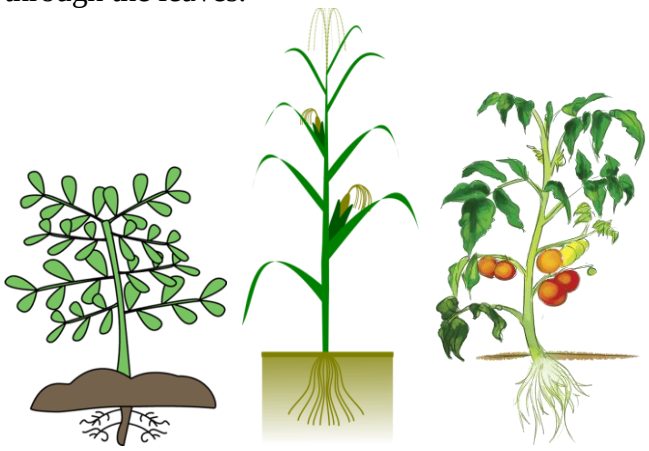

Image 96 – Plants absorb water and expel O_2

- **Evaporation** occurs when the liquid water from ocean surfaces, rivers, lakes, streams, seas and puddles turns to steam.
- **Condensation** occurs when water in a solid state (ice) is transformed into a liquid state.

In the **biosphere** we find the living beings; all the microbes, plants and animals are somewhere in this earth's layer.

The biosphere is formed for the layers of the earth. The layer of the solid surface is the **lithosphere**, the **atmosphere** is the layer of the air which extends above the lithosphere and the water of the earth, which can be found in the surface, on the ground or in the air, forms the **hydrosphere**.

The biosphere is everything that surrounds us; for example: the oceans, the continents, a coral reef, a home garden, etc. It is important to protect the biosphere avowing the use of harmful chemicals, the deforestation, the pollution, etc. and a way to do it is recycling, reusing and renewing.

Image 97 – Protect the biosphere

The **magnetosphere** is the magnetic field that extends from the interior of the earth into the space, where it meets the solar wind (a stream of charged particles emanating from the Sun).

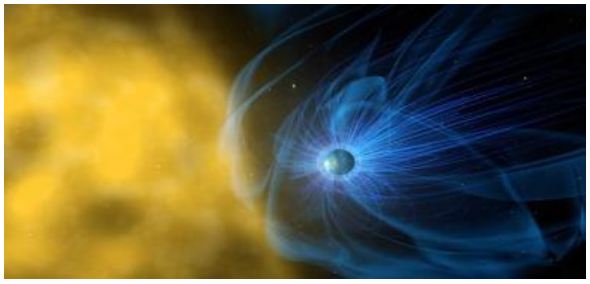

Image 98 – The magnetosphere

The origin of the magnetosphere is due to the depth of the earth's solid iron core, which is as hot as the sun.

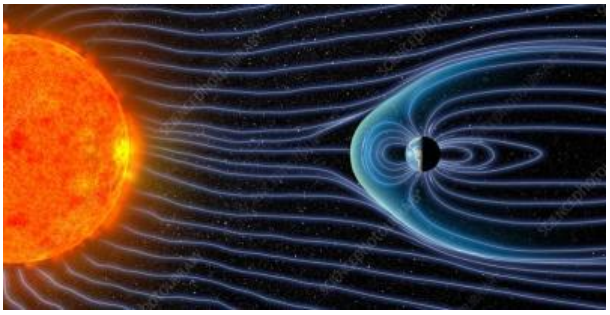

Image 99 – The magnetosphere

The magnetic field protects the earth from the damage caused by the solar wind, a stream of energy-charged particles emanating from the Sun. Thanks to the earth's magnetic field, we can only perceive the solar wind through phenomena such as: the aurora and geomagnetic storms (only when the solar wind is very strong).

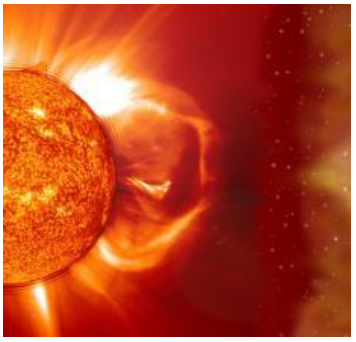

Image 100 – The magnetic field

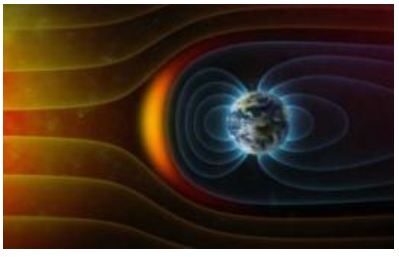

Image 101 - The magnetic field

Summary:

Remember:

In the **geosphere** all the solid inner parts of the earth; rocks, minerals, landforms, etc can be found.

	In the **hydrosphere** all the water of our planet; the rivers, the oceans and the vapor of water circulating through the air can be found. In the **biosphere** all the living beings can be found; animals, microbes, plants, etc. And in the **magnetosphere** the magnetic field we can find the aurora, the storms, etc. **Activity** Let's practice with the next DIY (do it yourself)! For this activity you will need: • 5 cardboards or block sheets • A pencil • Colored pencils • scissors • An eraser and a sharphener Take the cardboards or the block sheets and draw each layer on each sheet, (it is very important that you try to draw each layer with the corret characteristics); then, paint your drawings. In the fifth sheet, write the four layer names and cut them with a scissor. Finally, choice a place (for example your room) and paste the draws and the layer names on the wall in a disordered way. In this way, you can identify the layers of the earth relating the characteristics of each one with the correct name, remembering the function and why they are important for human life. I hope that you have understood this topic. See you soon! Don't forget to protect the planet!
References	https://www.agci.org/earth-systems/anthroposphere https://www.nationalgeographic.org/encyclopedia/earth/ https://www.britannica.com/science/water-cycle https://www.capasdelatierra.org/ https://www.capasdelatierra.org/geosfera/ https://www.shutterstock.com/image-vector/water-cycle-diagram-illustration-1120652594 https://www.capasdelatierra.org/wp-content/uploads/2018/04/biosfera.jpeg https://www.capasdelatierra.org/wp-content/uploads/2018/04/auroras-300x180.jpg https://www.capasdelatierra.org/wp-content/uploads/2018/04/campo-magnetico-300x188.jpg

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Table 40 – Design N° 7 "Parts of the atmosphere and its layers"

Bilingual Education Proposal supported by the design of Virtual Learning Objects (VLO)

Format for the design of the videos

General Information

Title:	Parts of the atmosphere and its layers
Designed by:	Carolina Córdoba Alvear Yineth Lorena Gaón Mosquera Natalia Mulcué Hurtado Juan Pablo Lara Cuetia Lizeth Ramos Viáfara
Adviser:	Mg. Adriana Idrobo Hurtado
Type of technological tools:	Genially (interactive image) and Animatron Pro
Subject:	Natural sciences
Approach:	Biological approach
Competences	Interpretive, Scientific.
Institution:	Institución Educativa Instituto Técnico sede Centro Docente Rafael Tello.
Course:	Fifth

Content

Topic:	The earth
Subtopic:	Parts of the atmosphere and its layers
Objective:	To learn the function of the atmosphere
Problem situation:	How to bring students closer to the beginning of scientific processes through the study of the physical environment?
Vocabulary:	The atmosphere-the exosphere, thermosphere, ionosphere, mesosphere, stratosphere and troposphere.
Theories and concepts:	The **atmosphere** is the gaseous layer that surrounds the Earth. The **exosphere** is the extern and fifth layer of the atmosphere. The **thermosphere** is the fourth layer of the atmosphere. The **ionosphere** is an area of the atmosphere of the earth, which contains atoms and molecules. The **mesosphere** is the third layer of the atmosphere. The **stratosphere** is the second layer of the atmosphere. The **troposphere** is the lowest layer of the atmosphere.

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Procedure

Introduction:	The **Atmosphere** is composed of a gaseous layer that surrounds the Earth. This layer protects us from the vacuum of space and the electromagnetic radiation emitted by the Sun.  **Image 102 – The atmosphere** The atmosphere contains oxygen (O2), an essential gas that we all breathe to live.  **Image 103 – Oxygen (O2)** According to researchers, the earth was formed 5 billion years ago, and the most of gases of our atmosphere were thrown into the air by the first volcanoes.  **Image 104 - Volcano**

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As a fun fact it's worth mentioning that during the next 500 million of years there won´t be much oxygen around the Earth.

The atmosphere acts as a gigantic filter that repels most of the ultraviolet radiation and partially absorbs the warm rays of the sun.

Image 105 – The atmosphere protect us of thee ultraviolet radition.

Ultraviolet radiation is harmful to living beings; in fact it is the cause of sunburn.

Image 106 – Ultraviolet radiation

For its part, the solar heat that passes through the atmosphere is necessary for all life on the earth.

Image 107 – The sun and earth

Examples:	The atmosphere has a layered structure such as: **the troposphere, stratosphere, mesosphere, thermosphere, exosphere** and **ionosphere.**

Image 108 – The earth's atmosphere

- **The troposphere** is the lowest layer of the **atmosphere;** which extends from the earth's surface to the beginning of the stratosphere**.** In this layer is the air we breathe and it climatizes process of the earth; the clouds we observe and the birds flying make part of the troposphere. In the troposphere are formed the winds, clouds, and the precipitation because the warm, moisture-laden air rises and the cold air descends. These winds depend of the local variations in temperature and the air pressure.

Image 109 – The troposphere

The troposphere has a direct contact with the earth's surface**,** that's why it is very sensitive to **the oceans evaporation, the water cycle, the photosynthesis of the plants, the respiration**

of animals and human activities. The troposphere is important because it's the layer in which the weather occurs.

- The **stratosphere** is the second layer of the atmosphere, which is located above the troposphere and below the mesosphere. The content of water vapor in the stratosphere is very low. That's mean that the formation of the stratospheric clouds, just occurs in presence of low temperatures to let the formation of ice crystals. These conditions generally only exist in the polar regions.

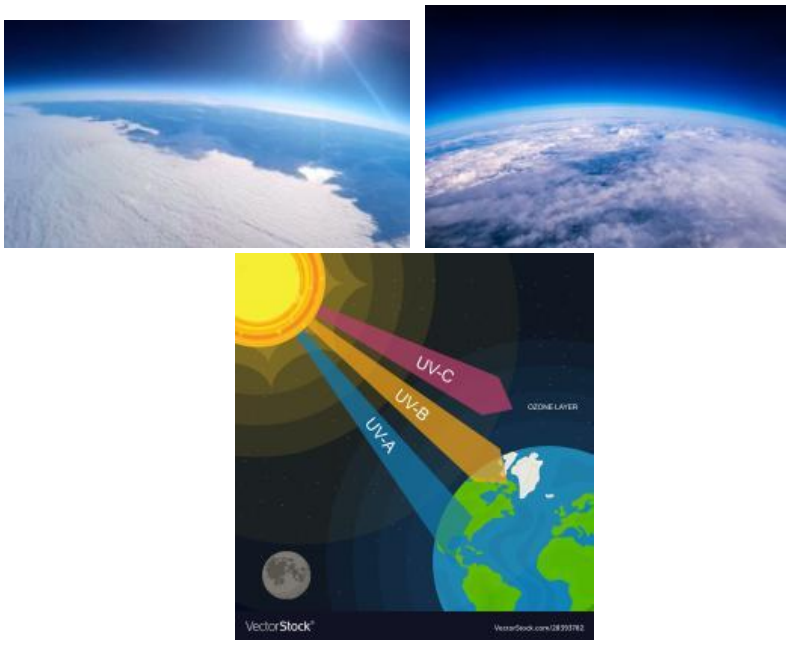

Image 110 – The stratosphere

The stratosphere is the protective blanket of the earth that houses the ozone layer (O3); that's **a mass that works like a shield and protect us from the UV radiation from the sun**, avowing the cancer and skin burns in human beings.
The **ozone layer** makes part of the stratosphere and its function is to absorb the solar radiation that falls on the earth.

- The **mesosphere** is the third layer located above the stratosphere and below the thermosphere. It is the coldest layer and its gases are made up of oxygen, carbon dioxide, and nitrogen.

Image 111 – The mesosphere

The aim of this layer is to destroy the meteors and asteroids before they can reach Earth's surface.

Image 112 – The mesosphere

In the mesosphere sometimes is formed a kind of special clouds (noctilucent clouds); which are close to the North and South poles. Generally, they are higher than any other type of cloud.

- The **thermosphere** is the fourth layer of the atmosphere, located above the mesosphere and below the exosphere.

Image 113 – The thermosphere

The main components of the air in the thermosphere are the atomic oxygen (O), atomic nitrogen (N) and helium (He).

The aim of the thermosphere is to protect and regulate the earth’s temperature by absorbing much of the UV radiation and X-rays emitted by the Sun. When the Sun is more active, the thermosphere heats up and increases in size, increasing its protective power.

Image 114 – Northern Lights

In this layer we can appreciate one of the most beautiful phenomena; the Northern Lights.

- The **exosphere** is the fifth and outermost layer of the atmosphere, beginning at the upper limit of the thermosphere, at a point in the atmosphere known as the exobase, exopause, or "critical altitude."

Image 115 – The exosphere

The exosphere is composed by very low densities of hydrogen, helium, and other heavier molecules, including nitrogen, oxygen, and carbon dioxide closer to the exobase.

The exosphere is the most distant layer from the atmosphere; but, it constitutes the first line of **defense of the planet against the rays of the Sun and meteors.**

Image 116 – The exosphere

	This layer is perfect to put satellites because there are not much friction and they can orbit easily. • The **ionosphere** contains a relatively large number of electrically charged atoms and molecules.  **Image 117 – The Ionosphere** These charged particles are created due to extraterrestrial radiation (mainly from the sun) on neutral atoms and air molecules in the atmosphere. This layer overlaps the mesosphere, thermosphere, and exosphere.  **Image 118 – The Ionosphere** The ionosphere influences the propagation of radio waves to distant places on the planet, as well as between satellites and earth. It influences also in the northern lights and protect us of the radiation.
Summary:	**Remember:** **The atmosphere** protects us from the vacuum of the space and the electromagnetic radiation emitted by the Sun, and its layers are: **the troposphere, stratosphere, mesosphere, thermosphere, exosphere** and **ionosphere.** **The troposphere** is the air we breathe and it climatizes the process of

	the earth and the clouds we observe. The **mesosphere** is the layer that destroys the meteors and asteroids before they can reach the earth's surface. The **thermosphere** is the layer that protects and regulates the earth's temperature by absorbing much of the radiation. The **exosphere** is the most distant layer from the atmosphere; but, it constitutes the first line of **defense of the planet against the rays of the sun and meteors.** The **ionosphere** contains a relatively large number of electrically charged atoms and molecules. Remember that we have to protect the atmosphere and the best way of contributing is **recycling, reusing** and **renewing.** **Activity** Let's practice with the next DIY (do it yourself)! For this activity you will need: • 7 cardboards or block sheets • A pencil • Colored pencils • scissors • An eraser and a sharphener Take the cardboards or the block sheets and draw each layer on each sheet, (it is very important that you try to draw each layer with the corret characteristics); then, paint your drawings. In the seventh sheet, write the six layer names and cut them with a scissor. Finally, choice a place (for example your room) and paste the draws and the layer names on the wall in a disordered way. In this way, you can identify the layers of the atmosphere relating the characteristics of each one with the correct name… remembering the function and why they are important for human life. I hope that you have understood this topic. See you soon! Don't forget to protect the planet!
References	https://www.agci.org/earth-systems/anthroposphere https://www.capasdelatierra.org/

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5.3.4. Evaluation of the VLOs

Finally, in the fourth step, with the purpose of evaluating the viability of the Bilingual Education Proposal, the VLOs were evaluated first. For that, the researchers considered the CODA tool “La Herramienta para la evaluación de calidad de los objetos virtuales de aprendizaje" which has 10 quality criteria (the 5 technological and the 5 pedagogical, since these allow to assess the potential technological and didactic effectiveness of the VLO) organized on a scale from 1 to 5, thus obtaining quantitative results, but the researchers only considered the criteria to adapt it in the questionnaire. The researchers proceeded to identify the criteria, to formulate 10 flexible and open – ended questions related to the VLOs evaluation and 6 related to the Bilingual Education Proposal evaluation. Once the questionnaire format was designed, a meeting with them was scheduled (due to the health emergency decreed by the national government for Covid-19*, this meeting was held through the Google Meet platform) with the purpose of socializing the Bilingual Education Proposal, and presenting the VLOs **(Appendix H).** The coordinator was at the meeting since some of her functions are to strengthen the pedagogical support and the accompaniment in institutional and academic process, the three fifth grade teachers were too (two of Mathematics and one of Natural Sciences) since being the teachers of these subjects, they helped the researchers to choose the topics of the Bilingual Curricular Plan; moreover, they will be the ones who will use and implement this proposal.

When the socialization was done, the investigators delivered to them the questionnaire through Google Forms, which is a survey management software offered by Google **(Appendix, I)**. In this way, the school teachers and the coordinator were able to watch the VLOs to later answer the questionnaire and evaluate them.

*Covid 19: Coronavirus disease (COVID-19) is an infectious disease caused by a newly discovered coronavirus. For that reason, the Colombian goverment through presidential decree N° 417 March 17th 2020 declared the health emergency in Colombia.

6. Analysis of the results.

In this way, the results obtained in the questionnaire which was addressed to the Rafael Tello coordinator and the Mathematics and Natural Sciences teachers, are included in this chapter with the purpose of evaluating the Bilingual Education Proposal. The questionnaire was divided in two parts: the first corresponded to the VLO evaluation, subdivided into two components (pedagogical and technological) in accordance with the CODA criteria for the evaluation of VLOs as support of this research project and the second was about the Bilingual Education Proposal Evaluation.

So in the first part of the Questionnaire, considering the answers of the coordinator and teachers about the first question of the pedagogical criteria, which is focused on the implementation of the objectives and strategies in the development of the VLOs topics, they agreed about the execution of objectives and the proposed topics in the digital resource. One of them claimed that the presented objectives were concise, achievable and measurable while another one said that the material had the objectives and basic standards projected in the PEI and the curricular plans even in the institution's coexistence manual, as well as the use of ICT which are very important because of the reinforcement of each proposed activity in the lesson plan. Another teacher, for his part, argued that the accomplishment of the objectives and topics were what gave the student the opportunity to apply the acquired knowledge during their learning process.

Regarding the second question that refers to the quality of contents of the VLOs, the evaluators in their answers agreed that they were very well organized, clear, dynamic, easy to understand and even more because the vocabulary added before exploring the content allowed a

greater understanding. Besides, the video as part of the VLOs was a complementary resource that helps to reinforce the explanation of the topic made by the teacher. In addition, some of them determined that, thanks to the proposed material, the academic process of each student like pruebas saber 5° and pruebas saber 11° is strengthened.

Moreover with regard to the ability to generate reflection, criticism and innovation, teachers coincided that the changes present in today's society require students to develop technological skills, allowing them to advance at their own pace, investigate and delve further into the topics of their interest; In the same way, the use of VLOs encourages autonomous learning since by having dynamism and creativity, it makes the student to feel free to enter and interact with them, which allows to use them at any time outside the class because it has a structure, information and activities that makes it possible.

Concerning the question about interactivity and adaptability in the VLOs, the coordinator and the teachers agreed that the dynamic content and the proposed activities positively influence student learning because the presented material gives them the possibility to easily interact. One of them also added that the dynamism itself makes the VLOs adaptable tools, that is to say, easy to handle. Another teacher said that the variety of assessment activities help the students to measure themselves and motivates them to overcome. Lastly, another teacher highlighted that the VLOs were innovative for the institution which can be translated into acceptance and strengthening of learning processes.

In respect of the question about motivation, the evaluators considered that aspects such as creativity, organization, design, innovation, and the well-structured activities of the VLOs are fundamental to catch the student's attention and therefore, strengthen their motivation as users of these. For them, the VLOs, when complying with these aspects and being a support material and

a teaching strategy, attracts the student to the knowledge. It should be noted that one of the teachers claimed that the material is characterized by being innovative, since these are new tools for both teachers and students and that by being striking, they will generate interest.

According with the question about technological criteria, which is focused on the negative or positive influence of the the organization of texts, images, sound, voice, colors, and the quality of audiovisual content on the student learning process, the teachers argued that these characteristics of audiovisual content have a positive influence on the student learning because they not only comply the raised objectives but also reinforce the concepts. Furthermore, one of the teachers highlighted the importance of the organization of the information, the clarity and brevity of the examples, whose complement are illustrations and graphs. Besides, the variety of the voices and the presentation of the topics make the VLOs dynamic; it means that they are not monotonous tools because they make the user feel comfortable and therefore want to browse the entire VLOs.

In relation to usability, teachers indicated that the exposed material is easy to use, facilitating autonomous learning, which allows the students to work at their own pace and generate possibilities of self-assessment, since any type of registration is required to navigate and interact with them. Additionally, the VLOs enable the users to identify achievements and weaknesses to overcome their own difficulties and in this way, they can achieve satisfactory progress in their learning process through this digital resource, insomuch everything is inside of the VLOs so the users do not have to click (enter) in pages of dangerous content.

With regard to the accessibility of the VLOs, the participants agreed that it was well worked, selected, dynamic, auditory, clear and simple material; furthermore, it can be used in different populations (it can be adjusted for people with disabilities) being inclusive and involve the alternative of being worked in printed version with those students who have connection issues; in

addition, the VLOs use clear and simple vocabulary and the complemented tools (videos and images) serve to strengthen the learning process in students in a varied way, complementing the textual information. Likewise, to surf on the VLOs there is no need to enter confidential information.

As far as the question about reusability, the teachers and coordinator sympathized that it can be used in any educational environment due to its manage facility, besides, they agreed that they would make use of the VLOs in the distinct educational contexts by using them to reinforce and complement their classes neither virtual, face-to-face classes or blended learning, they also said that this material can be worked in groups, pairs and individually, neither at home or in the institution by using the resources that the Rafael Tello has like the Computers room and tablets. One of them said that as the VLOs are non-static content, they can be modified according to the teachers and students' needs by adding more content and activities. Another teacher considered that the VLOs can be worked together with the rest of the teachers to make transversality possible.

Finally, in this last criteria, the evaluators manifested that the interoperability of the VLOs plays an essential role because being an inclusive both, teachers and the students can access from any technological device, since according to the information provided by the teachers, most of the students access their classes from cell phones and the ease of interoperability allows them to navigate through the VLOs without any limitations.

As mentioned before, in this second part of the questionnaire, the teachers and coordinator found some questions that looked to evaluate the Bilingual Education Proposal, as in the first part, teachers were free to express their comments in a descriptive way on the importance of its design and implementation in the institution.

In accordance with the teachers' experience, they thought that the innovation, interdisciplinarity and transversality of this Bilingual Education Proposal bring advantages for Rafael Tello School. One of them argued that this proposal strengthens the English in primary school, since the institution does not have specialized teachers in this language; on the contrary, they are teachers educated in basic concepts of this one as well as in the rest of areas of knowledge. Moreover, they thought that deepening the conceptualization of other subjects through English reinforces the knowledge and prepares the students at a global level and if this kind of project is developed in the public institutions of the country, it is possible to obtain achievements in the internal and the external tests presented by the students resulting in better possibilities for them. Two of the teachers said that it was the first time that they knew and had the opportunity to participate in a proposal like this. Also, they emphasized that in Santander de Quilichao, there is not an educational institution that has developed this kind of proposal.

One of them highlighted how important it would be to present this proposal to the local education authorities, because of the innovation in the said municipality. Besides, the implementation of this Bilingual Education Proposal is in accordance with the Instituto Tecnico institutional vision that has been characterized as a leader in innovation and academic improvement processes.

Another opinion was focused on the effectiveness of the development of lesson plans and how much students will enjoy them, thanks to the simple language of the topics that give them a better understanding.

Furthermore, the question which is focused on the contribution that this proposal would make to the Centro Rafael Tello and the quilichagueña community, the evaluators determined that the material presented integrate various aspects such as culture, transversality and different social

themes that allow to strengthen student English learning from distinct areas. Even some of them agreed that being a Bilingual Proposal, allows the students to move among many worlds and cultures, and by having the proposal a curricular transversality, it facilitates the support of different social processes of the community being in this way, a great contribution to the institution and to the Santander de Quilichao municipality.

In line with the question whether the teachers consider pertinent that the Instituto Tecnico Educational Institution seeks to implement the proposal in all its headquarters, and what actions should be taken to carry it out, the teachers established that it definitely should be, since this research project is very newfangled, and that is what makes it pertinent to implement it in the institution, which has projected to be a leader at the local and departmental level. In the same way, they coincided that the actions that should be taken is to present a macro project to the Ministerio de Educación Nacional where the importance of English in elementary school is defended, as well as the importance of bilingual teachers with knowledge of the diverse areas who can carry out a project like this with the teachers already existing in the institution, and at the same time being a support among themselves; in other matters, it is important that the University of Cauca continues nurturing, strengthening, supporting and replicating proposals like this one, then this could generate a significant transformation and impact in the learning process, that leads to a restructuring of the curriculum taking into account teachers, students and parents.

In conformity with the main pedagogical benefits that brings this Bilingual Education Proposal in the academic training process of the students of this institution, the teachers and coordinator determined that theVLOs as support of it, profits the motivation in the students for learning and the participation in classes. One of the evaluators said that curricular transversality allows the reinforcement of the topics and autonomous learning, teamwork and leadership.

Another one considered that, due to the didactic and interactive content, the VLOs promote critical and interpretative thinking and the need for the students to investigate and learn more about the topics. Another evaluator added that it foments Flipped classroom (a pedagogical model that transfer the work of some learning process outside the classroom, using the time of the class and the teacher's experience) and highlighted the active role that the students have; after all, they can illustrate more the concepts to improve their abilities in acquiring knowledge and making decisions; moreover, it strengthens the interaction between teacher-student and student-student.

As regards the impact that can have the implementation of the proposal on the students learning process, the teachers agreed that this proposal allows reinforcing and complementing the topics and concepts through interdisciplinary procedure, strengthening transverse processes by integrating the use of ICT in the different subjects, strengthen the command of English by visual and hearing challenges and increasing the vocabulary in a second language associated with the distinct areas of knowledge and transversal activities where other disciplines are integrated, such as: values, arts, critical thinking and others. Finally, one of the teachers claimed that when the proposal be implemented in the institution, it will bring positive results both in the academy and in school training.

Eventually, considering the question about whether the teachers can have difficulties to develop the Bilingual Education Proposal or not, the teachers and coordinator agreed that they could present inconvenients for executing the proposal in their classes, due to it is a complex task, insomuch as they do not have the same facility and open mind to face new changes but they will make an effort to implement it. For one of them, it is not viable because of the fear of facing a foreign language, but at the same time they see it as a challenge that will help to improve the

students' learning process as they must prepare in the best way for the school tests, as well as the new life that they will start when leaving elementary school. Nevertheless, two teachers considered that the agreement between the University of Cauca and the Instituto Técnico, will allow them to have support on the Modern Languages students to strengthen their knowledge in foreing languages.

7. Conclusions

Taking into account the development of this Bilingual Education Proposal, supported by the design and evaluation of the VLOs, the researchers concluded that:

- Through the Bilingual Education Proposal, the bilingualism is strengthened as the students can reach the level for fifth grade stipulated by MEN in the basic standards of competencies in foreing languages.
- The transversality of this proposal is a great contribution to Rafael Tello Institution and Santander de Quilichao municipality because it facilitates the support of different social processes of the community from diverse knowledge areas.
- It is an innovative and efficient proposal as much for the institution as for the region, which contributes to the learning processes by obtaining good results in the internal and external tests of the institutions.
- The agreement between the University of Cauca and the Instituto Tecnico allows teachers to have the support of Modern Language students to strengthen their knowledge of foreign languages.
- Bilingual Education not only strengthens the English language, but also amplifies the native language improving the comprehension and knowledge of the students about the topics; it is to say, that their language is enriched and it can motivate the students to explore other languages.
- The teachers can have some difficulties by developing this proposal since they are not English teachers also because of the fear of facing this foreing language.
- A Bilingual Education Proposal is a viable way in all official institutions to significantly improve the level of bilingualism in Colombia.

- It is possible to strengthen the foreign language education through different areas of knowledge.
- It is possible to implement Bilingual Education in official institutions.
- The VLOs as support of the Bilingual Education Proposal is a motivating instrument for students in terms of learning and participation in classes since they invite them to investigate, resulting in autonomous learning.
- The VLOs of this proposal are great and didactic tools that currently contribute to the educational process of the student, facilitating the understanding of content, and in turn accessing resources according to their needs and the context in which they are.
- Being an innovative proposal and the first of its kind in Santander de Quilichao, the institution continues to be a leader in the different institutional, academ ic, social and community processes, also it is closer to fulfilling the institutional vision projected for the year 2022.
- This proposal strengthens the transversality processes in the by developing different themes related to the use of ICT, the arts, values, critical thinking, quantitative thinking and reading comprehension, contributing not only to improving the knowledge of the two subjects proposed in this project.
- It is necessary to integrate ICT in the development of the curricula, since these have become an essential tool to design pedagogical strategies like the ones created in this Proposal.
- Designing this proposal was a challenge for the researchers, since it was necessary to carry out an exhaustive study from the PEI, the curricular topics of both subjects as well

as the management of the different programs and virtual platforms for the development of the VLOs.

- Working this proposal was a significat experience since it will help us to continue growing as teachers, to look for innovative learning models and to put in practice bilingual education in our current or future classes.

8. Recommendations

Taking into consideration all the process to carry out this Bilingual Education Proposal, the researchers recommend:

- To know the level of students in the second language before designing a Bilingual Education Proposal, since it will be useful to select the kind of vocabulary to use, either advanced or basic.
- To follow the MEN guidelines for the design of a Bilingual Education Proposal to achieve a concordance with the PEI and thus obtain appropriate and useful results to the institution.
- To develop a Bilingual Education Proposal not only in Mathematics and Natural Sciences but also in the rest of the knowledge areas.
- To take into account the level for the grade stipulated by MEN in the basic standards when developing a Bilingual Education Proposal.
- To select a Software Package that enables the use of tools according to the students age to create the appropriate material and interactive activities that catches their attention.
- To provide accompaniment by OPE students to the Natural Sciences and Mathematics teachers of Rafael Tello headquarters to carry out the lesson plans created in this Bilingual Education Proposal. Besides, the modern languages program should strengthen the proposal by integrating English with the rest of the subjects.
- To give participation to teachers in the area of technology in the training and management of the different programs and virtual platforms in order to integrate all the

subjects and thus create an institutional platform or database where teachers, students, parents and even other people can browse the different VLOs.

- To create integration spaces or include the students of the institutions that have an agreement with the university, in events as the Feria de las lenguas in which students can exhibit recreational activities such as: Math games, historical fact games and others, with the aim to share information by using English language to strengthen not only the knowledge of the different subjects, but also to improve the language use.
- To manage projects that raise awareness and commit to Santander mayoral services to develop a bilingual education plan from which the public schools of the municipality benefit.
- To urge the directive and academic council of Institución Educativa Instituto Técnico to adopt this proposal at the institutional level, since it will allow Instituto Técnico to achieve and consolidate itself as a leading institution in both social and academic processes.

9. References

Ardila, A. (2012 junio-diciembre). Ventajas y desventajas del bilingüismo. Forma y Función, 25(2), 99-114. Recuperado de https://www.redalyc.org/pdf/219/21928398005.pdf

Alarcón D, Angulo B, Caro C, Garzón E. (2014). *Propuesta curricular para la integración del inglés al área de Ciencias Naturales.* (tesis de Pregrado). Universidad Libre, Bogotá, Colombia. Retrieved from: https://repository.unilibre.edu.co/bitstream/handle/10901/7565/AlarconCastiblancoDanielaAlejandra2014.pdf?sequence=1&isAllowed=y

Arciniegas, M. (2014, octubre 17). ¿Intensificación del inglés o bilingüismo en la institución escolar? *HOJAS Y HABLAS.* Retrieved from: https://dialnet.unirioja.es/descarga/articulo/6628747.pdf

Arcón, D. (2014). *Educación Bilingüe Intercultural y la cultura sakapulteka en las escuelas primarias de Sacapulas, Quiché* (tesis de Maestría). Universidad de San Carlos de Guatemala, Guatemala. Retrieved from: http://biblioteca.usac.edu.gt/tesis/07/07_2204.pdf

Arias, H. (mayo, 2017). *Incidencia de un objeto virtual de aprendizaje en los procesos de aprendizaje sobre el territorio*. (Tesis de maestría). Tecnológico de Monterrey, México. Retrieved from: https://repositorio.tec.mx/handle/11285/622480

Bermúdez J, Fandiño Y. (2012 enero). El fenómeno bilingüe: perspectivas y tendencias en bilingüismo. *Revista de la Universidad de la Salle 59.* Retrieved from: https://ciencia.lasalle.edu.co/cgi/viewcontent.cgi?article=1309&context=ruls

Benavent M. (2014). *Educación bilingüe ¿realidad o utopía?* (tesis Maestría). Universidad Internacional de la Rioja. Retrieved from: https://reunir.unir.net/bitstream/handle/123456789/2232/Benavent-Sancho.pdf?sequence=1

Bravo, (2016). Diseño, construcción y uso de objetos virtuales de aprendizaje OVA. Tesis de licenciatura. Colombia: Universidad Nacional Abierta y a Distancia. San Juan de Pasto. Retrieved from: http://repository.unad.edu.co/bitstream/10596/8892/1/1087026799.pdf

Cardona, F. (octubre, 2014). *Diseño y desarrollo de recursos educativos para la enseñanza bilingue de matemáticas en primer ciclo de primaria en el Istmo de Tehuantepec*. (Tesis de Maestría). Universidad Autónoma de Querétaro, México. Retrieved from: http://ri-ng.uaq.mx/bitstream/123456789/263/1/RI001910.pdf

Caicedo Y, Chaparro P, Galindo Y, Trujillo Y. (2010). I*mplementación de una propuesta de bilingüismo para el Colegio Guimarc en su proceso de Institución Monolingue a Bilingue*

(tesis de Pregrado). Universidad Libre, Bogotá, Colombia. Retrieved from: https://repository.unilibre.edu.co/bitstream/handle/10901/8180/IMPLEMENTACI%C3%93N%20DE%20UNA%20PROPUESTA%20DE%20BILING%C3%9CISMO%20PARA%20EL%20COLEGIO%20GUIMARC%20%20EN%20SU%20PROCESO%20DE%20INSTITUC.pdf?sequence=1&isAllowed=y

Callejas M, Hernandez E, Pinzon J. (2011). Objetos de aprendizaje, un estado del arte. Red de Revistas Científicas de América Latina, el Caribe, España y Portugal. Retrieved from: https://www.redalyc.org/pdf/2654/265420116011.pdf

Consejo Directivo Instituto Técnico, 2018. *Manual de Convivencia y de Formación Escolar*. Retrieved from: http://www.educa20.com/colegio/tecnico/uploads/actua._manual__mayo_09_de_2013.pdf

Contreras O. (2012, 15 febrero). Stephen Krashen: sus aportes a la educación bilingüe. Rastros Rostros, 14(27). Retrieved from: https://dialnet.unirioja.es/descarga/articulo/6515551.pdf

Creswell, J. W. (1998). Qualitative inquiry and research design: Choosing among five designs. Thousand Oaks, CA: Sage. Retrieved from: https://www.fhi360.org/sites/default/files/media/documents/Qualitative%20Research%20Methods%20-%20A%20Data%20Collector's%20Field%20Guide.pdf

Cummins J, Swain M. (1986) Bilingualism in Education. en Nueva York. Retrieved from: https://www.taylorfrancis.com/books/9781315835877

Denzin, N. K. & Lincoln, Y. S. (1994). Introduction: Entering the field of qualitative research. In N. K. Denzin & Y. S. Lincoln. (eds.). Handbook of qualitative research. Thousand Oaks, CA: Sage. Retrieved from: http://www.personal.psu.edu/wxh139/Quality.htm

Duque, M. (2018). *OVA para el aprendizaje del inglés en grado sexto de la Institución educativa San Juan Bautista de la Salle.* (tesis de Especialización). Universidad Cooperativa de Colombia Facultad de Ciencias Humanas, sociales y Educación, Bogotá, Colombia. Retrieved from: https://repository.ucc.edu.co/bitstream/20.500.12494/7797/1/2018_ova_aprendizaje_ingles.pdf

EF Education First (EF), 2016. *EF EPI Índice del EF English Proficiency.* Retrieved from: https://www.ef.com/__/~/media/centralefcom/epi/downloads/full-reports/v6/ef-epi-2016-spanish-euro.pdf

Hernández R, Fernández C, Baptista M. (2006). Metodología de la investigación. Cuarta Edición en México D.F. Retrieved from: https://seminariodemetodologiadelainvestigacion.files.wordpress.com/2012/03/metodologc3a da-de-la-investigacic3b3n-roberto-hernc3a1ndez-sampieri.pdf

Hernández R, Fernández C, Baptista M. (2010). Metodología de la investigación. Quinta Edición en México D.F. Retrieved from: https://www.esup.edu.pe/descargas/dep_investigacion/Metodologia%20de%20la%20investigaci%C3%B3n%205ta%20Edici%C3%B3n.pdf

Hernández R, Fernández C, Baptista M. (2014). Metodología de la investigación, Sexta Edición en México D.F. Retrieved from: http://observatorio.epacartagena.gov.co/wp-content/uploads/2017/08/metodologia-de-la-investigacion-sexta-edicion.compressed.pdf

Jauregui, Z. S. (2018, junio 18). Transversalidad curricular: algunas consideraciones teóricas para su implementación. *Revista Boletín Redipe.* Retrieved from: https://www.redalyc.org/pdf/1341/134116861003.pdf

Kuip R, (2011). Los efectos cognitivos del bilingüismo. Trabajo final. Universidad de Utrecht . Retrieved from: https://dspace.library.uu.nl/bitstream/handle/1874/208468/los%20efectos%20cognitivos%20del%20bilinguismo.pdf?sequence=2

Lasagabaster D, (1998). The Threshold Hypothesis Applied to Three Languages in Contact at School. *International Journal of Bilingual Education and Bilingualism, 1 (2),* 119-133.

Lavrakas P, (2008) Meeting or focus group. *Encilcopedia sage research methods.* Retrieved from: https://methods.sagepub.com/reference/encyclopedia-of-survey-research-methods/n192.xml

Martínez, L. (2007 Marzo 30). La Observación y el Diario de Campo en la Definición de un Tema de Investigación. *Perfiles profesionales*. Retrieved from: https://escuelanormalsuperiorsanroque.files.wordpress.com/2015/01/9-la-observacin-y-el-diario-de-campo-en-la-definicin-de-un-tema-de-investigacin.pdf

Mathers, N; Fox, N and Hunn, A. (1998). Trent Focus for Research and Development in Primary Health Care: Using Interviews in a Research Project. Trent Focus. Retrieved from: http://web.simmons.edu/~tang2/courses/CUAcourses/lsc745/sp06/Interviews.pdf

Ministerio de Educación Nacional (MEN), Glosario. Retrieved from: https://www.mineducacion.gov.co/1759/w3-propertyvalue-55247.html?_noredirect=1

Ministerio de Educación Nacional (MEN), *Ley 115 de 1994 artículo 21*. Retrieved from: https://www.mineducacion.gov.co/1621/articles-85906_archivo_pdf.pdf

Ministerio de Educación, Cultura y Deporte (2002). *Marco Común Europeo De Referencia Para Las Lenguas: Aprendizaje, Enseñanza, Evaluación.* Retrieved from: https://cvc.cervantes.es/ensenanza/biblioteca_ele/marco/cvc_mer.pdf

Ministerio de Educación Nacional MEN. (2004). *Programa Nacional de Bilingüismo.* Retrieved from: https://www.mineducacion.gov.co/1621/articles-132560_recurso_pdf_programa_nacional_bilinguismo.pdf

Ministerio de Educación Nacional MEN. (2006). *Estándares Básicos de Competencias en Lenguas Extranjeras: inglés.* Retrieved from: https://www.mineducacion.gov.co/1621/articles-115174_archivo_pdf.pdf

Ministerio de Educación Nacional MEN. (2017). *Resultados Pruebas Saber Grado Quinto* . Retrieved from: http://www2.icfesinteractivo.gov.co/ReportesSaber359/consultaReporteSedeJornada.jspx

Ministerio de Educación Nacional MEN s,f. *Colombia, La Mejor Educada En El 2025. Líneas estratégicas de la política educativa del Ministerio de Educación Nacional*. Retrieved from: https://www.mineducacion.gov.co/1621/articles-355154_foto_portada.pdf

Ministerio de Educación Nacional, (2014).*Programa Nacional de Ingles 2015-2025.* Retrieved from: https://www.ucn.edu.co/institucion/sala-prensa/noticias/Documents/2014/Documento%20PROGRAMA%20NACIONAL%20DE%20INGL%C3%89S%202015-2025.pdf

Ramírez M, Torres M, (2011) Importancia Del Bilingüismo En El Proceso Enseñanza-aprendizaje Del Inglés *International Journal of Developmental and Educational Psychology 3(1),* 355-363. Retrieved from: http://infad.eu/RevistaINFAD/2011/n1/volumen3/INFAD_010323_355-364.pdf

Research Design And Methodology (n.d). Retrieved from: https://sg.inflibnet.ac.in/bitstream/10603/70084/7/07_chapter%203.pdf

Tencio, C (2013, mayo). La transversalidad: una oportunidad para fortalecer el currículo en la educación superior desde la gestión institucional. *Revista Calidad en la Educación Superior.* Retrieved from: https://revistas.uned.ac.cr/index.php/revistacalidad/article/view/454/349

Yepez A, Ruiz N (2016). *Diseño De La Propuesta Educativa Bilingüe Para El Gimnasio Bilingüe Grow Together.* (tesis de especialización en gerencia de proyectos educativos). Universidad Distrital Francisco José de Caldas, Bogotá, Colombia.

Velásquez J, (diciembre, 2009). La transversalidad como posibilidad curricular desde la educación ambiental. *Revista Latinoamericana de estudios educativos(Colombia).* Retrieved from: https://www.redalyc.org/pdf/1341/134116861003.pdf

Veytia M, Peréz C, Moreno J, García O. (2019). Aproximacion didáctico a los objetos virtuales de aprendizaje, Primera Edición, Durango, México.

10. Appendices

Appendix A; Consentimiento informado coordinadora.

Universidad del Cauca
Facultad de Ciencias Humanas y Sociales
Departamento de lenguas extranjeras
Programa de licenciatura en Lenguas Modernas Inglés-Francés Santander de Quilichao

CONSENTIMIENTO INFORMADO COORDINADORA.

Estimada Señora:
Nidia Esmeralda Orozco Oyola.
Coordinadora Sede Rafael Tello

El propósito del proyecto: PROPUESTA DE EDUCACIÓN BILINGÜE -INGLÉS- EN LAS ÁREAS DE CIENCIAS NATURALES Y MATEMÁTICAS, APOYADA EN EL DISEÑO Y EVALUACIÓN DE OBJETOS VIRTUALES DE APRENDIZAJE (OVAS) PARA EL GRADO 5 DEL CENTRO DOCENTE RAFAEL TELLO-SANTANDER DE QUILICHAO. (BILINGUAL EDUCATION PROPOSAL (ENGLISH) IN NATURAL SCIENCES AND MATHEMATICS, SUPPORTED BY THE DESIGN AND EVALUATION OF VIRTUAL LEARNING OBJECTS (VLO) IN THE FIFTH-GRADER STUDENTS CENTRO DOCENTE RAFAEL TELLO-SANTANDER DE QUILICHAO.) es diseñar herramientas OVAs como apoyo a la propuesta de educación bilingüe donde se integre el inglés en las áreas y curso anteriormente mencionados. La participación de la coordinará será otorgar el permiso a los investigadores con el fin de trabajar con las docentes de dichas áreas, quienes se encargarán de socializar la información sobre los contenidos programáticos y los planes de áreas a trabajar. Además, evaluaran los objetos virtuales de aprendizaje (OVAs) desarrollados por los investigadores.

Por lo anterior, yo _____ mayor de edad, coordinadora de la sede Rafael Tello, he sido informado(a) acerca de mi participación en la presente propuesta que será realizada por los estudiantes de la Universidad del Cauca del programa de Licenciatura en Lenguas Modernas Inglés-francés: Carolina Córdoba Alvear, Yineth Lorena Gaón Mosquera, Juan Pablo Lara Cuetia, Natalia Mulcué Hurtado y Lizeth Ramos Viáfara.

Luego de haber sido informado (a) sobre las condiciones de la participación en la socialización y evaluación de las temáticas, y comprendido el propósito del proyecto, entiendo que:

- La participación de los docentes o los resultados obtenidos por las personas encargadas no tendrá repercusión o consecuencia alguna.

- Los datos recolectados a través de los instrumentos serán utilizados en el trabajo de grado de los investigadores.
- La identidad de los docentes no será divulgada.

Atendiendo a la normatividad vigente sobre consentimientos informados (Ley 1581 de 2012 y Decreto 1377 de 2012), y de forma consciente y voluntaria.

[ ] DOY EL CONSENTIMIENTO [ ] NO DOY EL CONSENTIMIENTO para que los estudiantes de la Universidad del Cauca del programa de Licenciatura de Lenguas Modernas Ingles- francés pueden desarrollar las actividades planteadas en su proyecto que tiene como uno de sus objetivos diseñar una propuesta de educación bilingüe – inglés- en las áreas de Ciencias Naturales y Matemáticas, apoyada en el diseño y evaluación de OVAs para el grado quinto en la Sede Centro Docente Rafael Tello.

Firma: _____
C.C

Appendix B; Consentimiento informado docentes.

Universidad del Cauca
Facultad de Ciencias Humanas y Sociales
Departamento de lenguas extranjeras
Programa de licenciatura en Lenguas Modernas Inglés-Francés Santander de Quilichao

CONSENTIMIENTO INFORMADO DOCENTE CIENCIAS NATURALES Y MATEMATICAS.

Estimado(a) docente:

El propósito del proyecto PROPUESTA DE EDUCACIÓN BILINGÜE -INGLÉS- EN LAS ÁREAS DE CIENCIAS NATURALES Y MATEMÁTICAS, APOYADA EN EL DISEÑO Y EVALUACIÓN DE OBJETOS VIRTUALES DE APRENDIZAJE (OVAS) PARA EL GRADO 5 DEL CENTRO DOCENTE RAFAEL TELLO-SANTANDER DE QUILICHAO. (BILINGUAL EDUCATION PROPOSAL (ENGLISH) IN NATURAL SCIENCES AND MATHEMATICS, SUPPORTED BY THE DESIGN AND EVALUATION OF VIRTUAL LEARNING OBJECTS (VLO) IN THE FIFTH-GRADER STUDENTS CENTRO DOCENTE RAFAEL TELLO-SANTANDER DE QUILICHAO.) Es diseñar herramientas OVAs como apoyo a la propuesta de educación bilingüe donde se integre el inglés en las áreas y curso anteriormente mencionados. La participación de las docentes tiene que ver con la socialización de la información sobre los contenidos programáticos y los planes de áreas a trabajar donde se seleccionarán los temas a desarrollar en cada una de las sesiones de clase. Además, evaluar los objetos virtuales de aprendizaje OVAs desarrollados por los investigadores.

Por lo anterior, yo _____ mayor de edad, docente del área de _____, he sido informado(a) acerca de mi participación en el desarrollo de la presente propuesta que será realizada por los estudiantes de la Universidad del Cauca del programa de Licenciatura en Lenguas Modernas Inglés-francés: Carolina Córdoba Alvear, Yineth Lorena Gaón Mosquera, Juan Pablo Lara Cuetia, Natalia Mulcué Hurtado y Lizeth Ramos Viáfara.

Luego de haber sido informado (a) sobre las condiciones de la participación en la socialización y evaluación de las temáticas, y comprendido el propósito del proyecto, entiendo que:

- La participación de los docentes o los resultados obtenidos por las personas encargadas no tendrá repercusión o consecuencia alguna.
- Los datos recolectados a través de los instrumentos serán utilizados en el trabajo de grado de los investigadores.
- La identidad de los docentes no será divulgada.

Atendiendo a la normatividad vigente sobre consentimientos informados (Ley 1581 de 2012 y Decreto 1377 de 2012), y de forma consciente y voluntaria.

[ ] DOY EL CONSENTIMIENTO [ ] NO DOY EL CONSENTIMIENTO para que los estudiantes de la Universidad del Cauca del programa de Licenciatura de Lenguas Modernas Ingles- francés pueden desarrollar las actividades planteadas en su proyecto que tiene como uno de sus objetivos diseñar una propuesta de educación bilingüe – inglés- en las áreas de Ciencias Naturales y Matemáticas, apoyada en el diseño y evaluación de OVAs para el grado quinto en la Sede Centro Docente Rafael Tello.

Firma: _____
C.C

Appendix C; Plan de area ciencias naturales y matematicas grado quinto.

SANTANDER DE QUILICHAO, CAUCA
INSTITUCIÓN EDUCATIVA INSTITUTO TÉCNICO
Plan de área ciencias naturales

1. INTRODUCCIÓN

CARACTERIZACIÓN DEL ÁREA

La enseñanza de las CIENCIAS NATURALES Y EDUCACIÓN AMBIENTAL tiene como propósito fundamental el de desarrollar en los estudiantes habilidades que les permita utilizar el conjunto de conocimientos y las metodologías que se abordan desde el pensamiento científico (que se relaciona naturalmente con el pensamiento matemático, habilidades, valores y actitudes que permite formular, resolver problemas, modelar, comunicar, razonar, comparar y ejercitar procedimientos para facilitar el desempeño flexible, eficaz y con sentido en un contexto determinado), para plantear preguntas, recorrer diversas rutas de indagación, experimentación, analizar y contrastar diversas fuentes de información y construir conclusiones basadas en la relación que establecen con su entorno.

El proceso de enseñanza aprendizaje del área de ciencias está enfocado en la formación de un estudiante activo, protagonista de su propio aprendizaje, que este en constante construcción de su conocimiento mediante diversas estrategias metodológicas como resolución de problemas, método investigativo y puestas en común, que le permita desarrollar un pensamiento científico que lo oriente hacia un desarrollo humano, integral y sostenible dentro de su contexto, fomentando en él la curiosidad y el deseo de saber (disciplinar y teórico), saber hacer y saber ser. De la mano con lo anterior, se requiere un docente generador de valores, principios, actitudes y posibilitador de los ambientes necesarios para la formación del futuro ciudadano. Para lograrlo, la enseñanza del área estará enmarcada dentro de diversas actividades que potencien la participación del estudiante, lo involucren con su entorno y lo motiven para la búsqueda a las respuestas de sus propios interrogantes.

Así, se deben organizar actividades formativas a nivel individual, grupal y colectivas, que creen un ambiente apropiado de cordialidad en el aula, que favorezca el desarrollo social, el proceso conceptual y procedimental de los alumnos, a través de actividades prácticas, que involucren la utilización de las competencias, de las metas de calidad, de los estándares curriculares propios de la enseñanza de la ciencias naturales y de los DBA, y para que con ellos se puedan contrastar hipótesis y llegar a la construcción de nuevos conocimientos.

JUSTIFICACIÓN

En los últimos siglos los seres humanos, a través de la investigación han intentado comprender el mundo que los rodea, entenderse a sí mismos y las relaciones con el entorno. Como producto de esta actividad, hoy se cuenta con un gran caudal de conocimiento científico. La ciencia es el camino para descubrir el conocimiento, a través de la ciencia nos preguntamos sobre la naturaleza, sus leyes y fenómenos, como ocurren, que relación guardan unos con otros y con nuestra vida. Las ciencias naturales contribuyen a mejorar y a estructurar el pensamiento de manera organizada, para poder entender y resolver problemáticas de la vida cotidiana, mejora el entendimiento y las condiciones de vida de los miembros de nuestra sociedad, ya que el conocimiento científico ayuda a comprender la naturaleza de las relaciones humanas, brindándonos la posibilidad de una mejor vida.

El sentido del área de Ciencias Naturales es ofrecer a los estudiantes la posibilidad de conocer los procesos físicos, químicos y biológicos y su relación con los procesos culturales, en especial aquellos que tienen la capacidad de afectar el carácter armónico del ambiente. Este conocimiento debe darse en el estudiante en forma tal que pueda entender los procesos evolutivos que hicieron posible que hoy se

hable del ser humano como especie cultural y que pueda apropiarse de ese conjunto de conocimientos que le permiten ejercer un control sobre su entorno, acompañado por una actitud de humildad que le haga ser consciente de sus limitaciones y de los peligros que un ejercicio irresponsable de este poder sobre la naturaleza puede tener. Es por esto que las Ciencias Naturales como área fundamental dentro del currículo tiene una gran responsabilidad en la formación integral de las personas a fin de garantizarles una mejor calidad de vida. Teniendo en cuenta dentro del plan de estudios el diseño, la implementación, la evaluación y la aplicación de diferentes estrategias legitimadas desde la Constitución Nacional, la Ley General de Educación y el Proyecto Educativo Institucional, las cuales permiten establecer una relación directa con la enseñanza en Ciencias Naturales, logrando diferentes competencias en los estudiantes como son: el desarrollo de la creatividad, las habilidades y destrezas propias de la edad, como también su capacidad de aprendizaje, estimulando la curiosidad para observar y explorar el medio natural, familiar y social.

AREA:CIENCIAS NATURALES			
Asignatura	CIENCIAS NATURALES	Docentes	✓ Yolanda Manquillo ✓ Luz Aida Benavides ✓ Belliny Alexandra López Guzmán ✓ Silvio Aurelio Cerón
Intensidad Horaria	4 HORAS SEMANALES		
Grado	QUINTO – BASICA PRIMARIA		
Período	I, II, III, IV		
Pregunta Problematizadora	PERIODO I: ✓ ¿Cómo inducir a los educandos hacia el conocimiento de los Reinos de la naturaleza, teniendo en cuenta sus características y clasificación? PERÍODO II: ✓ ¿Cómo involucrar a los estudiantes en el conocimiento y cuidado de los sistemas del cuerpo humano? PERÍODO III: ✓ ¿Cómo motivar a los estudiantes hacia el liderazgo de campañas orientadas hacia el cuidado del medio ambiente y su exploración? PERÍODO IV: ✓ ¿Cómo acercar a los estudiantes hacia el inicio de los procesos científicos mediante el estudio del entorno físico?		
Objetivos Específicos	✓ Despertar la curiosidad científica y el deseo de saber a través de la exploración y contacto con el entorno. ✓ Indagar los saberes previos y a partir de ellos construir nuevos conocimientos. ✓ Desarrollar y potenciar la capacidad Investigativa a través de situaciones y actividades de aprendizaje. ✓ Identificar y proponer distintas soluciones a las necesidades y problemáticas ambientales. ✓ Establecer un compromiso ético frente al uso responsable de los recursos naturales. ✓ Identificar características, diferencias y estructuras de los seres vivos que les permiten desarrollarse en un entorno y que se puedan utilizar como criterios de clasificación. ✓ Comprender la importancia de la función que realiza cada sistema y órgano del cuerpo humano y sus cuidados, para un buen funcionamiento.		
EBC	✓ Explico la importancia de la célula como unidad básica de un ser vivo. ✓ Identifico los niveles de organización celular de los seres vivos. ✓ Represento los diversos sistemas de órganos del ser humano y explico su función. ✓ Identifico en mi entorno objetos que cumplen funciones similares a las de mis órganos y sustento la comparación.		

	✓ Verifico la conducción de electricidad o calor en materiales. ✓ Comparo las neuronas con circuitos eléctricos. ✓ Identifico las funciones de los componentes de un circuito eléctrico. ✓ Relaciono el estado de reposo o movimiento de un objeto con las fuerzas aplicadas sobre éste. ✓ Formulo preguntas específicas sobre una observación o experiencia y escojo una para indagar y encontrar posibles respuestas. ✓ Formulo explicaciones posibles, con base en el conocimiento cotidiano, teorías y modelos científicos, para contestar preguntas. ✓ Analizo el ecosistema que me rodea y lo comparo con otros. ✓ Identifico adaptaciones de los seres vivos, teniendo en cuenta las características de los ecosistemas en que viven. ✓ Describo los principales elementos del sistema solar y establezco relaciones de tamaño, movimiento y posición. ✓ Comparo el peso y la masa de un objeto en diferentes puntos del sistema solar.
DBA	✓ Comprende que los sistemas del cuerpo humano están formados por órganos, tejidos y células y que la estructura de cada tipo de célula está relacionada con la función del tejido que forman. ✓ Comprende que los seres humanos (y en muchos otros animales) la nutrición involucra el funcionamiento integrado de un conjunto de sistemas de órganos: digestivo, respiratorio y circulatorio. ✓ Comprende que un circuito eléctrico básico está formado por un generador y fuente (pila), conductores (cables) y uno o más dispositivos (bombillos, motores, timbres), que deben estar conectados apropiadamente (por sus dos polos) para que funcione y produzcan diferentes efectos. ✓ Comprende que algunos materiales son buenos conductores de la corriente eléctrica y otros no (denominados aislantes) y que el paso de la corriente siempre genera calor. ✓ Comprende que existe distintos tipos de ecosistemas (terrestres y acuáticos) y que sus características (temperatura, humedad, tipos de suelo, altitud) permiten que habiten en ellos diferentes seres vivos.
Unidades Temáticas	**20.** La célula y los seres vivos. **21.** Funciones y sistemas del cuerpo humano **22.** Los ecosistemas y los recursos naturales **23.** Las máquinas simples y compuestas **24.** El universo.
Articulación	Proyecto PESCC: Ambiente escolar

Ejes Temáticos I PERÍODO:	**LA CÉLULA Y LOS SERES VIVOS** ✓ La célula y sus partes ✓ Clases de células y sus funciones vitales. ✓ La organización de los seres vivos (unicelulares y pluricelulares) ✓ Reinos de la naturaleza **LAS PLANTAS Y LOS ANIMALES** ✓ Los animales y su nutrición. ✓ La cadena alimenticia. ✓ La Reproducción de los animales ✓ La nutrición y reproducción de las plantas **PERCIBO A TRAVES DE LOS SENTIDOS** ✓ Estructura del átomo ✓ La moléculas y su organización ✓ Cambios físico-químicos de la materia.	Competencias	Conceptuales: ✓ Comprende la organización de los seres vivos y que están formados por unidades básicas llamadas células. Procedimentales: ✓ Observa videos y láminas para ampliar sus conocimientos sobre estos. ✓ Representa a través del modelado los tipos de célula y establece semejanzas y diferencias entre estas. ✓ Elabora maquetas representando los diferentes reinos y las expone. ✓ Describe el proceso de reproducción de los animales y las plantas. Actitudinales: ✓ Establece un compromiso frente al respeto y el cuidado de los seres vivos.
Ejes Temáticos II PERÍODO:	**FUNCIONES Y SISTEMAS DEL CUERPO HUMANO** ✓ La digestión y la respiración en la nutrición ✓ La circulación ✓ La excreción en la nutrición ✓ El sistema locomotor ✓ El sistema reproductor ✓ El sistema nervioso	COMPETENCIAS	Conceptuales: ✓ Comprende los procesos y funciones de los sistemas del ser humano. Procedimentales: ✓ Observa videos y láminas para ampliar sus conocimientos sobre estos.

	LA SALUD Y LA ENFERMEDAD ✓ Factores que influyen en la salud. ✓ Hábitos saludables ✓ Tipos de enfermedades ✓ Formas de contagio de las infecciones y su tratamiento. **PERCIBO A TRAVES DE LOS SENTIDOS** ✓ La energía ✓ Formas de energía ✓ Propiedades ✓ Fuentes ✓ Energía eléctrica y lumínica ✓ Conducción de la electricidad		✓ Representa a través del modelado los sistemas y establece semejanzas y diferencias entre estas. ✓ Promueve campañas sobre hábitos de vida saludable. ✓ Expone sobre algunas enfermedades contagiosas y su tratamiento. **Actitudinales:** ✓ Interioriza la responsabilidad que tiene el ser humano del autocuidado. ✓ Se interesa en el conocimiento de las causas de que algunas enfermedades contagiosas y la prevención de las mismas. ✓ Participa activamente en la elaboración de circuitos sencillos.
Ejes Temáticos III PERÍODO:	**EL ECOSISTEMA Y LOS RECURSOS NATURALES** ✓ Adaptaciones en los sistemas ✓ Relación alimentaria entre seres vivos ✓ Recursos naturales: flora, fauna, suelo, aire y agua. **PROTECCIÓN AMBIENTAL** ✓ Los principales problemas ambientales ✓ La contaminación ✓ La deforestación ✓ La sobreexplotación		**Conceptuales:** ✓ Comprende la organización de la naturaleza y las relaciones entre los seres vivos dentro de un ecosistema. ✓ Comprende la necesidad de cuidar el entorno natural. **Procedimentales:** ✓ Explora su entorno e identifica las relaciones entre los seres vivos de un ecosistema, reconociendo sus elementos. ✓ Expone sobre problemas ambientales de su entorno y propone posibles soluciones. ✓ Expone acerca de las áreas protegidas en Colombia, su ubicación y características.

	✓ Protección ambiental ✓ Cuidado del medio ✓ Áreas protegidas en Colombia. **PERCIBO A TRAVES DE LOS SENTIDOS** ✓ Las fuerzas y sus efectos. ✓ Clases de fuerzas ✓ Trayectoria y movimiento (movimiento rectilíneo, circular y curvo)		Actitudinales: ✓ Interioriza el deber de cuidar el entorno natural.
Ejes Temáticos IV PERÍODO:	**LAS MÁQUINAS** ✓ Máquinas simples (la polea, el plano inclinado, el tronillo, la palanca) ✓ Máquinas compuestas y sus funciones. **EL UNIVERSO** ✓ Las estrellas ✓ Las galaxias ✓ Vía láctea ✓ El sol ✓ Las constelaciones ✓ Cometas ✓ Partes de la tierra y sus capas (atmósfera, hidrósfera y geósfera)	COMPETENCIAS	Conceptuales: ✓ Reconoce la importancia y el uso adecuado de las máquinas. ✓ Identifica los elementos que componen el universo y sus características. Procedimentales: ✓ Observa videos, láminas y escucha lecturas relacionadas con los elementos del universo para conocer sobre este. ✓ Expone acerca de las distintas máquinas actuales y nuevos inventos para las tareas cotidianas. Actitudinales: ✓ Trabaja en equipo y es respetuoso de las opiniones de sus demás compañeros. ✓ Participa activamente y se interesa por aprender.
Actividades Pedagógicas	✓ Indagación de saberes previos ✓ Observación y exploración de su entorno ✓ Formulación de preguntas		

	✓ Participación activa de los estudiantes en su aprendizaje a través de vivencias concretas. (Exposiciones, experimentos...) ✓ Utilización de material pedagógico (fichas, lecturas...) y recursos audiovisuales.		
Evaluación	Se tendrán en cuenta las siguientes competencias: Actitudinales y Comportamentales 30%. ✓ Asistencia Puntual ✓ Participación en Clase ✓ Trabajo en Equipo Cognitivas 60%. ✓ Tareas, Trabajos y Talleres ✓ Evaluación Escrita ✓ Evaluación Oral Autoevaluación 5% Coevaluación 5% **NOTA:** Se concertan y consignan en los Acuerdos de Aula.	**Recursos**	✓ Cuaderno ✓ Lápiz ✓ Borrador ✓ Saca punta ✓ Material didáctico (fichas) ✓ Instrumentos para experimentos ✓ Archivos multimedia
Estudiantes con NEE	Teniendo conocimiento de la existencia de estudiantes con capacidades Diversas, se establece que estos tendrán un porcentaje diferente en cada uno de las competencias a ser evaluadas, otorgando una mayor ponderación a aquellos que hacen alusión a las actitudes que debe tener un estudiante comprometido con su proceso formativo. Actitudinales y Comportamentales 50%. Cognitivas 40%. Autoevaluación 5% Coevaluación 5% **NOTA:** Se concertan y consignan en los Acuerdos de Aula.		
Indicadores de Desempeño	**I PERIODO:** ✓ Comprende la organización de los seres vivos y que están formados por unidades básicas llamadas células. **II PERÍODO:** ✓ Comprende los procesos y funciones de los sistemas del ser humano. **III PERÍODO:**		

	✓ Comprende la organización de la naturaleza y las relaciones entre los seres vivos dentro de un ecosistema. **IV PERÍODO:** ✓ Reconoce la importancia y el uso adecuado de las máquinas. ✓ Identifica los elementos que componen el universo y sus características.

PLAN DE ÁREA
MATEMÁTICAS.

I. **INTRODUCCIÓN**: Caracterización del área en términos generales.

II. **PANORAMA INSTITUCIONAL DEL ÁREA**: Aportes a la filosofía institucional y Diagnóstico.

III. **OBJETIVOS GENERALES**: Lo que pretende alcanzar el área, teniendo en cuenta las directrices del Ministerio de Educación Nacional y lo establecido en el PEI.

IV. **REFERENTES CONCEPTUALES**: Según los documentos promulgado por MEN para cada área (Lineamientos curriculares, estándares básicos por competencias y derechos básicos de aprendizaje, orientaciones pedagógicas del MEN, Mallas de aprendizaje, Competencias, Dimensiones, Factores, Pensamientos y/o Procesos)

V. ARTICULACIÓN:

5.1 Cátedras de Ley (Competencias Ciudadanas, Competencias Laborales, Catedra para la paz, Catedra de estudios afrocolombianos)

5.2 PESCC y sus Subproyectos

VI. **ATENCIÓN DE ESTUDIANTES CON CAPACIDADES DIVERSAS**: Planes especiales de apoyo para estudiantes con dificultades en su proceso de aprendizaje y/o capacidades excepcionales.

VII. **METODOLOGÍA / MODELO PEDAGÓGICO:** "La metodología aplicable a cada una de las áreas, señalando el uso del material didáctico, textos escolares, ayudas audiovisuales, informática educativa o cualquier otro medio que oriente la acción pedagógica".

VIII. DESARROLLO DE UNIDADES TEMATICAS

IX. **EVALUACIÓN** (Teniendo en cuenta el sistema de evaluación institucional, REDES de desempeño, SIEDE y el decreto 1290)

X. BIBLIOGRAFÍA .

I INTRODUCCION

El propósito fundamental del presente plan de estudios de Matemáticas, es la formación de los niños y jóvenes como agentes activos en la transformación de la sociedad y la historia, se busca educarlos para la vida con una formación integral que incluya además de lo cognoscitivo, lo socioafectivo y lo psicomotor, proponiendo destrezas y habilidades necesarias para desplegar sus potencialidades que permitan la orientación en los aspectos de socialización, participación y transformación de la realidad dentro de una perspectiva democrática y en comunidad.

Además, se presenta como una reflexión que por su naturaleza integra aspectos filosóficos, epistemológicos, sociológicos, psicológicos y pedagógicos, que permiten proponer en la educación la idea de hombre que aporte a la construcción de una sociedad más justa, en ellos se concibe el conocimiento como proceso y conjunto de experiencias que dura toda la vida, transferible a otras situaciones y presente en diferentes contextos. Los conocimientos y verdades se consideran como proyectos que deben revisarse y corregirse permanentemente. El estudiante es el centro del proceso y el maestro es su orientador y animador.

Partiendo de los lineamientos y estándares orientados por el Ministerio de Educación Nacional para la enseñanza y aprendizaje de la actividad Matemática y cuya contribución es la formación integral de los niños y jóvenes de nuestra región, como también sobre la manera de cómo ésta puede contribuir más eficazmente a los grandes logros de la educación actual. Por ello la educación debe responder al desarrollo global y nacional, como la relacionada con una educación incluyente para todos, la atención a la diversidad y a la interculturalidad y a la formación de ciudadanos y ciudadanas con las competencias necesarias para el ejercicio de derechos y deberes democráticos.

La matemática ha contribuido y contribuye al desarrollo de las ciencias, el arte y la tecnología, la arquitectura, las grandes obras de ingeniería y la economía.

Así la educación llegará a ser un proceso para posibilitar la autodeterminación personal y social y la escuela como el espacio necesario para el dialogo y el desarrollo de la conciencia crítica.

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"INSTITUTO TÉCNICO"
Santander de Quilichao, Cauca

LECTIVO 2018

III OBJETIVOS GENERALES

- Generar en todos los estudiantes una actitud favorable hacia las matemáticas y estimular en ellos el interés por su estudio.
- Desarrollar en los estudiantes una sólida comprensión de los conceptos, procesos y estrategias básicas de la matemática e igualmente, la capacidad de utilizar todo ello en la solución de problemas.
- Suministrar a los estudiantes el lenguaje apropiado que les permita comunicar de manera eficaz sus ideas y experiencias matemáticas.
- Estimular en los estudiantes el uso creativo de las matemáticas para expresar nuevas ideas y descubrimientos, así como para reconocer los elementos matemáticos presentes en actividades creativas.

OBJETIVOS ESPECIFICOS:

- ✓ Retar a los estudiantes a lograr un nivel de excelencia que corresponda a su etapa de desarrollo.
- ✓ Desarrollar habilidades que le permitan razonar, lógica, critica y objetivamente.
- ✓ Aprovechar los conocimientos previos adquiridos por los estudiantes en los entornos: familiar, escolar, social, etc.
- ✓ Adquirir independencia en la actividad intelectual.
- ✓ Ampliar la capacidad en el estudiante para realizar generalizaciones y modulaciones.
- ✓ Desarrollar habilidades en los procedimientos operativos, aritméticos y geométricos.
- ✓ Adquirir precisión en la expresión verbal y familiaridad con el lenguaje y expresiones simbólicas.
- ✓ Utilizar la matemática para interpretar y solucionar problemas de la vida cotidiana, de la tecnología y de la ciencia.

Intensidad Horaria	4		
Grado	QUINTO		
Período	I		
Pregunta Problematizadora	¿Porque es importante los números naturales en el vida del estudiantes?		
Objetivos Específicos	*Resolver y formular problemas cuya estrategia de solución requiera de las relaciones y propiedades de los números naturales y sus operaciones. *Resolver y formular problemas en situaciones aditivas de composición, transformación comparación e igualación. *Identifico en el contexto de una situación, la necesidad de un cálculo exacto o aproximado y lo razonable de los resultados obtenidos.		
EBC	*Utilizar los números, las operaciones y sus propiedades para resolver situaciones cotidianas. *Realizar cálculos rápidos de reparto a partir de los criterios de divisibilidad. *Reconstruir o expresar números a partir de la composición y descomposición de números primos.		
DBA	*Interpreta y utiliza los números naturales y racionales en su representación fraccionaria para formular y resolver problemas aditivos, multiplicativos y que involucren operaciones de potenciación. *Describe y desarrolla estrategias (algoritmos, propiedades de las operaciones básicas y sus relaciones) para hacer estimaciones y cálculos al solucionar problemas de potenciación.		
Unidad Temática	Operaciones con naturales y teoría de números		

Ejes Temáticos	*Adición, sustracción, multiplicación y división de números naturales. *Potenciación, radicación y logaritmación. *Múltiplos de un número. *Divisores de un numero *Criterios de divisibilidad. *Números primos y compuestos. *Descomposición en factores primos. *Mínimo común múltiplo (m.c.m). *Mínimo común divisor (m.c.d)	Competencias	. Pensamiento numérico
Actividades Pedagógicas	-.Resolución de problemas: seleccionar y aplicar estrategias para resolver situaciones cotidianas que involucren las operaciones básicas		
Evaluación	Los criterios de evaluación van acorde al sistema de evaluación institucional y a los acuerdos de aula. En el proceso evaluativo se asignara los porcentajes conceptuales procedimentales y actitudinales	Recursos	Humano, Cuaderno, fotocopias, regla, transportador, compas, texto guía libros de consulta, planta física y demás espacios (biblioteca, sala de sistema) ayudas audiovisuales y material didáctico.
Estudiantes con NEE	Dependen de las orientaciones generales que se establezcan en la Institución*		
Indicadores de Desempeño	*Domina las operaciones básicas de números naturales. *Conoce y aplica los conceptos de mínimo común múltiplo y máximo común divisor *Comprende los conceptos de potencia, raíz y logaritmo de un numero natural *Resuelve situaciones de la vida cotidiana que requieran del uso de una o más de las operaciones , o de las relaciones que se realizan o		

ÁREA:			
Asignatura	MATEMATICAS	Docentes	María Del Pilar Chaves
Intensidad Horaria	4		
Grado	QUINTO		
Período	2		
Pregunta Problematiza dora	¿Qué importancia tienen los conceptos de fracción y decimal en el proceso educativo y su relación con su entorno en el diario vivir?		
Objetivos Específicos	*Interpretar las fracciones en diferentes contextos: situaciones de medición, relaciones parte todo, cociente, razones y proporciones. *Identificar en el contexto de una situación, la necesidad de un cálculo exacto o aproximado y lo razonable de los resultados obtenidos.		
EBC	Conoce el significado de la fracción en situaciones cotidianas. Valoración de las fracciones como una forma de expresión de cantidades Elabora y comunica explicaciones basadas en las características de los números decimales		
DBA	Compara y ordena números fraccionarios a través de diversas interpretaciones, recursos y representaciones.		
Unidad Temática	Las fracciones y sus operaciones		

	Articulación	De acuerdo con los objetivos planteados en este segundo periodo se propone la articulación con las siguientes áreas del conocimiento: Lenguaje Ciencias naturales Ciencias sociales Artística y educación física.		
	Ejes Temáticos	*Las fracciones sus términos *Representación de fracciones equivalentes *Adición y sustracción de fracciones homogéneas *Adicción y sustracción de fracciones heterogéneas *Fracción de una unidad *Multiplicación de fracciones *División de fracciones	Competencias	-Pensamiento numérico
	Actividades Pedagógicas	Utilizar tecnologías de la información y la comunicación disponibles en mi entorno para el desarrollo de diversas actividades Realización de pruebas diagnosticas Determinar estrategias para el refuerzo Utilizar caos cotidianos para trabajar los temas Realizar autoevaluaciones		
	Evaluación	Los criterios de evaluación van acorde al sistema de evaluación institucional y a los acuerdos de aula. En el proceso evaluativo se asignara los porcentajes conceptuales procedimentales y	Recursos	. Humano, Cuaderno, fotocopias, texto guía libros de consulta, planta física y demás espacios (biblioteca, sala de sistema) ayudas audiovisuales y material didáctico.

Appendix D; Planes de clase Ciencias Naturales y Matemáticas versión español.

Plan de clase Nº 1 – La Célula.

Institución:	Instituto Técnico	**Sede:**	Centro Docente Rafael Tello	**Periodo**	1

Docente:		**Grado:**	Quinto			**Semana**	1
Asignatura:	Ciencias Naturales	**Fecha:**	D	M	AÑO	**Intensidad Horaria**	2 horas

TEMA: La Célula	
SUBTEMA: Partes de la célula.	
SITUACIÓN PROBLEMA: ¿Cómo inducir a los alumnos al conocimiento de los Reinos de la naturaleza, teniendo en cuenta sus características y clasificación?	
OBJETIVOS SEMANALES:	
General: Conocer la célula como una estructura y unidad funcional de todo ser vivo.	
Especificos: • Identificar las características principales de una célula y su importancia en cada ser vivo. • Identificar las partes principales de la célula.	
Competencias:	**Vocabulario**
Competencia científica e interpretativa	Célula, núcleo, membrana plasmática, pared celular, membrana nuclear, nucléolo, cromosomas, cromatina, organelos, citoesqueleto
Estandares en Inglés	
Escucha: • Los estudiantes identificaran el nombre de los personajes y evento principales de una historia leída por el profesor y apoyada en imágenes, videos y otro tipo de material visual Monologo • Los estudiantes buscaran oportunidades para usar lo que conocen en inglés. Habla • Los estudiantes mantendrán una simple conversación en ingles con un compañero cuando desarrollo una actividad en clase.	

Estandares de Competencias.	
• Explicar la importancia de la célula como unidad básica de los seres vivos. • Escuchar activamente a los compañeros, reconocer diferentes puntos de vista y los compara consigo mismo.	
Enfoque:	**Método:**
Enfoque comunicativo y humanístico	Audio-visual y audio-lingüístico.

Inicio	
Actividad (es)	1. El profesor creara un contexto en el cual introducirá el tema de la célula, y preguntara a los estudiantes si conocen qué es una célula, su función y sus partes. 2. El profesor presentara un video corto sobre la explicación de la célula, y las partes principales con flashcards.
Desarrollo	
Actividad (es)	3. En esta actividad, el profesor dará a cada estudiante una parte de la célula en desorden, la cual debe ser localizada, de acuerdo a la explicación del video y la interacción con las flashcards 4. Taller: los estudiantes recibirán un documento, donde deben resolver actividades como: crucigramas, sopa de letras o términos sobre la célula y sus funciones
Final	
Actividad (es)	Para finalizar, los estudiantes harán una maqueta donde la célula y sus principales partes se moldean, haciendo uso de materiales reciclables o plastilina.

Materiales and recursos.

OVA a utilizar.		**Descripción**
1	OVA de Ciencias Naturales -La célula y sus partes. https://naturalsciencesbilingualeducation.blogspot.com/	Este OVA contiene el título del tema, el objetivo, las palabras clave, el vocabulario, las versiones en inglés y español de los planes de clase, la teoría, un video para reforzar el tema y finalmente, las actividades para los estudiantes sobre la célula y sus partes.
Otros recursos:		
Flashcards, materiales reciclables, plastilina.		

Evaluación del tema.
Identificar las principales partes de la célula a través de una pequeña exposición

Plan de clase Nº 2 – Tipos de células y sus funciones vitales (Célula eucariota).

Institución:	Instituto Técnico	**Sede:**	Centro Docente Rafael Tello	**Periodo**	1

Docente:		**Grado:**	Quinto			**Semana**	2
Asignatura:	Ciencias Naturales	**Fecha:**	D	M	AÑO	**Intensidad Horaria**	2 horas

TEMA: La célula y seres vivos.	
SUBTEMA: Tipos de células y sus funciones vitales.	
SITUACIÓN PROBLEMA: ¿Cómo están organizados los seres vivos?	
OBJETIVOS SEMANALES:	
General: Conocer los diferentes tipos de células y su clasificación.	
Específicos: • Despertar la curiosidad científica y el deseo de conocer a través de la exploración y el contacto con el medio. • Identificar y proponer diferentes soluciones a las necesidades y problemas ambientales. • Identificar características, diferencias y estructuras de los seres vivos que les permitan desarrollarse en un medio y que puedan utilizarse como criterios de clasificación.	
Competencias:	**Vocabulario**
Pensamiento científico.	Las células procariotas y eucariotas, los protozoos, los hongos, las plantas y los animales tienen células eucariotas.
Estándares en Inglés	
• El estudiante identifica los nombres de los personajes y los hechos principales de una historia leída por el profesor y sustentada en imágenes, videos o cualquier tipo de material visual. • El estudiante busca oportunidades para usar lo que sé en inglés. • El estudiante mantiene una conversación sencilla en inglés con un compañero cuando desarrollo una actividad en el aula.	
Estándares de Competencias.	
• Identificar los niveles de organización celular de los seres vivos. • Representar los distintos sistemas orgánicos del ser humano y explicar su función.	

• Identificar objetos en mi entorno que realizan funciones similares a las de mis órganos y apoyar la comparación.

Enfoque:	**Método:**
Enfoque comunicativo y humanista	Audio-visual y audio-lingüístico.

Desarrollo de la clase.

Inicio	
Actividad (es)	• El docente comenzará con un ice breaker que consiste en un desafío donde en el piso habrá unos dibujos de las partes del cuerpo (pies y manos) pero estarán desorganizados. El alumno deberá saltar siguiendo los patrones sin cometer errores hasta alcanzar la meta. • Luego, el profesor pegará en la pizarra un dibujo de la celda, cada parte estará marcada con una flecha, y en una caja, habrá unos papeles con las partes de la celda. Esta actividad consiste en que cada alumno salga a la pizarra y tome una hoja de papel, la lea y la coloque en la celda según sus partes.
Desarrollo	
Actividad (es)	• Por otro lado, el profesor retomará el tema de la célula y sus partes, y luego presentaremos la clasificación de la célula (eucariota y procariota) y sus principales características. • En la misma línea, estudiaremos la célula eucariota donde conoceremos su estructura, los tipos de células eucariotas (animal y vegetal) para finalmente, observar algunos ejemplos de organismos con este tipo de célula.
Final	
Actividad (es)	• Además, el profesor presentará un dibujo de la célula animal y vegetal para conocer sus diferencias. • A través de un breve ejercicio, los alumnos dispondrán de unos dibujos donde podrán observar algunos seres vivos y deberán relacionar cada organismo con su tipo de célula eucariota (animal o vegetal).

Materiales and recursos.

OVAs a utilizar.		**Descripción.**
1	OVA de Ciencias Naturales –Tipos de células y sus funciones vitales (Célula eucariota). https://naturalsciencesbilingualeducation.blogspot.com/	Este OVA contiene el título del tema, el objetivo, las palabras clave, el vocabulario, las versiones en inglés y español de los planes de clase, la teoría, un video para reforzar el tema y finalmente, las actividades para los estudiantes sobre los tipos de células y sus funciones vitales (Célula eucariota).
Otros recursos:		
Tablero, lápiz, lapiceros, colores, flashcards, imagen de la célula, recursos online		

Evaluación del tema.
• El docente asignará un tipo de célula eucariota (animal o vegetal) a cada alumno que debe realizar un modelo del tipo celular utilizando material reciclable y nombrando cada parte.

Plan de clase Nº 3 – Tipos de células y sus funciones vitales (Célula procariota).

Institución:	Instituto Técnico	**Sede:**	Centro Docente Rafael Tello	**Periodo**	1

Docente:		**Grado:**	Quinto			**Semana**	3
Asignatura:	Ciencias Naturales	**Fecha:**	D	M	AÑO	**Intensidad Horaria**	2 horas

TEMA: La célula y seres vivos.}	
SUBTEMA: Tipos de células y sus funciones vitales.	
SITUACIÓN PROBLEMA: ¿Cómo están organizados los seres vivos?	
OBJETIVOS SEMANALES:	
General: Conocer los diferentes tipos de células y su clasificación.	
Específicos: • Despertar la curiosidad científica y el deseo de conocer a través de la exploración y el contacto con el medio. • Identificar y proponer diferentes soluciones a las necesidades y problemas ambientales. • Identificar características, diferencias y estructuras de los seres vivos que les permitan desarrollarse en un medio y que puedan utilizarse como criterios de clasificación.	
Competencias:	**Vocabulario**
Pensamiento científico.	Las células procariotas y eucariotas, los protozoos, los hongos, las plantas y los animales tienen células eucariotas.
Estándares en Inglés	
• El estudiante identifica los nombres de los personajes y los hechos principales de una historia leída por el profesor y sustentada en imágenes, videos o cualquier tipo de material visual.	

• El estudiante busca oportunidades para usar lo que sé en inglés. • El estudiante mantiene una conversación sencilla en inglés con un compañero cuando desarrollo una actividad en el aula.
Estándares de Competencias.
• Identificar los niveles de organización celular de los seres vivos. • Representar los distintos sistemas orgánicos del ser humano y explicar su función. • Identificar objetos en mi entorno que realizan funciones similares a las de mis órganos y apoyar la comparación.

Enfoque:	**Método:**
Enfoque comunicativo y humanista	Audio-visual y audio-lingüístico.

Desarrollo de la clase.

Inicio	
Actividad (es)	• El profesor comenzará con un ice breaker que consiste en formar un círculo entre todos los alumnos, cada uno debe decir una palabra del vocabulario relacionado con la celda y terminar haciendo un movimiento: ej. planta la célula y mueve el pie derecho; el siguiente alumno debe repetir la palabra y el movimiento realizado por su compañero y debe agregar una nueva palabra más un movimiento. • Luego, los estudiantes presentarán sus modelos de la célula animal o vegetal indicando sus partes y características.
Desarrollo	
Actividad (es)	• Posteriormente, el docente presentará el tema "célula procariota" donde explicará sus características, estructura y ejemplos de organismos con este tipo de célula. • De la misma forma, el profesor presentará dos imágenes de seres vivos (una procariota y otra eucariota), los alumnos deberán establecer las diferencias entre los dos organismos teniendo en cuenta la explicación de ambos tipos de células y deberán registrarlas. en su hoja de investigación.
Final	
Actividad (es)	• Finalmente, el profesor dará una retroalimentación sobre el tema (tipos de células) tomando como ejemplo a los dos seres vivos del ejercicio anterior con el fin de aclarar dudas.

Materiales and recursos.

OVA a utilizar.		**Descripción.**
1	OVA de Ciencias Naturales –Tipos de células y sus funciones vitales (Célula procariota). https://naturalsciencesbilingualeducation.blogspot.com/	Este OVA contiene el título del tema, el objetivo, las palabras clave, el vocabulario, las versiones en inglés y español de los planes de clase, la teoría, un video para reforzar el tema y finalmente, las actividades para los

		estudiantes sobre los tipos de células y sus funciones vitales (Célula procariota).
Otros recursos:		
Tablero, recursos online, colores, lapiceros, lápiz, flashcards de la célula.		

Evaluación del tema.
• Desarrollar el taller titulado "tipos de células" donde los estudiantes encontrarán algunos ejercicios breves de aplicación.

Plan de clase Nº 4 – Los Reinos de la Naturaleza (Parte 1).

Institución:	Instituto Técnico	**Sede:**	Centro Docente Rafael Tello	**Periodo**	1

Docente:		**Grado:**	Quinto			**Semana**	4
Asignatura:	Ciencias Naturales	**Fecha:**	D	M	AÑO	**Intensidad Horaria**	2 horas

TEMA: Los seres vivos
SUBTEMA: Los reinos de la naturaleza
SITUACIÓN PROBLEMA: ¿Cómo inducir a los alumnos al conocimiento de los reinos de la naturaleza, teniendo en cuenta sus características y clasificación?
OBJETIVOS SEMANALES:
General: Identificar las características y diferencias de los seres vivos que hacen parte de cada uno de los reinos de la naturaleza.
Especificos: • Describir las características de cada uno de los cinco reinos de la naturaleza • Clasificar los seres vivos en uno de los reinos teniendo en cuenta las características.

Competencias:	**Vocabulario**
Competencia científica e interpretative	Monera, protista, fungi, microorganismos, levadura, hongos, moho, trufa, algas, amebas, euglena, plasmodio, bacterias.

Estandares en Inglés	
• El estudiante sigue cuidadosamente lo que dicen el profesor y compañeros durante un juego y actividad. • El estudiante asocia un dibujo con su descripción escrita.	
Estandares de Competencias.	
• El estudiante dentifica las estructuras de los seres vivos que les permite desarrollarse en un entorno y la cuales pueden ser usadas como criterios de clasificación.	
Enfoque:	**Método:**
Enfoque comunicativo y humanístico	Audio-visual y audio-lingüístico.

Desarrollo de la clase.

Inicio	
Actividad (es)	• Warm up: "tingo tango" para comenzar la clase, se les pedirá a los estudiantes hacer un circulo para jugar el tingo tango, entonces se les hará preguntas como: ¿han escuchado sobre los reinos de la naturaleza?, ¿Cuántos reinos piensan o saben ustedes que existen?, ¿a qué reino piensan ellos que pertenecen los seres humanos?
Desarrollo	
Actividad (es)	• Para dar una introducción general sobre este tema, se usará un video. Una vez haya terminado el video, se les preguntara a los estudiantes acerca de la información que ellos pudieron obtener del video es decir que entendieron. • Para introducir los reinos monera, protista y fungi, el profesor utilizara diapositivas para identificar los seres que pertenecen a cada uno de ellos y sus características
Final	
Actividad (es)	• En el tablero se colocará tres columnas con los nombres de los tres reinos, uno a uno los estudiantes pasaran al tablero y pegaran las imágenes de los organismos en su columna correspondiente. • Para reforzar el vocabulario, se usara un juego de asociación, las flashcards contendrán las imágenes de los seres vivos y otras flashcards contendrán el nombre de los seres vivos presentados en las imágenes, en grupos más o menos de siete personas tendrán que encontrar las parejas, es decir que la flashcard con la imagen y la del nombre.

Materiales and recursos.

OVA a utilizar.		**Descripción.**
1	OVA de Ciencias Naturales –Los reinos de la naturaleza. https://naturalsciencesbilingualeducation.blogspot.com/	Este OVA contiene el título del tema, el objetivo, las palabras clave, el vocabulario, las versiones en inglés y español de los planes de clase, la teoría, un video para reforzar el tema y finalmente, las actividades para los estudiantes sobre los reinos de la naturaleza.
Otros recursos:		
Flashcards		

Evaluación del tema.
Se les pedirá a los estudiantes buscar imágenes de seres vivos, cortarlos y pegarlos en sus cuadernos y clasificarlos en sus respectivos reinos.

Lesson Plan Nº 5 – Los Reinos de la Naturaleza (Parte 2).

Institución:	Instituto Técnico	**Sede:**	Centro Docente Rafael Tello	**Periodo**	1

Docente:		**Grado:**	Quinto	**Semana**	5
Asignatura:	Ciencias Naturales	**Fecha:**	D M AÑO	**Intensidad Horaria**	2 horas

TEMA: Los seres vivos	
SUBTEMA: Los reinos de la naturaleza	
SITUACIÓN PROBLEMA: ¿Cómo inducir a los alumnos al conocimiento de los Reinos de la naturaleza, teniendo en cuenta sus características y clasificación?	
OBJETIVOS SEMANALES:	
General: Identificar las características y diferencias de los seres vivos que hacen parte de cada uno de los reinos de la naturaleza.	
Especificos: • Describir las características de cada uno de los cinco reinos de la naturaleza • Clasificar los seres vivos en uno de los reinos teniendo en cuenta las características.	
Competencias:	**Vocabulario**
Competencia científica e interpretative	Monera, protista, fungi, microorganismos, levadura, hongos, moho,

	trufa, algas, amebas, euglena, plasmodio, bacterias.
Estandares en Inglés	
• El estudiante sigue cuidadosamente lo que dicen el profesor y compañeros durante un juego y actividad. • El estudiante asocia un dibujo con su descripción escrita.	
Estandares de Competencias.	
• Identifico las estructuras de los seres vivos que les permite desarrollarse en un entorno y la cuales pueden ser usadas como criterios de clasificación.	
Enfoque:	**Método:**
Enfoque comunicativo y humanístico	Audio-visual y audio-lingüístico.

Desarrollo de la clase.

Inicio	
Actividad (es)	• Warm up: para revisar los reinos anteriormente trabajados, el profesor le entregará un papel a cada estudiante, cada papel tendrá nombres de los organismos, en el salón de clase habrán tres reinos: el protista, monera y fungi, una vez cada estudiante tenga su papel, se les pedirá encontrar su respectivo reino Para verificar que están en su reino el estudiante dirá por ejemplo "soy un pájaro y pertenezco al reino animal" si ellos están en el reino equivocado, sus compañeros le ayudaran a encontrar el correcto dando algunas pistas utilizando las características de estos reinos.
Desarrollo	
Actividad (es)	• Usando diapositivas, el profesor mostrara las características del reino animal y vegetal. Al mismo tiempo se les pedirá a los estudiantes completar la hoja de trabajo que contiene las características y ejemplos de seres vivos que pertenecen a estos reinos. • Los estudiantes trabajaran en grupos de cinco personas una actividad llamada "a que reino pertenezco" cada grupo recibirá una hoja de trabajo y una bolsa con imágenes de organismos vivos, los estudiantes leerán la corta descripción y decidirán a que reino pertenece cada imagen.
Final	
Actividad (es)	• Para dar un repaso general los estudiantes y profesor jugarán "Quien quiere ser millonario" en parejas los estudiantes comenzarán a jugar, las preguntas están todas relacionadas a alos reinos de la naturaleza. El jugador que gane continua, el que no gane dará paso a un nuevo jugador, si ambos pierden, cederán el paso a dos nuevos jugadores.

Materiales and recursos.

OVA a utilizar.		**Descripción.**
1	OVA de Ciencias Naturales –Los reinos de la naturaleza. https://naturalsciencesbilingualeducation.blogspot.com/	Este OVA contiene el título del tema, el objetivo, las palabras clave, el vocabulario, las versiones en inglés y español de los planes de clase, la teoría, un video para reforzar el tema y finalmente, las actividades para los estudiantes sobre los reinos de la naturaleza.
Otros recursos:		
Hojas de trabajo, imagines		

Evaluación del tema.
Los estudiantes dibujaran y colorearan los organismos que pertenecen al reino animal y vegetal.

Plan de clase Nº 6 – La tierra.

Institución:	Instituto Técnico	**Sede:**	Centro Docente Rafael Tello	**Periodo**	2

Docente:		**Grado:**	Quinto	**Semana**	6
Asignatura:	Ciencias Naturales	**Fecha:**	D M AÑO	**Intensidad Horaria**	2 horas

TEMA: La tierra
SUBTEMA: Partes de la tierra.
SITUACIÓN PROBLEMA: ¿Cómo acercar al alumno al inicio de los procesos científicos mediante el estudio del entorno físico?
OBJETIVOS SEMANALES:
General: Conocer nuestro planeta.
Especificos:

<table>
<tr><td colspan="2">

- Aprender sobre la estructura y la superficie de la tierra.
- Identificar las diferentes capas de la tierra.

</td></tr>
<tr><td>Competencias:</td><td>Vocabulario</td></tr>
<tr><td>Competencia científica e interpretative</td><td>Sequía, ecuador, erosión, océano, manto, eje, ozono, rotación, terreno.</td></tr>
<tr><td colspan="2">Estandares en Inglés</td></tr>
<tr><td colspan="2">Escucha
• El estudiante reconoce cuando me habla en inglés y yo reacciono verbalmente y no verbalmente.
• El estudiante comprende descripciones breves y sencillas de objetos y lugares familiares.
Lectura
• El estudiante reconoce palabras y frases familiares en contextos inmediatos</td></tr>
<tr><td colspan="2">Estandares de Competencias.</td></tr>
<tr><td colspan="2">• Ubicarme en el universo y en la Tierra e identificar características de la materia, fenómenos físicos y manifestaciones de energía en el medio.
• Describe las características físicas de la Tierra y su atmósfera.
• Reconocer las características de la Tierra que la convierten en un planeta vivo.</td></tr>
<tr><td>Enfoque:</td><td>Método:</td></tr>
<tr><td>Enfoque comunicativo y humanístico</td><td>Audio-visual y audio-lingüístico.</td></tr>
</table>

Desarrollo de la clase.

<table>
<tr><td colspan="2">Inicio</td></tr>
<tr><td>Actividad (es)</td><td>• El profesor presentará el tema, explicando a los alumnos qué es la tierra; definir el concepto de movimiento y reconocer que la Tierra tiene movimiento de rotación, de lo que está compuesta y explicar las capas de la tierra a través de diapositivas realizadas en la herramienta de genially.</td></tr>
<tr><td colspan="2">Desarrollo</td></tr>
<tr><td>Actividad (es)</td><td>• El maestro usará a los estudiantes para modelar cómo la Tierra gira alrededor del sol a medida que gira sobre su eje y les explicará que la Tierra tarda 1 año o 365 días en hacer un viaje completo alrededor del sol, para ayudarlos a entender esto, el maestro les dirá que en este período de tiempo, en cada cumpleaños, la Tierra ha hecho un viaje más completo alrededor del sol.</td></tr>
<tr><td colspan="2">Final</td></tr>
</table>

Actividad (es)	• Para comprender mejor las capas de la Tierra, el docente realizará una actividad que consiste en crear nuestro planeta con plastilina, creando e identificando cada capa de la Tierra. De esta forma, a través de la actividad, el profesor podrá evaluar la habilidad del alumno y su comprensión del tema presentado. Trabajo en equipo: • En parejas, los alumnos realizarán una tabla comparativa entre las características de cada una de las capas de la tierra. • Para poner en práctica los conocimientos adquiridos, el docente realizará un cuestionario de evaluación sobre el tema en la plataforma kahoot.

Materiales and recursos.

OVA a utilizar.		**Descripción.**
1	OVA de Ciencias Naturales -Capas de la Tierra https://naturalsciencesbilingualeducation.blogspot.com/	Este OVA contiene el título del tema, el objetivo, las palabras clave, el vocabulario, las versiones en inglés y español de los planes de clase, la teoría, un video para reforzar el tema y finalmente, las actividades para los estudiantes sobre las capas de la tierra.
Otros recursos:		
Plastilina, genially, kahoot		

Evaluación del tema.
Los estudiantes dibujaran y colorearan los organismos que pertenecen al reino animal y vegetal.

Plan de clase Nº 7 – Partes de la tierra.

Institución:	Instituto Técnico	**Sede:**	Centro Docente Rafael Tello	**Periodo**	2

Docente:		**Grado:**	Quinto			**Semana**	7
Asignatura:	Ciencias Naturales	**Fecha:**	D	M	AÑO	**Intensidad Horaria**	2 horas

TEMA: La tierra	
SUBTEMA: Partes de la tierra y sus capas.	
SITUACIÓN PROBLEMA: ¿Cómo acercar al alumno al inicio de los procesos científicos mediante el estudio del entorno físico?	
OBJETIVOS SEMANALES:	
General: Aprender las capas de la tierra.	
Especificos: • Identificar las funciones de cada capa de la tierra.	
Competencias:	**Vocabulario**
Desarrollar la capacidad de los estudiantes para interpretar, argumentar, proponer y utilizar conocimientos biológicos, físicos, químicos, ambientales y tecnológicos en el proceso de desarrollo humano y sus relaciones con la sociedad, la naturaleza y la preservación de la vida en el planeta.	Geosfera, Atmosfera, Hidrosfera, Biosfera and Magnetosfera.
Estandares en Inglés	
Escucha • El estudiante reconoce cuando le hablan en inglés y reacciona de manera verbal y no verbal. • El estudiante comprende descripciones cortas y sencillas de objetos y lugares conocidos. Lectura • Reconozco palabras y frases familiares en contextos inmediatos.	
Estandares de Competencias.	
• Comprender la organización de la naturaleza y las relaciones entre los seres vivos dentro de un ecosistema. • Comprender la necesidad de cuidar el medio natural. • Explorar su entorno e identificar las relaciones entre los seres vivos de un ecosistema, reconociendo sus elementos. • Exponer sobre los problemas ambientales de su entorno y proponer posibles soluciones. • Exponer sobre áreas protegidas en Colombia, su ubicación y características. • Interiorizar el deber de cuidar el medio ambiente natural.	
Enfoque:	**Método:**
Enfoque comunicativo y humanístico	Audio-visual y audio-lingüístico.

Desarrollo de la clase.

Inicio	
Actividad (es)	• En continuidad con la temática de las partes de la tierra y sus capas, el docente presentará una imagen

	interactiva como modo introductorio de las capas de la tierra.
Desarrollo	
Actividad (es)	• El profesor comenzará proyectando una imagen interactiva, la cual al dar clic en ella permitirá conocer la descripción de las capas internas de la tierra; tales como: la gesosfera (la cual es la tierra misma: las rocas, minerales y formas terrenales de la superficie y el interior), la atmósfera (que es el delgado velo de moléculas de gas que separa la tierra del frío vacío del espacio), la hidrósfera (que es la suma de toda el agua de la Tierra y el ciclo del agua que la distribuye por el planeta), la biósfera (la cual es la capa del planeta tierra donde existe la vida), y la magnetosfera (que es el campo magnético que se extiende desde el interior de la tierra hasta el espacio). Cada una de estas capas tienen características e importantes funciones en la tierra. En la siguiente sección se explicará a cerca de la atmósfera y sus capas.
Final	
Actividad (es)	• Como actividad interactiva, los alumnos resuelven crucigramas con el fin de asociar las diferentes capas de la tierra con la descripción correcta de acuerdo a su función.

Materiales and recursos.

OVA a utilizar.		**Descripción.**
1	OVA de Ciencias Naturales -Partes de la tierra y sus capas https://naturalsciencesbilingualeducation.blogspot.com/	Este OVA contiene el título del tema, el objetivo, las palabras clave, el vocabulario, las versiones en inglés y español de los planes de clase, la teoría, un video para reforzar el tema y finalmente, las actividades para los estudiantes sobre partes de la tierra y sus capas.
Otros recursos:		
Lápiz, cuadernos, borrador, colores		

Evaluación del tema.
Para evaluar este tema. El profesor hará un taller individual sobre las partes de la tierra y sus capas.

Plan de clase Nº 8 – La atmosfera y sus capas.

Institución:	Instituto Técnico	**Sede:**	Centro Docente Rafael Tello	**Periodo**	2

Docente:		**Grado:**	Quinto	**Semana**	8
Asignatura:	Ciencias Naturales	**Fecha:**	D M AÑO	**Intensidad Horaria**	2 horas

TEMA: La tierra	
SUBTEMA: La atmosfera y sus capas.	
SITUACIÓN PROBLEMA: ¿Cómo motivar a los estudiantes hacia el liderazgo de campañas orientadas al cuidado del medio ambiente y su exploración?	
OBJETIVOS SEMANALES:	
General: Aprender la función de la atmósfera.	
Especificos: • Identificar las capas de la atmósfera.	
Competencias:	**Vocabulario**
Desarrollar la capacidad de los estudiantes para interpretar, argumentar, proponer y utilizar conocimientos biológicos, físicos, químicos, ambientales y tecnológicos en el proceso de desarrollo humano y sus relaciones con la sociedad, la naturaleza y la preservación de la vida en el planeta.	Geosfera, Atmosfera, Hidrosfera, Biosfera and Magnetosfera.
Estandares en Inglés	
Escucha • El estudiante reconoce cuando le hablan en inglés y reacciona de manera verbal y no verbal. • Comprendo descripciones cortas y sencillas de objetos y lugares conocidos. Lectura • Reconozco palabras y frases familiares en contextos inmediatos.	
Estandares de Competencias.	
• Comprender la organización de la naturaleza y las relaciones entre los seres vivos dentro de un ecosistema. • Comprender la necesidad de cuidar el medio natural. • Explorar su entorno e identificar las relaciones entre los seres vivos de un ecosistema, reconociendo sus elementos. • Exponer sobre los problemas ambientales de su entorno y proponer posibles soluciones.	

• Exponer sobre áreas protegidas en Colombia, su ubicación y características. • Interiorizar el deber de cuidar el medio ambiente natural.

Enfoque:	**Método:**
Enfoque comunicativo, heuristico y humanístico	Audio-visual y audio-lingüístico.

Desarrollo de la clase.

Inicio	
Actividad (es)	• El docente pregunta a los alumnos a cerca de la atmósfera con el propósito de identificar el conocimiento previo que tengan al respecto, y así dar paso a la introducción del tema.
Desarrollo	
Actividad (es)	• Mediante la proyección de una presentación tipo vídeo, el docente explica la función de la atmósfera que hace parte de las capas exteriores del planeta; del mismo modo, se explicarán una a una las capas de la atmósfera, las cuales consisten en: la exósfera, termosfera, ionosfera, mesosfera, estratosfera y troposfera.
Final	
Actividad (es)	• A modo de evaluación colectiva, el docente pedirá a algunos estudiantes que pasen al frente de sus compañeros. Mientras uno de ellos está de espalda al tablero, los demás podrán ver una de las imágenes proyectadas, la cual puede pertenecer a cualquiera de las capas de la atmósfera. La tarea de los demás compañeros será describirla según sus características hasta que el estudiante logre decir el nombre correcto.

Materiales and recursos.

OVA a utilizar.		**Descripción.**
1	OVA de Ciencias Naturales -La atmosfera y sus capas	Este OVA contiene el título del tema, el objetivo, las palabras clave, el vocabulario, las versiones en inglés y español de los planes de clase, la teoría, un video para reforzar el tema y finalmente, las actividades para los estudiantes sobre la atmosfera y sus capas.
Otros recursos:		
Lápiz, cuadernos, borrador, colores		

Evaluación del tema.
Para evaluar este tema. El profesor hará un taller individual sobre las partes de la atmósfera y sus capas.

Matematicas

Plan de clase Nº 1 – Suma y resta de números naturales.

Institución:	Instituto Técnico	**Sede:**	Centro Docente Rafael Tello	**Periodo**	1

Docente:		**Grado:**	Quinto	**Semana**	1
Asignatura:	Matemáticas	**Fecha:**	D M AÑO	**Intensidad Horaria**	2 horas

TEMA: Operación con números naturales.
SUBTEMA: Suma y resta de números naturales.
SITUACIÓN PROBLEMA: ¿Por qué los números naturales son importantes en la vida del estudiante?
OBJETIVOS SEMANALES:
General: Reconocer y usar las números naturales para resolver operaciones en la vida cotidiana

Especificos:

- Resolver y formular problemas cuyas estrategias de solución requiere las relaciones y propiedades de los números naturales y sus operaciones
- Resolver y formular problemas en situaciones aditivas de composición, trasformación, comparación e igualdad.
- Identificar en el contexto, la necesidad de una situación, la necesidad de un cálculo exacto o aproximado y la razonabilidad de los resultados obtenidos.

Competencias:	**Vocabulario**
Pensamiento numérico.	Números naturales, conjunto de, sumar, resta, números compuestos, infinito, sucesor

Estandares en Inglés

Escucha:

- El estudiante sigue cuidadosamente lo que el profesor y compañeros dicen durante un juego o actividad
- El estudiante dentifica de quien están hablando de acuerdo con sus descripciones.

Lectura:

- El estudiante asocia un dibujo con su descripción escrita

Escritura

• El estudiante une frases y conectores que expresan secuencia y adición Monologo • El estudiante puede hablar sobre cantidades y cuenta objetos hasta mil Habla • El estudiante pregunta al profesor y compañeros para aclarar una pregunta o explicar de lo que se esta hablando
Estandares de Competencias.
• Resolver y formular problemas cuyas estrategias de solución requiere las relaciones y propiedades de los números naturales y sus operaciones

Enfoque:	**Método:**
Enfoque comunicativo y algorítmico	Audio-visual y audio-lingüístico.

Desarrollo de la clase.

Inicio	
Actividad (es)	• El profesor introducirá el tema con la presentación de un video, con el cual explicara en detalles lo que es un numero natural • En relación con el video, el profesor preguntara sobre el video para corroborar si los estudiantes entendieron lo que el video desea explicar
Desarrollo	
Actividad (es)	• El profesor explica lo que es un número natural por medio de flashcards, donde frutas, animales, etc. Serán usadas para identificar cuáles son los y cuales no son los números naturales. • En la siguiente actividad, cada estudiante representara un numero natural, la idea es sumar o restar con el numero asignado.
Final	
Actividad (es)	• Para finalizar, un juego será usado donde un tablero será usado el cual contiene suma y resta de números naturales, cada estudiantes lanzara un dado y dependiendo del número, correrá una ficha y realizara la operación

Materiales and recursos.

OVA a utilizar.		**Descripción.**
1	OVA de Matemáticas -Suma y resta con números naturales. https://mathematicsbilingualeducation.blogspot.com/	Este OVA contiene el título del tema, el objetivo, las palabras clave, el vocabulario, las versiones en inglés y español de los planes de clase, la teoría, un video para reforzar el tema y finalmente, las actividades para los

		estudiantes sobre suma y resta con números naturales.
Otros recursos:		
Flashcards, tablero con un juego.		

Evaluación del tema.
Identificar si es o no un numero natural,; además, el estudiante realizara una suma y resta con dicho numero

Plan de clase Nº 2 – Propiedades de la Adicción.

Institución:	Instituto Técnico	**Sede:**	Centro Docente Rafael Tello	**Periodo**	1

Docente:		**Grado:**	Quinto			**Semana**	2
Asignatura:	Matemáticas	**Fecha:**	D	M	AÑO	**Intensidad Horaria**	2 horas

TEMA: Operación con números naturales.	
SUBTEMA: Propiedades de la adición	
SITUACIÓN PROBLEMA: ¿Por qué los números naturales son importantes en la vida del estudiante?	
OBJETIVOS SEMANALES:	
General: Conocer y aprender las propiedades de la adición.	
Especificos:	
• Reconocer y aplicar las propiedades de la adición	
Competencias:	**Vocabulario**
Pensamiento numérico y variacional.	números, suma, dificultades, objeto físico
Estandares en Inglés	
Escucha:	
• El estudiante sigue cuidadosamente lo que el profesor y compañeros dicen durante un juego o actividad	
• El estudiante dentifica de quien están hablando de acuerdo con sus descripciones.	
Lectura:	
• El estudiante asocia un dibujo con su descripción escrita	
Escritura	
• El estudiante une frases y conectores que expresan secuencia y adición	

Monologo • El estudiante puede hablar sobre cantidades y cuenta objetos hasta mil Habla • El estdnate pregunta al profesor y compañeros para aclarar una pregunta o explicar de lo que se esta hablando
Estandares de Competencias.
• Usar números, operaciones y sus propiedades para resolver situaciones cotidianas.

Enfoque:	**Método:**
Enfoque comunicativo y algorítmico	Audio-visual y audio-lingüístico.

Desarrollo de la clase.

Inicio	
Actividad (es)	• El docente realizará una presentación en power point de las propiedades de la suma, de esta forma explicará a los alumnos de qué trata el tema.
Desarrollo	
Actividad (es)	Para comprender mejor el tema, los alumnos conocerán las propiedades de la suma a través de una situación diaria. Un ejemplo como la preparación de la mochila para la escuela. Para iniciar el juego buscamos una mochila vacía y la abrimos. Primero, colocamos 3 cuadernos grandes y luego 6 cuadernos pequeños. ¿Cuántos cuadernos hay en la mochila? Para resolver esta pregunta solo tienes que sumar los cuadernos grandes más el número de cuadernos pequeños. ¿Seguiría habiendo 9 cuadernos en la mochila si hubiéramos puesto los cuadernos pequeños primero y luego los grandes? El resultado de la adición será el mismo. El orden del factor no altera el producto. El maestro dice a los estudiantes que esta es la propiedad de la primera suma (PROPIEDAD COMUTATIVA). Para practicar la segunda propiedad de la suma, el maestro pide a sus alumnos que pongan 3 lápices verdes, 8 lápices amarillos y 2 lápices azules dentro de la bolsa. La pregunta será ¿cuántos lápices hay en el estuche? Para saber cuántos hay. Los estudiantes deben sumar 3 + 8 + 2 = ¿Cómo se resuelve esta suma? pregunta el maestro ¿Sumar primero tres más ocho y sumar dos al resultado? (3 + 8) + 2 = ¿O sumar ocho más dos primeros y sumar tres al resultado? 3 + (8 + 2)

	El profesor explica a los alumnos, se puede resolver de cualquiera de las dos formas y el resultado será el mismo. Cuando tenemos tres o más sumandos, es posible comenzar sumando los dos primeros números y al resultado sumar el tercero, o viceversa, comenzar sumando el segundo y el tercero y al resultado sumar el primero. Esta es la segunda de las propiedades de la suma y la conocemos como PROPIEDAD ASOCIATIVA.
Final	
Actividad (es)	La suma de cualquier número más cero (0) es igual al mismo número. Por tanto, cero (0) es el ELEMENTO NEUTRO de la suma. Para poner en práctica, los alumnos harán un ejercicio; ponemos 4 galletas de chocolate y 0 galletas de avena en nuestra mochila. ¡No tenemos galletas de avena! ¿Cuántas galletas hay en total en la mochila? Hay 4 galletas en la mochila. La suma de cualquier número más cero (0) es igual al mismo número. Por tanto, cero (0) es el ELEMENTO NEUTRO de la suma.

Materiales and recursos.

OVA a utilizar.		**Descripción.**
1	OVA de Matemáticas -Propiedades de la suma. https://mathematicsbilingualeducation.blogspot.com/	Este OVA contiene el título del tema, el objetivo, las palabras clave, el vocabulario, las versiones en inglés y español de los planes de clase, la teoría, un video para reforzar el tema y finalmente, las actividades para los estudiantes sobre propiedades de la suma.
Otros recursos:		
Power point, cuadernos, mochila, lápiz.		

Evaluación del tema.
Practicar las tres propiedades de la suma por medio de un juego descrito.

Plan de clase Nº 3 – Propiedades de la Sustracción.

Institución:	Instituto Técnico	**Sede:**	Centro Docente Rafael Tello	**Periodo**	1

Docente:		**Grado:**	Quinto			**Semana**	3
Asignatura:	Matemáticas	**Fecha:**	D	M	AÑO	**Intensidad Horaria**	2 horas

TEMA: Operación con números naturales.
SUBTEMA: Propiedades de la sustracción.
SITUACIÓN PROBLEMA: ¿Por qué los números naturales son importantes en la vida del estudiante?
OBJETIVOS SEMANALES:
General: conocer y aprender sobre las propiedades de la resta.
Especificos: • Reconocer y aplicar la resta de propiedades.

Competencias:	**Vocabulario**
Pensamiento numérico.	Números naturales, conjunto de, sumar, resta, números compuestos, infinito, sucesor

Estandares en Inglés
Escucha • El estudiante reconoce cuando habla en inglés y reaccionoa verbalmente y no verbalmente. • El alumno comprende descripciones breves y sencillas de objetos y lugares familiares. Leyendo • El estudiante reconoce palabras y frases familiares en contextos inmediatos.
Estandares de Competencias.

• Usar números, operaciones y sus propiedades para resolver situaciones cotidianas.

Enfoque:	**Método:**
Enfoque comunicativo y algorítmico	Audio-visual y audio-lingüístico.

Desarrollo de la clase.

Inicio	
Actividad (es)	• El maestro hará una pregunta sobre lo que saben los estudiantes sobre la propiedad de la resta, los estudiantes participarán. Para aprender mucho más sobre la resta, el maestro les mostrará a los estudiantes un video corto, en el que se explicará la resta de propiedades.
Desarrollo	
Actividad (es)	• Para aplicar este tema, los alumnos realizarán una actividad con flashcards en la que aparecerán diferentes operaciones de descanso y los alumnos deberán identificar cuál es el minuendo, sustraendo, diferencia. Este ejercicio permite que los alumnos conozcan las dos propiedades de la resta. A continuación, el profesor presentará un juego, en el que los alumnos deberán resolver unos ejercicios según el tema.
Final	
Actividad (es)	• Para practicar y poner a prueba los conocimientos de los alumnos en la identificación de las diferentes propiedades, el profesor realizará un último ejercicio, el cual cada alumno deberá resolver algún ejercicio diseñado por el profesor, una vez finalizados los alumnos se socializarán los ejercicios para despejar dudas en caso de ellos tienen.

Materiales and recursos.

OVA a utilizar.		**Descripción.**
1	OVA de Matemáticas -Propiedades de la resta. https://mathematicsbilingualeducation.blogspot.com/	Este OVA contiene el título del tema, el objetivo, las palabras clave, el vocabulario, las versiones en inglés y español de los planes de clase, la teoría, un video para reforzar el tema y finalmente, las actividades para los estudiantes sobre propiedades de la resta.
Otros recursos:		
Video, flashcards.		

Evaluación del tema.
To complete the exercises about the properties of subtraction.

Plan de clases Nº 4 – Números Primos y Compuestos.

Institución:	Instituto Técnico	**Sede:**	Centro Docente Rafael Tello	**Periodo**	1

Docente:		**Grado:**	Quinto			**Semana**	4
Asignatura:	Matemáticas	**Fecha:**	D	M	AÑO	**Intensidad Horaria**	2 horas

TEMA: Operación con números naturales.	
SUBTEMA: Números Primos y Compuestos	
SITUACIÓN PROBLEMA: ¿Por qué los números naturales son importantes en la vida del estudiante?	
OBJETIVOS SEMANALES:	
General: Aprender la importancia de los números primos y compuestos.	
Especificos: • Resolver y formular problemas cuya estrategia de solución requiera de las relaciones y propiedades de los números naturales y sus operaciones. • Resolver y formular problemas en situaciones aditivas de composición, transformación comparación e igualación. • Identifico en el contexto de una situación, la necesidad de un cálculo exacto o aproximado y lo razonable de los resultados obtenidos.	
Competencias:	**Vocabulario**
Pensamiento numérico.	Números primos, números compuestos, números naturales.
Estandares en Inglés	
Escucha • El estudiante reconoce cuando habla en inglés y reacciona verbalmente y no verbalmente. • El alumno comprende descripciones breves y sencillas de objetos y lugares familiares.	

Lectura • El estudiante reconoce palabras y frases familiares en contextos inmediatos.
Estandares de Competencias.
• Utilizar los números, las operaciones y sus propiedades para resolver situaciones cotidianas. • Realizar cálculos rápidos de reparto a partir de los criterios de divisibilidad. • Reconstruir o expresar números a partir de la composición y descomposición de números primos

Enfoque:	**Método:**
Enfoque Heurístico y algorítmico	Audio-visual y audio-lingüístico.

Desarrollo de la clase.

Inicio	
Actividad (es)	• A modo de introducción, el docente pregunta a los estudiantes si tienen algún conocimiento acerca de los números primos y compuestos, su uso y cuál es la manera de identificarlos. Luego, dará la definición y concepto con la intención de encaminarlos en el tema.
Desarrollo	
Actividad (es)	• El docente dibujará en el tablero una tabla en la que plasmará los números primos del 1 al 100, con el objetivo de mostrar a los estudiantes la manera en que se deben seleccionar. Ejemplo: se iniciará con el número 2 el cual es un número primo, pero todos los múltiplos de 2 serán números compuestos, ya que serán divisibles entre 2, entonces se tachan todos los múltiplos de 2…y así sucesivamente. Luego, para explicar el uso de dichos números en un contexto real, el docente dará al estudiante una serie de problemas matemáticos, los cuales solucionarán entre todos. De esta manera, el estudiante logrará identificar los divisores de los números. Para identificar los números compuestos, el docente explicará brevemente que al contrario de los números primos, estos sí se pueden dividir por más números a parte de ellos mismos y el 1.
Final	
Actividad (es)	• A modo de conclusión y evaluación grupal, el docente utilizará una ruleta virtual, la cual contendrá determinados números. La idea es que al ser seleccionado cualquier número, el docente mirará su lista de estudiantes y a quien corresponda ese número deberá descifrar si el número hace parte del grupo de los compuestos o primos.

Materiales and recursos.

OVA a utilizar.		**Descripción.**
1	OVA de Matemáticas -Números primos y	Este OVA contiene el título del tema, el objetivo, las palabras clave, el

	compuestos. https://mathematicsbilingualeducation.blogspot.com/	vocabulario, las versiones en inglés y español de los planes de clase, la teoría, un video para reforzar el tema y finalmente, las actividades para los estudiantes sobre números primos y compuestos.
Otros recursos:		
Lápiz, cuadernos, borrador, colores		

Evaluación del tema.
Para evaluar este tema. El profesor hará un taller individual sobre los números primos y compuestos.

Plan de clases Nº 5 – La multiplicación y sus propiedades.

Institución:	Instituto Técnico	**Sede:**	ente Rafael Tello			**Periodo**	1

Docente:		**Grado:**	Quinto			**Semana**	5
Asignatura:	Matemáticas	**Fecha:**	D	M	AÑO	**Intensidad**	2 horas

TEMA: Operación con números naturales.	
SUBTEMA: la multiplicación y sus propiedades	
SITUACIÓN PROBLEMA: ¿Por qué los números naturales son importantes en la vida del estudiante?	
OBJETIVOS SEMANALES:	
General: Identificar las propiedades de la multiplicación y la división de naturales	
Especificos: • Resolver problemas cuyas estrategias de solución requieran las propiedades de la multiplicación y la división de los números naturales.	
Competencias:	**Vocabulario**
Pensamiento numérico, interpretativo y varicional.	Propiedades conmutativa, asociativa y distributiva, factores, producto, igual
Estandares en Inglés	
• El estudiante sigue cuidadosamente lo que dicen sus compañeros y profesor durante un juego o actividad • El estudiante asocia un dibujo con su descripción escrita.	
Estandares de Competencias.	

Resuelvo y formula problemas cuya solución requiera la relación y propiedades de los números naturales en sus operaciones.

Enfoque:	**Método:**
Enfoque comunicativo y algorítmico.	Audio-visual y audio-lingüístico.

Desarrollo de la clase.

Inicio	
Actividad (es)	1. Introducir las propiedades de la multiplicación utilizando diapositivas 2. En una hoja de trabajo se entregarán algunos ejercicios de multiplicación los estudiantes tendrán que analizar que propiedad deben utilizar para resolverlas.
Desarroll	
Actividad (es)	3. En una clase previa se les pedirá a los estudiantes traer diferentes cosas relacionadas con comida: comida chatarra, comida saludable etc. Ellos crearan una tienda. La idea es que ellos compren, una vez hayan comprado, ellos tendrán que hacer una lista de sus compras y utilizar la multiplicación para saber cuánto gastaron. Por ejemplo: 3 bombones x 300=900
Final	
Actividad (es)	4. Finalmente, el docente hará un ejercicio de retroalimentación con ejemplos de aplicación para aclarar dudas y

Materiales and recursos.

OVA a utilizar.		**Descripción.**
1	OVA de Matemáticas –Propiedades de la multiplicación y división con números naturales. https://mathematicsbilingualeducation.blogspot.	Este OVA contiene el título del tema, el objetivo, las palabras clave, el vocabulario, las versiones en inglés y español de los planes de clase, la teoría, un video para reforzar el tema y finalmente, las actividades para los estudiantes sobre
Otros recursos:		
Hoja de ejercicios, lápiz, borrador, recursos online y computacionales.		

Evaluación del tema.
Los estudiantes resolverán el taller llamado “propiedades de la multiplicación”

Plan de clases Nº 6 – División de números naturales.

Institución:	Instituto Técnico	**Sede:**	Centro Docente Rafael Tello	**Periodo**	1

Docente:		**Grado:**	Quinto			**Semana**	6
Asignatura:	Matemáticas	**Fecha:**	D	M	AÑO	**Intensidad**	2 horas

TEMA: Operación con números naturales.
SUBTEMA: División números de naturales
SITUACIÓN PROBLEMA: ¿Por qué los números naturales son importantes en la vida del estudiante?
OBJETIVOS SEMANALES:
General: Identificar las propiedades de la multiplicación y la división de naturales
Especificos: • Resolver problemas cuyas estrategias de solución requieran las propiedades de la multiplicación y la división de los números naturales.

Competencias:	**Vocabulario**
Pensamiento numérico, interpretativo y varicional.	Division, dividendo, divisor, residuo, cociente, igual.

Estandares en Inglés
• El estudiante sigue cuidadosamente lo que dicen sus compañeros y profesor durante un juego o actividad • El estudiante asocia un dibujo con su descripción escrita.
Estandares de Competencias.
• Resuelvo y formula problemas cuya solución requiera la relación y propiedades de los números naturales en sus operaciones.

Enfoque:	**Método:**
Enfoque comunicativo y algorítmico.	Audio-visual y audio-lingüístico.

Desarrollo de la clase.

Inicio	
Actividad (es)	1. Hacer un repaso de la multiplicación y ejercicios de aplicación para practicar esta operación. 2. Se hará la presentación del tema con el objetivo de conocerlos términos de la división.
Desarroll	
Actividad (es)	3. Se les explicará por medio de ejemplos a los estudiantes como hacer divisiones de una, dos y tres cifras para posteriormente hacer unos ejercicios prácticos aplicando la división. 4. Los estudiantes tendrán unas situaciones con una serie de preguntas que deberán resolver por medio de la
Final	
Actividad (es)	5. Se les enseñara la división con naturales, se les explicara cuando pueden usar estas operaciones matemáticas 6. En una hoja de trabajo se les dará algunos problemas matemáticos como: - Ana compró 10 manzanas y cada una costó $ 500. ¿Cuánto costaron las 10 manzanas? – Gabriel tiene 50 gallinas, cada una pone un huevo por día. ¿Cuántos huevos recoge Gabriel en tres días? Sabiendo que Gabriel tiene seis hijos ¿cuantos huevos puede

Materiales and recursos.

OVA a utilizar.		**Descripción.**
1	OVA de Matemáticas –Propiedades de la multiplicación y división con números naturales. https://mathematicsbilingualeducation.blogspot.	Este OVA contiene el título del tema, el objetivo, las palabras clave, el vocabulario, las versiones en inglés y español de los planes de clase, la teoría, un video para reforzar el tema y finalmente, las actividades para los estudiantes sobre
Otros recursos:		
Hoja de ejercicios, lápiz, borrador, tablero, recursos online.		

Evaluación del tema.
Los estudiantes resolverán el taller llamado “División de números naturales”

Plan de clase Nº 7 – Fracciones y sus términos.

Institución:	Instituto Técnico	**Sede:**	Centro Docente Rafael Tello	**Periodo**	1

Docente:		**Grado:**	Quinto			**Semana**	6
Asignatura:	Matemáticas	**Fecha:**	D	M	AÑO	**Intensidad Horaria**	2 horas

TEMA: Las fracciones y sus operaciones.	
SUBTEMA: Fracciones, sus términos y fracciones equivalentes.	
SITUACIÓN PROBLEMA: ¿Cuál es la importancia del concepto de fracciones en el proceso educativo y su relación con su entorno en la vida diaria?	
OBJETIVOS SEMANALES:	
General: Comparar y ordenar números fraccionarios mediante diversas interpretaciones, recursos y representaciones.	
Específicos: • Interpretar fracciones en diferentes contextos: situaciones de medición, relación parte-todo, cociente, razones y proporciones. • Identificar en el contexto de una situación, la necesidad de un cálculo exacto o aproximado y la razonabilidad de los resultados obtenidos.	
Competencias:	**Vocabulario**
Pensamiento numérico.	Fracciones, numerador, denominador, recta numérica.
Estándares en Inglés	
• El estudiante lee y escribe y representa mitades o cuartos como partes de un conjunto usando símbolos, palabras y modelos. • El estudiante sigue atentamente lo que dicen el profesor y compañeros de clase durante un juego o actividad. • El estudiante asocia un dibujo con su descripción escrita.	
Estándares de Competencias.	
• Conocer el significado de la fracción en situaciones cotidianas. Evaluar fracciones como forma de expresión de cantidades.	

• Responder a breves explicaciones basadas en las características de los números fraccionarios.

Enfoque:	**Método:**
Enfoque comunicativo y algorítmico	Audio-visual y audio-lingüístico.

Desarrollo de la clase.

Inicio	
Actividad (es)	• El docente comenzará con un breve repaso de las operaciones con números naturales como suma, resta, multiplicación y división, con el fin de preparar al alumno para desarrollar el nuevo tema (fracciones) donde estas operaciones estarán muy presentes. • Luego, abordaremos los términos de una fracción (numerador y denominador), además de aprender cuál es su función como operación matemática y los tipos de fracciones.
Desarrollo	
Actividad (es)	• Por otro lado, el docente explicará por medio de ejemplos como ubicar una fracción en la recta numérica prestando atención en el numerador y en el denominador dado por el profesor. • Posteriormente, el docente mostrará una imagen con una pizza repartida en 2/8 partes. Luego ubicara esa fracción en una recta numérica explicando paso a paso como se debe hacer.
Final	
Actividad (es)	• Taller: para esta actividad, los estudiantes tendrán las fracciones representadas gráficamente. Deben escribir la fracción que identifiquen y posteriormente, ubicarla en la recta numérica. . • Conclusión: el profesor dará una retroalimentación final con una representación gráfica final de una fracción para aclarar posibles dudas y asignará la tarea para la siguiente clase.

Materiales and recursos.

OVA a utilizar.		**Descripción.**
1	OVA de Matemáticas –Fracciones y sus términos. https://mathematicsbilingualeducation.blogspot.com/	Este OVA contiene el título del tema, el objetivo, las palabras clave, el vocabulario, las versiones en inglés y español de los planes de clase, la teoría, un video para reforzar el tema y finalmente, las actividades para los estudiantes sobre fracciones y sus términos.
Otros recursos:		
Recursos online y computacionales, tablero, lápiz, lapicero, colores, flashcards.		

Evaluación del tema.
• Desarrollar el taller de la aplicación sobre las fracciones.

Plan de clase Nº 8 – Fracciones equivalentes.

Institución:	Instituto Técnico	**Sede:**	Centro Docente Rafael Tello	**Periodo**	1

Docente:		**Grado:**	Quinto	**Semana**	6
Asignatura:	Matemáticas	**Fecha:**	D M AÑO	**Intensidad Horaria**	2 horas

TEMA: Las fracciones y sus operaciones.	
SUBTEMA: Fracciones equivalentes.	
SITUACIÓN PROBLEMA: ¿Cuál es la importancia del concepto de fracciones en el proceso educativo y su relación con su entorno en la vida diaria?	
OBJETIVOS SEMANALES:	
General: Comparar y ordenar números fraccionarios mediante diversas interpretaciones, recursos y representaciones.	
Específicos: • Interpretar fracciones en diferentes contextos: situaciones de medición, relación parte-todo, cociente, razones y proporciones. • Identificar en el contexto de una situación, la necesidad de un cálculo exacto o aproximado y la razonabilidad de los resultados obtenidos.	
Competencias:	**Vocabulario**
Pensamiento numérico.	Fracciones, numerador, denominador, fracciones equivalentes.
Estándares en Inglés	
• El estudiante lee y escribe y representa mitades o cuartos como partes de un conjunto usando símbolos, palabras y modelos. • El estudiante sigue atentamente lo que dicen el profesor y compañeros de clase durante un juego o actividad.	

• El estudiante asocia un dibujo con su descripción escrita.
Estándares de Competencias.
• Conocer el significado de la fracción en situaciones cotidianas. Evaluar fracciones como forma de expresión de cantidades. • Responder a breves explicaciones basadas en las características de los números fraccionarios.

Enfoque:	**Método:**
Enfoque comunicativo y algorítmico	Audio-visual y audio-lingüístico.

Desarrollo de la clase.

Inicio	
Actividad (es)	• El docente comenzará con un breve repaso de las fracciones y sus términos, además presentara una fracción de forma grafica para que los estudiantes identifiquen el numerador y denominador. • Luego, el docente escribirá tres fracciones en el tablero, y los estudiantes deberán ubicarlas en la recta numérica para finalmente hacer una corta retroalimentación con uno de los ejemplos.
Desarrollo	
Actividad (es)	• Por otro lado, el docente explicará que es una fracción equivalente y como por medio de la multiplicación y división, podemos hallar fracciones de este tipo. • El docente tomara unos ejemplos para profundizar en la explicación y asignará unos cortos ejemplos para que los estudiantes pueden poner en práctica el tema para luego, el docente hacer una revisión y aclara dudas.
Final	
Actividad (es)	• Taller: para esta actividad, los estudiantes tendrán las fracciones representadas gráficamente. Deben escribir la fracción que identifiquen y posteriormente, ubicarla en la recta numérica y hallar sus fracciones equivalentes. • Conclusión: el profesor dará una retroalimentación final con una representación gráfica final de una fracción para aclarar posibles dudas y asignará la tarea para la siguiente clase.

Materiales and recursos.

OVA a utilizar.		**Descripción.**
1	OVA de Matemáticas –Fracciones y sus términos. https://mathematicsbilingualeducation.blogspot.com/	Este OVA contiene el título del tema, el objetivo, las palabras clave, el vocabulario, las versiones en inglés y español de los planes de clase, la teoría, un video para reforzar el tema y finalmente, las actividades para los estudiantes sobre fracciones y sus términos.

Otros recursos:
Recursos online y computacionales, tablero, lápiz, lapicero, colores, flashcards.

Evaluación del tema.
• Desarrollar el taller de la aplicación sobre las fracciones.

Plan de clase Nº 9 – Tipos de fracciones.

Institución:	Instituto Técnico	**Sede:**	Centro Docente Rafael Tello	**Periodo**	1

Docente:		**Grado:**	Quinto			**Semana**	7
Asignatura:	Matemáticas	**Fecha:**	D	M	AÑO	**Intensidad Horaria**	2 horas

TEMA: Las fracciones y sus operaciones.
SUBTEMA: Tipos de fracciones.
SITUACIÓN PROBLEMA: ¿Cuál es la importancia del concepto de fracciones en el proceso educativo y su relación con su entorno en la vida diaria?
OBJETIVOS SEMANALES:
General: Comparar y ordenar números fraccionarios mediante diversas interpretaciones, recursos y representaciones.

Específicos:

- Identificar tipos de fracciones.
- Comparar y contrastar diferentes tipos de fracciones.
- Representar fracciones en una recta numérica.

Competencias:	**Vocabulario**
Pensamiento numérico y variacional.	Fracciones, numerador, denominador, fracciones propias, impropias y

	mixtas.
Estándares en Inglés	
• El estudiante lee y escribe y representa mitades o cuartos como partes de un conjunto usando símbolos, palabras y modelos. • El estudiante sigue atentamente lo que dicen el profesor y compañeros de clase durante un juego o actividad. • El estudiante asocia un dibujo con su descripción escrita.	
Estándares de Competencias.	
• Conocer el significado de la fracción en situaciones cotidianas. • Evaluar fracciones como forma de expresión de cantidades. • Responder a breves explicaciones basadas en las características de los números fraccionarios.	
Enfoque:	**Método:**
Enfoque comunicativo y algorítmico	Audio-visual y audio-lingüístico.

Desarrollo de la clase.

Inicio	
Actividad (es)	• El profesor comenzará con un icebreaker donde cada alumno deberá seleccionar los múltiplos de un número en el menor tiempo posible y sin cometer errores: ejemplo Los múltiplos del número 3, y cada alumno dirá rápidamente un número que sea un múltiplo de tres. (el número puede cambiar en cualquier momento) • Luego, se hará una revisión del tema anterior, donde el docente presentará gráficamente varias fracciones y los estudiantes deberán relacionar la fracción con la representación gráfica correcta, y también deberán encontrar sus respectivas fracciones equivalentes mediante amplificación.
Desarrollo	
Actividad (es)	• Por otro lado, el docente introducirá el tema, a través de una serie de representaciones gráficas para tener en cuenta cada parte de una fracción (numerador y denominador), y también explicará cada uno de los tres tipos de fracciones (propia, impropia, y mixto) a través de ilustraciones y ejemplos cortos. Asimismo, se estudiarán los pasos para convertir una fracción mixta en impropia y viceversa. • De la misma forma, el profesor presentará algunos problemas de interpretación y análisis donde los alumnos deberán utilizar las fracciones para resolverlos. El propósito del ejercicio anterior es aclarar dudas que existen en el grupo.
Final	
Actividad (es)	• A través de un taller, los alumnos dispondrán de ejercicios relacionados con el tema donde deberán utilizar los tipos de fracciones para encontrar la solución a los problemas planteados. • Conclusión: el profesor dará una retroalimentación final donde los alumnos podrán responder algunas

	preguntas sobre el tema abordado con el fin de aclarar dudas.

Materiales and recursos.

OVA a utilizar.		**Descripción.**
1	OVA de Matemáticas –Tipos de Fracciones. https://mathematicsbilingualeducation.blogspot.com/	Este OVA contiene el título del tema, el objetivo, las palabras clave, el vocabulario, las versiones en inglés y español de los planes de clase, la teoría, un video para reforzar el tema y finalmente, las actividades para los estudiantes sobre tipos de fracciones.
Otros recursos:		
Tablero, recursos computacionales y online, cuaderno, lápiz, lapicero, colores, flashcards.		

Evaluación del tema.
• Desarrollar la guía de talleres titulada “Tipos de fracciones”.

Plan de Clase Nº 10 – Suma de fracciones homogéneas y heterogeneas.

Institución:	Instituto Técnico	**Sede:**	Centro Docente Rafael Tello	**Periodo**	1

Docente:		**Grado:**	Quinto			**Semana**	7
Asignatura:	Matemáticas	**Fecha:**	D	M	AÑO	**Intensidad Horaria**	2 horas

TEMA: Las fracciones y sus operaciones.
SUBTEMA: Suma de Fracciones homogéneas y heterogéneas.
SITUACIÓN PROBLEMA: ¿Cuál es la importancia del concepto de fracciones en el proceso educativo y su relación con su entorno en la vida diaria?
OBJETIVOS SEMANALES:
General: Comparar y ordenar números fraccionarios mediante diversas interpretaciones, recursos y representaciones.
Específicos: • Identificar tipos de fracciones.

• Comparar y contrastar diferentes tipos de fracciones. • Sumar fracciones homogéneas y heterogéneas.	
Competencias:	**Vocabulario**
Pensamiento numérico y variacional.	Fracciones, numerador, denominador, fracción homogénea, heterogénea, mínimo común múltiplo.
Estándares en Inglés	
• El estudiante lee y escribe y representa mitades o cuartos como partes de un conjunto usando símbolos, palabras y modelos. • El estudiante sigue atentamente lo que dicen mi profesor y compañeros de clase durante un juego o actividad. • El estudiante asocia un dibujo con su descripción escrita.	
Estándares de Competencias.	
• Conocer el significado de la fracción en situaciones cotidianas. • Evaluar fracciones como forma de expresión de cantidades. • Responder a breves explicaciones basadas en las características de los números fraccionarios.	
Enfoque:	**Método:**
Enfoque comunicativo y algorítmico	Audio-visual y audio-lingüístico.

Desarrollo de la clase.

Inicio	
Actividad (es)	• El profesor comenzará con un ICEBREAKER llamada Simon says…. Versión matemática. Este juego consiste en que los estudiantes representaran figuras geométricas como un triangulo o un circulo usando su cuerpo o respondiendo alguna preguntas como ¿Cuánto es 2x2?. El profesor puede incrementar la velocidad del reto para ver si los estudiantes pueden hacerlo de la misma forma. • Luego, el profesor hará un repaso de los temas anteriores donde el escribirá tres fracciones y los estudiantes deberán clasificarlos de acuerdo a su tipo (mixta, propia o impropia), ellos deberán convertir las fracciones mixtas a impropias y viceversa.
Desarrollo	
Actividad (es)	• Por otra parte, el profesor presentara el tema iniciando con una explicación de lo que es una fracción homogénea para luego, explicar los pasos para desarrollar una suma de fracciones cuando esta es homogénea. • Luego, trabajaremos la definición de una fracción heterogénea y explicaremos los pasos para sumar cuando

	las fracciones son heterogéneas reduciéndolas a su común denominador.
Final	
Actividad (es)	• De la misma forma, a través de unas actividades interactivas, los estudiantes tendrán algunos ejercicios relacionados con este tema donde deberán resolver sumas cuando la fraccione es homogénea y heterogénea siguiendo los pasos dados por el docente. • Conclusión: el profesor dará unos números, y los estudiantes deberán encontrar el mínimo común múltiplo de cada pareja o grupo de números.

Materiales and recursos.

OVAs a utilizar.		**Descripción.**
1	OVA de Matemáticas –Fracciones y sus términos. **https://mathematicsbilingualeducation.blogspot.com/**	Este OVA contiene el título del tema, el objetivo, las palabras clave, el vocabulario, las versiones en inglés y español de los planes de clase, la teoría, un video para reforzar el tema y finalmente, las actividades para los estudiantes sobre fracciones y sus términos.
Otros recursos:		
Recursos online y computacionales, tablero, lápiz, lapicero, colores, flashcards.		

Evaluación del tema.

Lesson Plan Nº 11 – Resta de fracciones homogéneas y heterogéneas.

Institución:	Instituto Técnico	**Sede:**	Centro Docente Rafael Tello	**Periodo**	1

Docente:		**Grado:**	Quinto			**Semana**	7
Asignatura:	Matemáticas	**Fecha:**	D	M	AÑO	**Intensidad Horaria**	2 horas

• Desarrollar la guía de talleres titulada “Suma de fracciones”.

TEMA: Las fracciones y sus operaciones.
SUBTEMA: Resta de Fracciones homogéneas y heterogéneas.

SITUACIÓN PROBLEMA: ¿Cuál es la importancia del concepto de fracciones en el proceso educativo y su relación con su entorno en la vida diaria?	
OBJETIVOS SEMANALES:	
General: Comparar y ordenar números fraccionarios mediante diversas interpretaciones, recursos y representaciones.	
Específicos: • Identificar tipos de fracciones. • Comparar y contrastar diferentes tipos de fracciones. • Restar fracciones homogéneas y heterogéneas.	
Competencias:	**Vocabulario**
Pensamiento numérico y variacional.	Fracciones, numerador, denominador, fracción homogénea, heterogénea, mínimo común múltiplo.
Estándares en Inglés	
• El estudiante lee y escribe y representa mitades o cuartos como partes de un conjunto usando símbolos, palabras y modelos. • El estudiante sigue atentamente lo que dicen mi profesor y compañeros de clase durante un juego o actividad. • El estudiante asocia un dibujo con su descripción escrita.	
Estándares de Competencias.	
• Conocer el significado de la fracción en situaciones cotidianas. • Evaluar fracciones como forma de expresión de cantidades. • Responder a breves explicaciones basadas en las características de los números fraccionarios.	
Enfoque:	**Método:**
Enfoque comunicativo y algorítmico	Audio-visual y audio-lingüístico.

Desarrollo de la clase.

Inicio	
Actividad (es)	• El profesor comenzará con un ICEBREAKER llamada Simon says…. Versión matemática. Este juego consiste en que los estudiantes representaran figuras geométricas como un triangulo o un circulo usando su cuerpo o respondiendo alguna preguntas como ¿Cuánto es 2x2?. El profesor puede incrementar la velocidad del reto para ver si los estudiantes pueden hacerlo de la misma forma. • Luego, el docente hará un repaso del tema anterior, donde escribirá tres adiciones y los alumnos deberán resolverlos según la explicación que le dé el docente.
Desarrollo	
Actividad (es)	• Por otra parte, el profesor hará un repaso de lo que es una fracción homogénea para luego, explicar los pasos para desarrollar una resta de fracciones cuando esta es homogénea.

	• Luego, recodaremos la definición de una fracción heterogénea y explicaremos los pasos para restar cuando las fracciones son heterogéneas reduciéndolas a su común denominador.
Final	
Actividad (es)	• De la misma forma, a través de unas actividades interactivas, los estudiantes tendrán algunos ejercicios relacionados con este tema donde deberán resolver restas cuando la fracción es homogénea y heterogénea siguiendo los pasos dados por el docente. • Conclusión: el profesor dará unos números, y los estudiantes deberán encontrar el mínimo común múltiplo de cada pareja o grupo de números.

Materiales and recursos.

OVAs a utilizar.		**Descripción.**
1	Mathematics VLO –Fractions **https://mathematicsbilingualeducation.blogspot.com/**	Este OVA contiene el título del tema, el objetivo, las palabras clave, el vocabulario, la versión en inglés y español de los planes de lecciones, la teoría, un video para reforzar el tema y finalmente las actividades para los estudiantes sobre fracciones.
Otros recursos:		
Recursos online y computacionales, tablero, lápiz, paceros, colores, flaschards,		

Evaluación del tema.
• Desarrollar la guía de talleres titulada “Resta de Fracciones”.

Plan de clase Nº 12 – Multiplicación y división de fracciones.

Institución:	Instituto Técnico	**Sede:**	Centro Docente Rafael Tello			**Periodo**	2

Docente:		**Grado:**	Quinto			**Semana**	12
Asignatura	Matemáticas	**Fecha:**	D	M	YEAR	**Intensidad**	2 horas

TEMA: Fracciones y sus términos.

<table>
<tr><td colspan="2">SUBTEMA: Multiplicación y división de fracciones.</td></tr>
<tr><td colspan="2">SITUACIÓN PROBLEMA: ¿Cuál es la importancia del concepto de fracciones en el proceso educativo y su relación con su entorno en la vida</td></tr>
<tr><td colspan="2">OBJETIVOS SEMANALES:</td></tr>
<tr><td colspan="2">General: Comparar y ordenar números fraccionarios mediante diversas interpretaciones, recursos y representaciones.</td></tr>
<tr><td colspan="2">Específicos:
• Identificar tipos de fracciones.
• Comparar y contrastar diferentes tipos de fracciones.
• Sumar fracciones homogéneas y heterogéneas.</td></tr>
<tr><td>Competencias:</td><td>Vocabulario</td></tr>
<tr><td>Pensamiento numérico y variacional.</td><td>Fracciones, numerador, denominador, multiplicación, division, factores, productos.</td></tr>
<tr><td colspan="2">Estándares en Inglés.</td></tr>
<tr><td colspan="2">• El estudiante lee y escribe y representa mitades o cuartos como partes de un conjunto usando símbolos, palabras y modelos.
• El estudiante sigue atentamente lo que dicen mi profesor y compañeros de clase durante un juego o actividad.
• El estudiante asocia un dibujo con su descripción escrita.</td></tr>
<tr><td colspan="2">Estándares de Competencias.</td></tr>
<tr><td colspan="2">• Conocer el significado de la fracción en situaciones cotidianas.
• Evaluar fracciones como forma de expresión de cantidades.
• Responder a breves explicaciones basadas en las características de los números fraccionarios.</td></tr>
<tr><td>Enfoque:</td><td>Método:</td></tr>
<tr><td>Enfoque comunicativo y algorítmico</td><td>Audio visual and audio lingual.</td></tr>
</table>

Desarrollo de la clase.

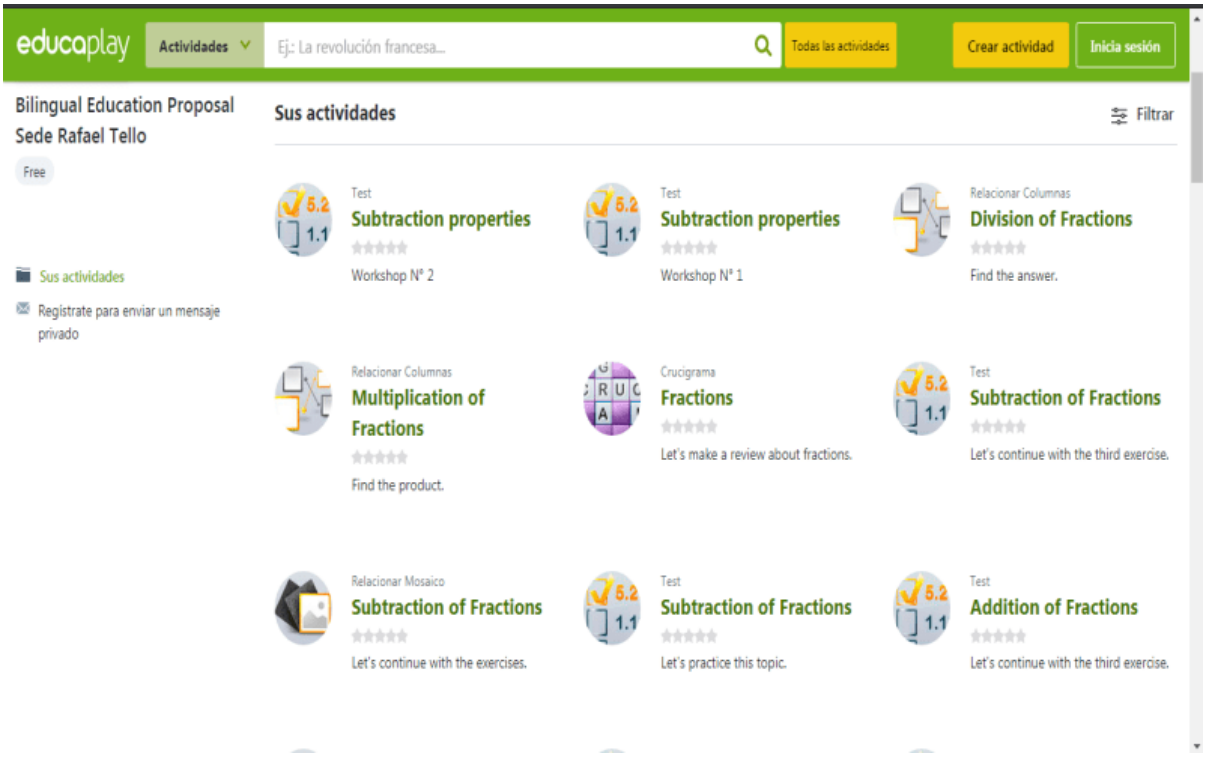
Inicio	
Actividad (es)	El profesor iniciará con un ICE BREAKER donde los estudiantes tendrán una o dos figures con las medidas de sus lados, ellos deberán rápidamente (sin usar lápiz y papel) encontrar el perímetro de ambas figures in el menor tiempo posible. Los primeros tres quienes resuelvan los ejercicios sin equivocarse, serán los ganadores.
Desarroll	
Actividad (es)	Luego, el profesor explicara el proceso para multiplicar fracciones y lo hará usando ejemplos de aplicación para reforzar la explicación. Del mismo modo, el profesor explicara los paso para resolver una división de fracciones las cuales serán presentadas por medio de ejemplos y las cuales serán desarrolladas con la ayuda del profesor.
Final	
Actividad (es)	Taller: los estudiantes tendrán un corto taller donde se les presentaran unos ejercicios de aplicación, los cuales serán desarrollados en parejas,

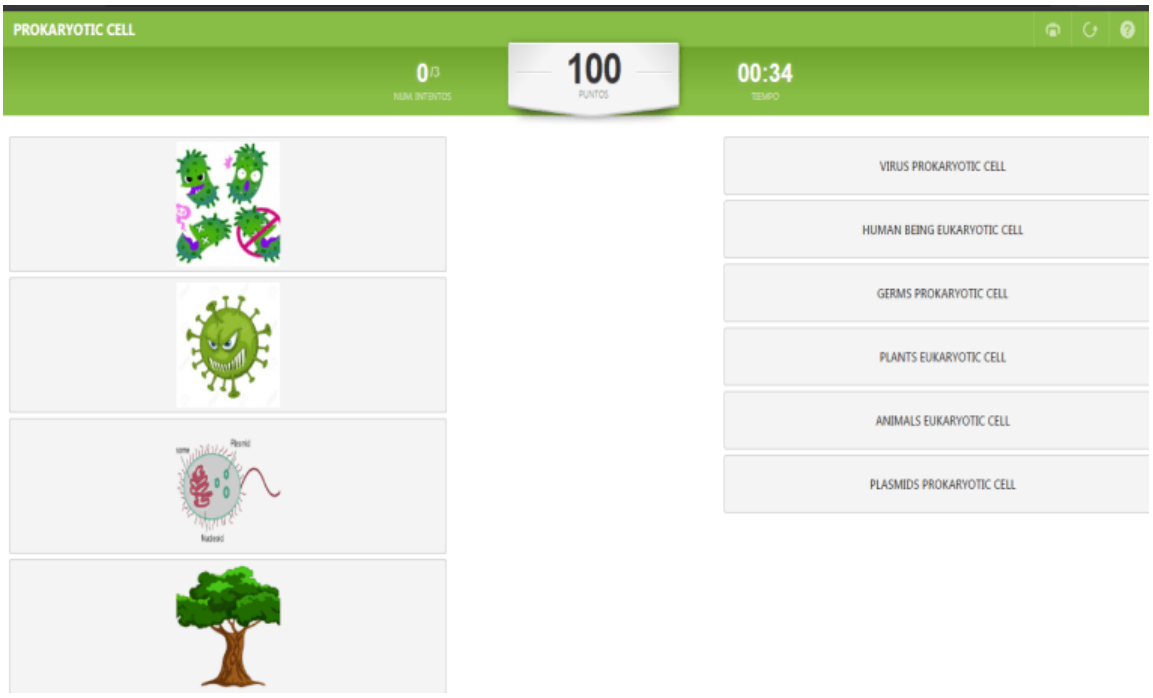
Materiales y recursos

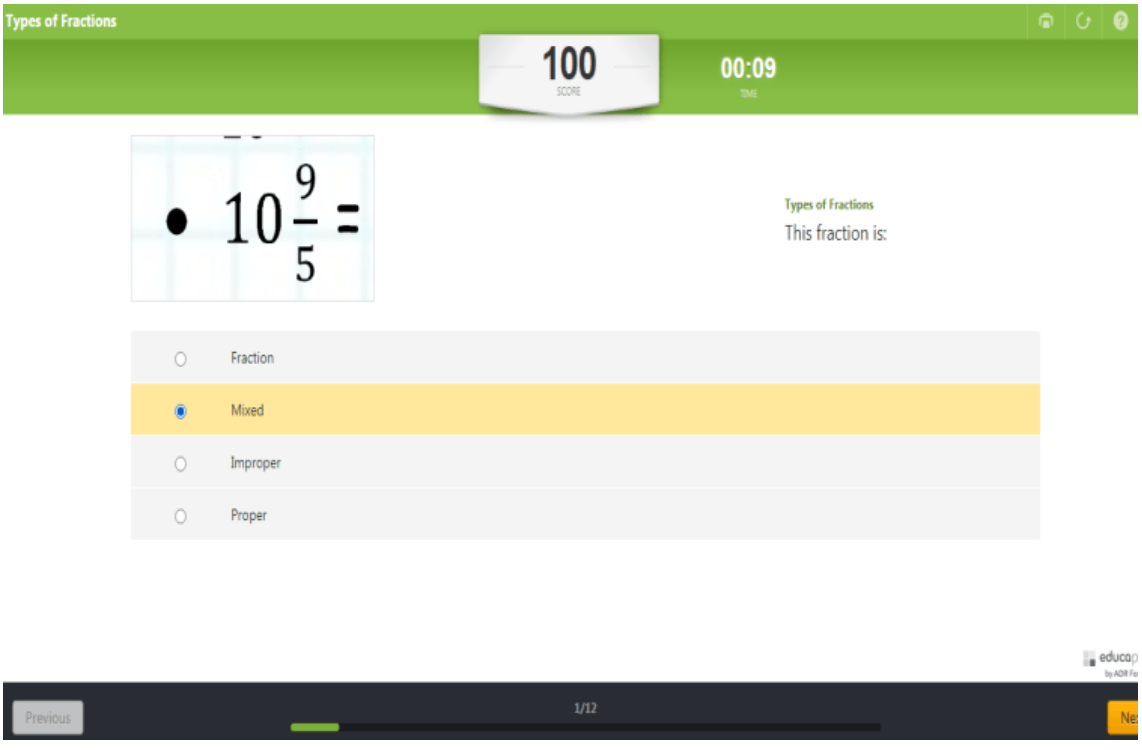
OVAs a utilizar		**Descripción**
1	Mathematics VLO –Multiplication and division of fractions. https://mathematicsbilingualeducation.blogspot.	Este OVA contiene el título del tema, el objetivo, las palabras clave, el vocabulario, las versiones en inglés y español de los planes de clase, la teoría, un video para reforzar el tema y finalmente, las actividades para los estudiantes sobre fracciones
Otros recursos:		
Tablero, recursos online, flashcards, cuaderno, lapis, colores.		

Evaluación del tema
Desarrollar el taller titulado Multiplicación y división de fracciones.

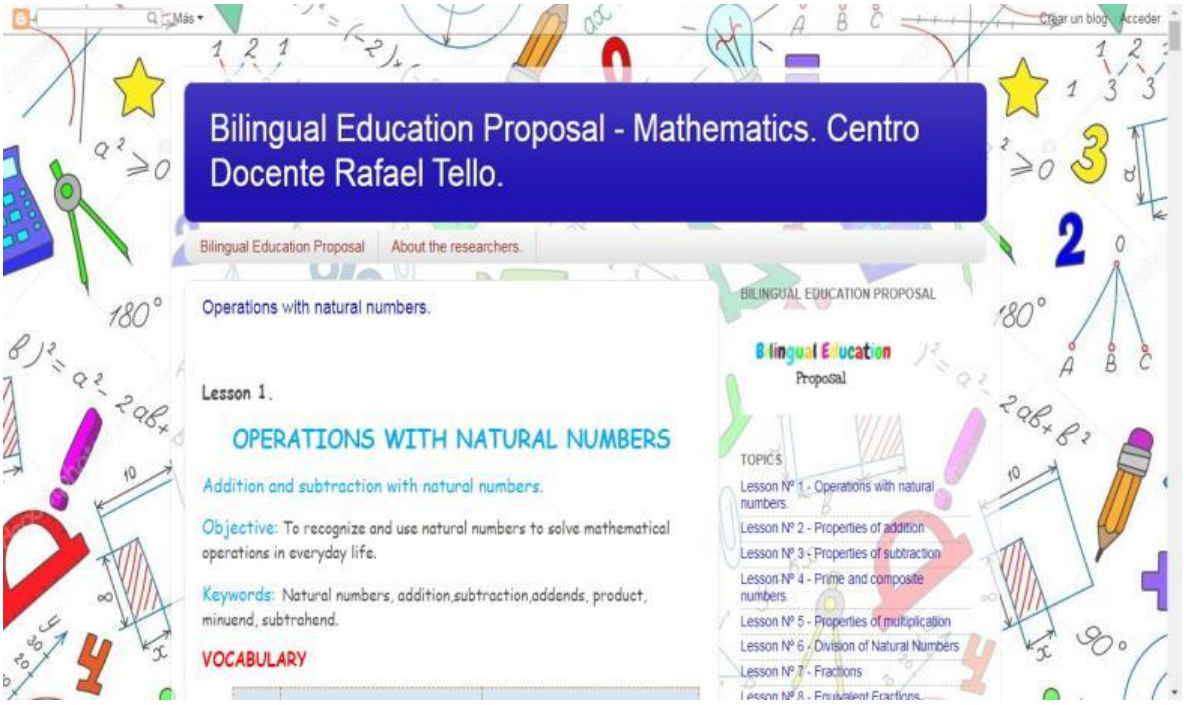
Appendix E; Actividades Educaplay y worksheet.



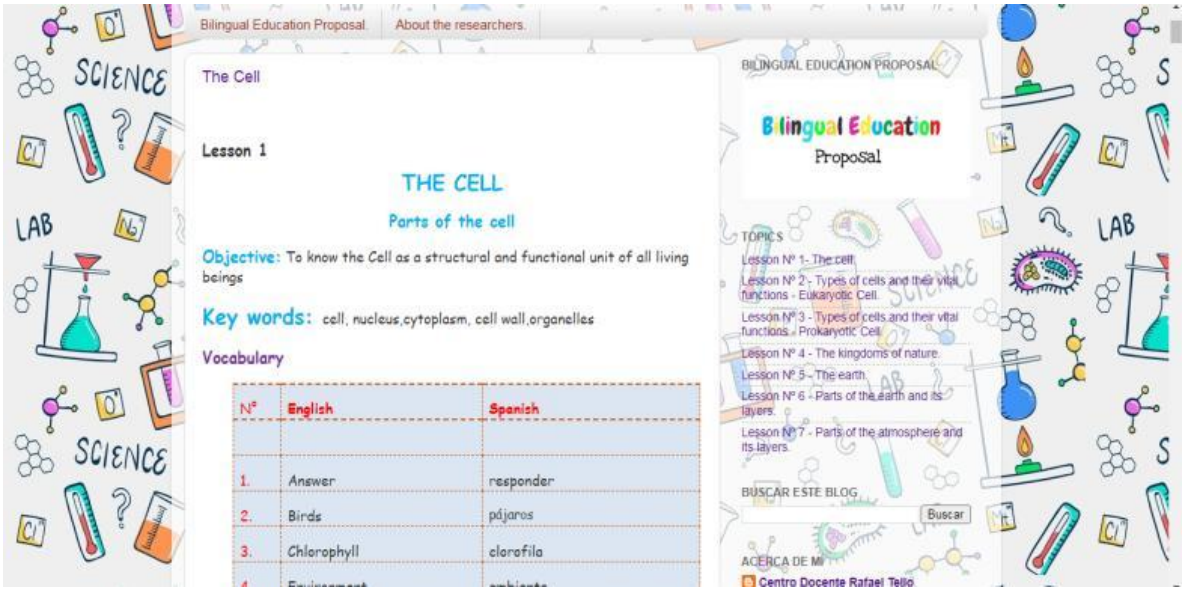

PROKARYOTIC CELL
0/3
NUM. INTENTOS
100
PUNTOS
00:34
TIEMPO
VIRUS PROKARYOTIC CELL
HUMAN BEING EUKARYOTIC CELL
GERMS PROKARYOTIC CELL
PLANTS EUKARYOTIC CELL
ANIMALS EUKARYOTIC CELL
PLASMIDS PROKARYOTIC CELL


Types of Fractions
100
SCORE
00:09
TIME
• $10\frac{9}{5}$ =
Types of Fractions
This fraction is:
Fraction
Mixed
Improper
Proper
Previous
1/12

Appendix F; Virtual Learning Objects (VLOs) - Objetos Virtuales de Aprendizaje (OVAs)

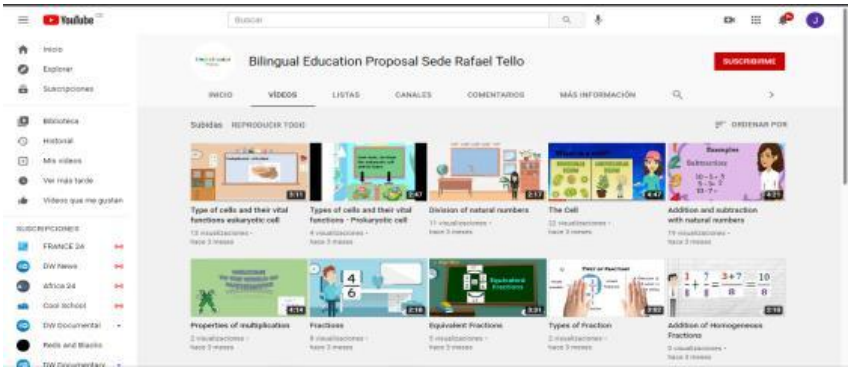


Link to acces: https://mathematicsbilingualeducation.blogspot.com/



Link to acces: https://naturalsciencesbilingualeducation.blogspot.com/

Appendix G; Videos



Link to acces: https://www.youtube.com/channel/UCopx2IxXrqj9VEVFkbsHkjg/videos
Also, you can find the videos in the VLOs as support of each topic.

Appendix H, Invitación socialización y evaluación de la propuesta.

Santander de Quilichao, 17 de marzo de 2021.

Señora
Nidia Esmeralda Orozco
Coordinadora
Institución Educativa Centro Docente Rafael Tello

Señora
Martha Leticia Lucumí Mina
Profesora Ciencias Naturales

Señor
Fabricio Valencia Idrobo
Profesor Matemáticas

Cordial saludo,

Asunto: Solicitud para socialización proyecto de investigación sobre educación bilingüe y evaluación de Objetos Virtuales de Aprendizaje – OVA´s.

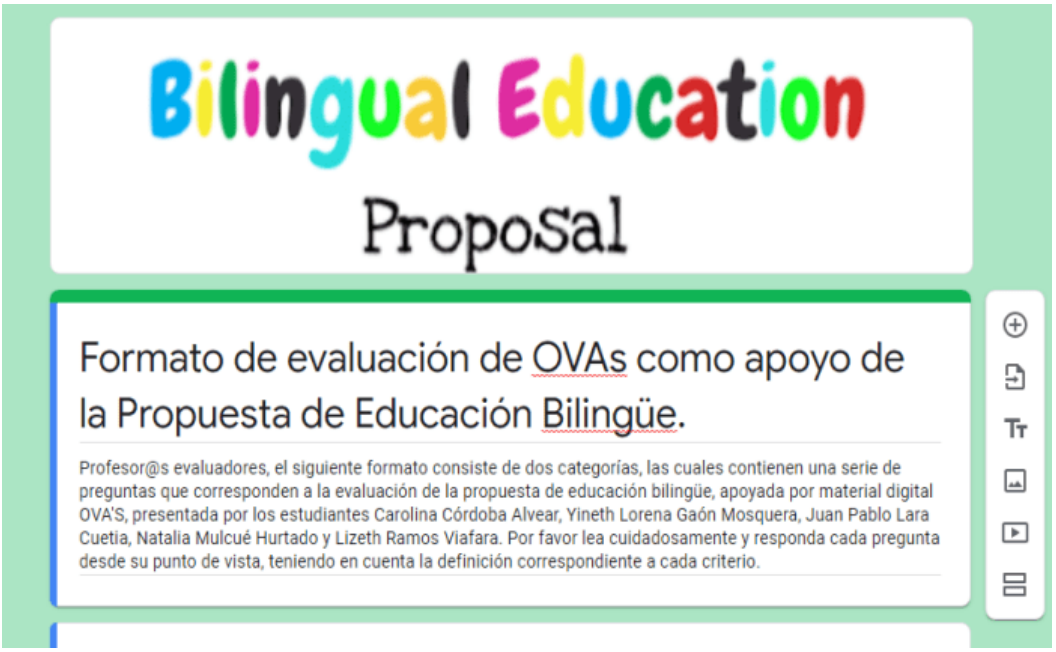
Deseando que se encuentren bien.

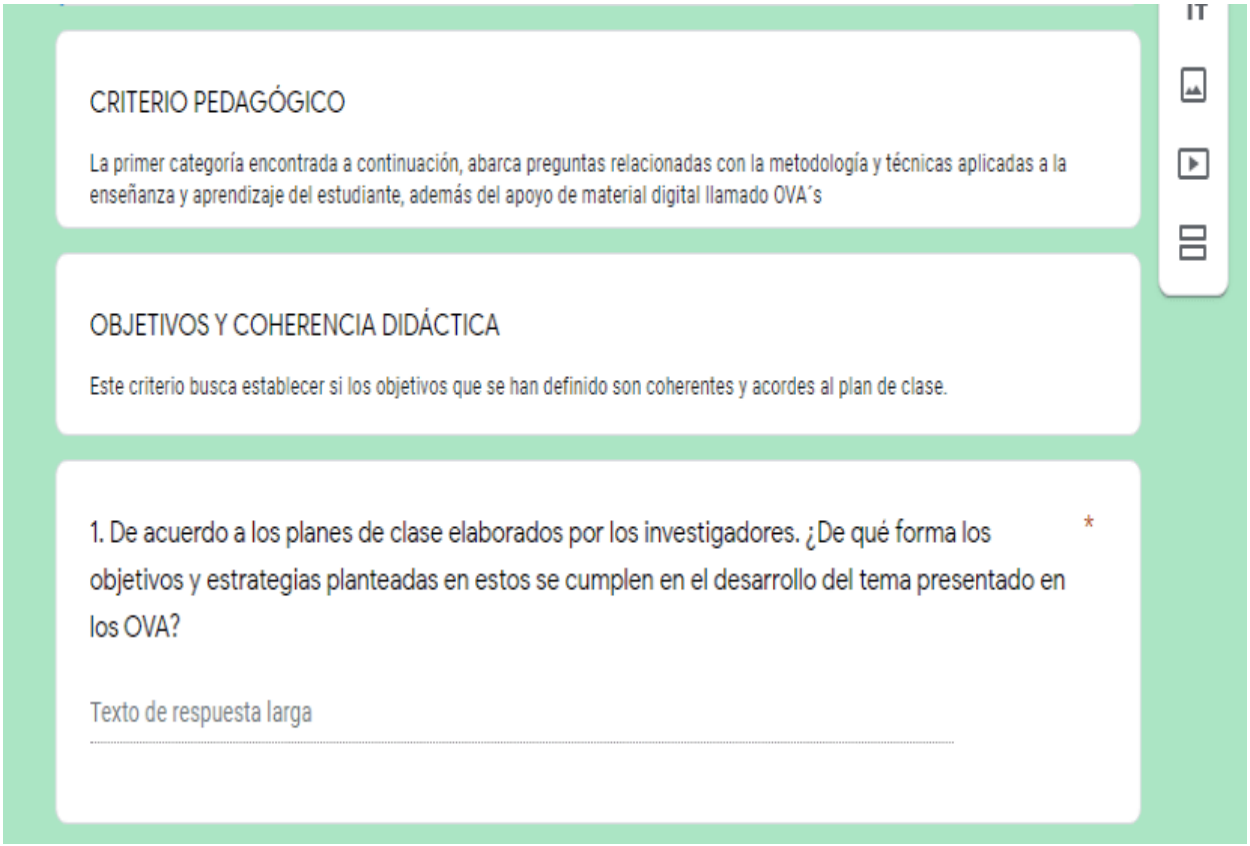
De manera respetuosa, los abajo firmantes, solicitamos un espacio de su tiempo para una reunión, por medio de la herramienta *Meet,* en la que se socializará el trabajo de grado titulado ***"PROPUESTA DE EDUCACION BILINGUE (INGLÉS) EN CIENCIAS NATURALES Y MATEMATICAS, APOYADO POR EL DISEÑO Y EVALUACIÓN DE OBJETOS VIRTUALES DE APRENDIZAJE (OVAs) EN ESTUDIANTES DEL GRADO QUINTO CENTRO DOCENTE RAFAEL TELLO- SANTANDER DE QUILICHAO"***, diseñada por los estudiantes Carolina Córdoba Alvear, Yineth Lorena Gaón Mosquera, Natalia Mulcué Hurtado, Juan Pablo Lara Cuetia y Lizeth Ramos Viáfara, del Programa de Licenciatura en Lenguas Modernas inglés – francés de la Universidad del Cauca, sede Santander de Quilichao.

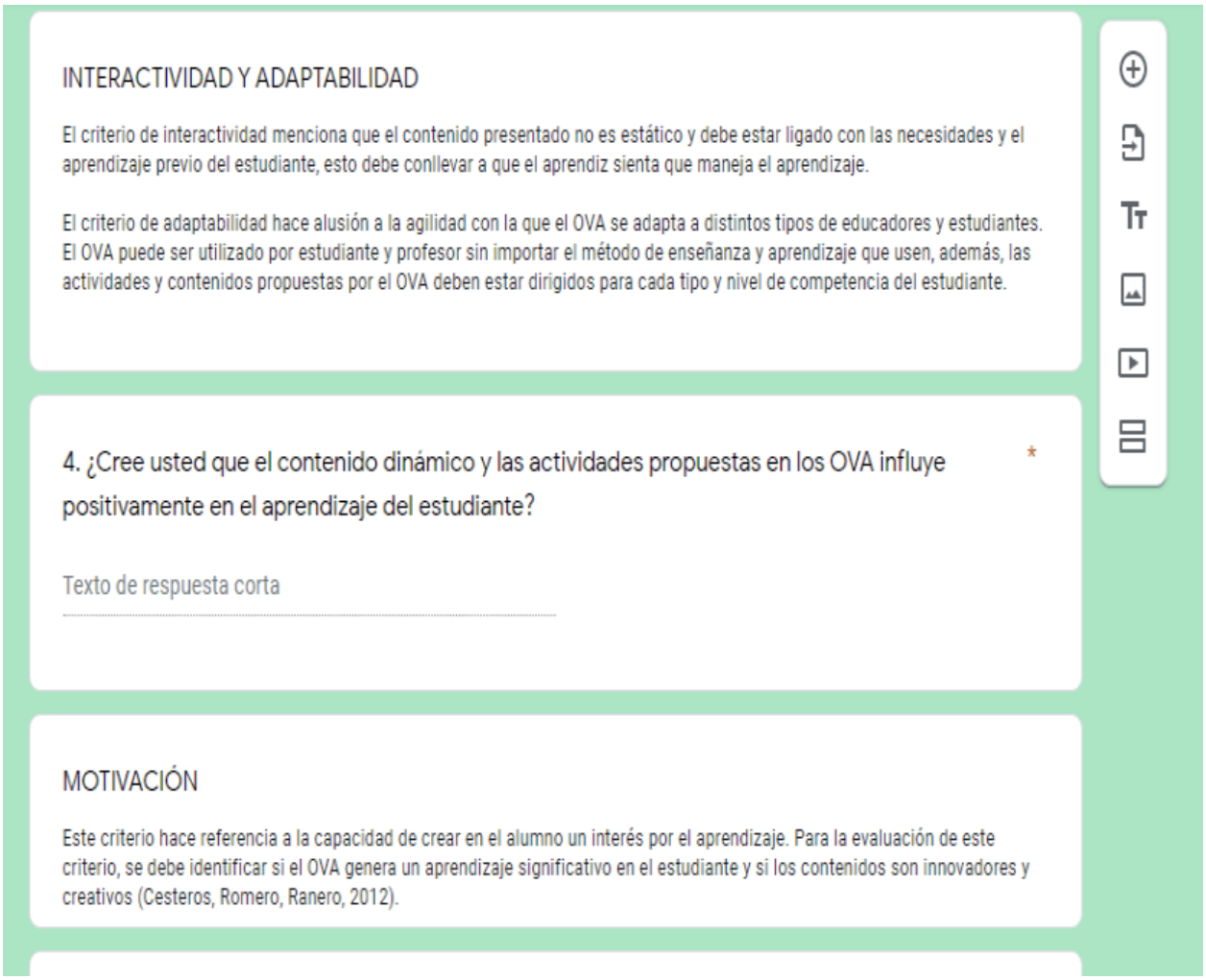
De antemano, agradecemos la atención prestada y quedamos atentos a una respuesta con la fecha y hora que mejor se ajuste a su tiempo.

Appendix I; Formato para la evaluación de los OVAs como parte de la propuesta.

Link:
https://docs.google.com/forms/d/e/1FAIpQLSf6FH5j6323S35YsrACdzjTkiZIQ8AfFWm0XHnL3cq8fTbx4w/viewform?usp=sf_link






INTERACTIVIDAD Y ADAPTABILIDAD
El criterio de interactividad menciona que el contenido presentado no es estático y debe estar ligado con las necesidades y el aprendizaje previo del estudiante, esto debe conllevar a que el aprendiz sienta que maneja el aprendizaje.
El criterio de adaptabilidad hace alusión a la agilidad con la que el OVA se adapta a distintos tipos de educadores y estudiantes. El OVA puede ser utilizado por estudiante y profesor sin importar el método de enseñanza y aprendizaje que usen, además, las actividades y contenidos propuestas por el OVA deben estar dirigidos para cada tipo y nivel de competencia del estudiante.
4. ¿Cree usted que el contenido dinámico y las actividades propuestas en los OVA influye positivamente en el aprendizaje del estudiante? *
Texto de respuesta corta
MOTIVACIÓN
Este criterio hace referencia a la capacidad de crear en el alumno un interés por el aprendizaje. Para la evaluación de este criterio, se debe identificar si el OVA genera un aprendizaje significativo en el estudiante y si los contenidos son innovadores y creativos (Cesteros, Romero, Ranero, 2012).


5. ¿Considera que aspectos como: la creatividad, las actividades, el contenido y la organización de los OVA motivan al estudiante al aprendizaje? *
Texto de respuesta larga
CRITERIO TECNOLÓGICO
La segunda categoría encontrada a continuación, abarca preguntas relacionadas con aspectos informáticos correspondientes al diseño de las OVA.
FORMATO Y DISEÑO
Para la evaluación de este criterio, se debe tener en cuenta la organización, claridad y contenidos audiovisuales tales como: imágenes, audios, vídeos y textos de los contenidos de las OVA, con el fin de establecer la comprensión y asimilación por parte del estudiante, impulsando no solo el aprendizaje, sino también fomentando la reflexión (Cesteros, Romero, Ranero, 2012).
6. ¿Cree usted que los contenidos audiovisuales, tales como: la organización de los textos, imágenes,sonido, voz, colores, y la calidad de los mismos; influyen positiva o negativamente en el proceso de aprendizaje del estudiante? ¿por qué? *

USABILIDAD

En cuanto a este criterio, en él se determina la facilidad que existe cuando las personas interactúan con los OVAs. La usabilidad cuenta con algunas condiciones con las cuales pueden valorarse.

1. La navegación dentro del contenido digital del OVA es manejable. Facilidad y rapidez cuando de buscar contenidos se trata.
2. Información e instrucciones claramente explicadas del uso de los OVA para que la persona pueda interactuar con ellas.

Cada uno de los vínculos deben operarse de manera correcta, no deben haber enlaces que dirijan a contenidos errados.

7. ¿De qué manera cree usted que el uso de los OVA facilitan la interacción de estos y los estudiantes? *

Texto de respuesta larga

ACCESIBILIDAD

Los OVA deben ajustarse a personas con discapacidad de tipo visual y auditiva a fin de que puedan usarlos con los dispositivos ofrecidos. Para que haya accesibilidad dentro de los OVA se deben acatar los siguientes subcriterios:
El OVA ofrece texto de apoyo para todos los elementos no textuales.

A. La resolución de la imagen es correcta y/o se puede ampliar.
B. Se procura utilizar un lenguaje claro y sencillo

8.De acuerdo con los OVA presentados, ¿cumplen estos con los subcriterios de accesibilidad? ¿Por qué? *

Texto de respuesta larga

REUSABILIDAD

Este criterio sugiere que el OVA tiene la oportunidad de usarse varias veces o alguno de sus componentes. Se pueden considerar y evaluar tres tipos de reusabilidad ya sea de contenido, del cual se puede tomar una de sus partes para construir otros OVA, de contexto educativo y del entorno.

A. Reusabilidad de contenido: el contenido del OVA o alguna de sus partes puede volver a utilizarse para construir otros OVAs.
B. Reusabilidad de contexto educativo: El OVA o alguna de parte de su contenido puede emplearse en más de un grupos de alumnos.
C. Reusabilidad de entorno: El OVA o alguna de sus partes puede usarse en diferentes ambientes de aprendizaje: presencial, virtual, mixto

9. ¿Cómo haría usted uso de los OVA en diversos entornos de aprendizaje: presencial, virtual, a distancia, semi-presencial? *

Texto de respuesta larga

INTEROPERABILIDAD

La interoperabilidad hace referencia al uso que se le puede dar al OVA diversos entornos y sistemas informáticos. Además, la interoperabilidad se puede evaluar de forma práctica probando que el OVA se puede visualizar/ejecutar en varios entornos informáticos de uso general.

10. De acuerdo a la página web (blog) en el que se encuentran desarrollados los OVA, ¿Cree usted que pueden utilizarse en cualquier dispositivo tecnológica? SI/ NO ¿por qué? *

Texto de respuesta larga

En esta segunda parte, los profesores evaluadores encontrarán una serie de preguntas las cuales buscan evaluar la Propuesta de Educación Bilingüe diseñada por los estudiantes investigadores.

Descripción (opcional)

11. Desde su experiencia docente ¿Cuál es su opinión frente a la propuesta de educación bilingüe (Inglés) en Ciencias Naturales y Matemáticas, apoyada por el diseño y evaluación de objetos virtuales de aprendizaje (OVA) en los estudiantes del grado quinto Centro Docente Rafael Tello? *

12. A partir de la propuesta presentada por los investigadores, ¿Cuál sería el mayor aporte que esta propuesta le haría tanto a la comunidad educativa del Centro Docente Rafael Tello como a la comunidad Quilichagüeña? *

Texto de respuesta larga

13. La propuesta de Educación Bilingüe se caracteriza por ser la primera a nivel local tomando como escenario el Centro Docente Rafael Tello. Desde su experiencia como docente en la institución ¿Considera pertinente que la Institución Educativa Instituto Técnico busque implementar esta propuesta en todas sus sedes como parte de su visión institucional a mediano o largo plazo? ¿Cuales son las acciones que deberá tomar la institución para llevarla a cabo? *

Texto de respuesta larga

14. De acuerdo a la propuesta de Educación Bilingüe, ¿cuales considera usted que son los principales beneficios pedagógicos que aporta esta propuesta en el proceso de formación académico de los estudiantes de la institución? *

15. Teniendo en cuenta la propuesta de educación bilingüe, apoyada en el diseño de los OVA como recurso educativo, ¿Cuál será el impacto que puede tener la implementación de esta en el proceso de aprendizaje tanto del inglés como de las otras asignaturas en los estudiantes? *

Texto de respuesta larga

16. A partir de los OVA y el material presentado, ¿Considera usted que los profesores de Ciencias Naturales y Matemáticas pueden o no, presentar dificultades en la ejecución de la propuesta de educación bilingüe? ¿Cuáles serían las principales razones? *

Texto de respuesta larga