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Tasks design based on the application of thinking typologies to improve Experimental Sciences learning

Diseño de tareas basadas en la aplicación de tipologías de pensamiento para mejorar el aprendizaje de Ciencias Experimentales

TRABAJO FIN DE GRADO
EN EDUCACIÓN PRIMARIA

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RESUMEN

Este trabajo tiene como objetivo principal realizar una propuesta en la que se utilicen diferentes teorías de pensamiento para desarrollar destrezas de pensamiento a través de las ciencias con inglés como lengua vehicular. En el documento se aprecia primero una justificación teórica en la que podemos ver las relaciones que existen entre el Método Científico, el Aprendizaje Experiencial, las Inteligencias Múltiples, el desarrollo de Habilidades de Pensamiento y conectar finalmente todo esto con las Teorías de Adquisición del Lenguaje a través de las cuales se ha seleccionado este. En la parte final del documento se desarrolla la propuesta diseñada y las conclusiones a las que se ha llegado tras desarrollarla.

PALABRAS CLAVE

Método Cientifico, Aprendizaje Experiencial, Inteligencias Múltiples, Teorías de Pensamiento, Habilidades de Pensamiento, Enseñanza de Ciencias.

ABSTRACT

This work has as its principal aim to design an educative proposal in which different thinking theories are used in order to developthinking skills using English as a vehicular language. In the present document we can first observe a theoretical justification in which we stablish relationships between the Scientific Method, Experience-Based Learning, the Multiple Intelligences, the development of Thinking Skills and finally connecting all of this to the Language Acquisition Theories that we have used to select the language used. In the final part od this document we can see the proposal design, as well as the conclusions that have been reached after developing it.

KEY WORDS

Scientific Method, Experience-Based Learning, Multiple Intelligences, Thinking Theories, Thinking Skills, Science Learning.

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1. INTRODUCTION

In a world of constant change and complexity, education faces the challenge of preparing students to be critical and problem-solving thinkers. This Final Degree Project delves into the creation of an educational project for the subject of natural sciences through the use of thinking routines, as well as metacognition, thinking skills, and gamification as fundamental pedagogical tools for the development of higher cognitive skills in students.

First, through an exhaustive review of different authors, theories, and educational approaches related to thinking routines and thinking skills, highlighting their importance in improving the learning process of our students.

The study also presents a practical approach, where a proposal will be designed and developed with specific activities based on the named educational approaches to be implemented in a real educational environment.

Ultimately, this work seeks to promote the understanding and application of thinking routines and thinking skills as key pedagogical strategies to foster critical thinking, problem-solving, and meaningful learning in today's educational environment. These tools are essential to empower students and prepare them to meet the challenges of the 21st century successfully.

2. GOALS AND COMPETENCES TO DEVELOP IN THIS DOCUMENT.

The main goal of this work is the creation of an educational intervention, to design the process of learning to develop thinking skills, using different methodologies, with the goal of connecting natural science content with the appropriate language for Year 4 Primary Education.

The specific objectives developed in the different parts of this work are the following. With the use and elaboration of a theoretical framework, I intend to:

1. Know the main language acquisition theories in order to apply them in the classroom.
2. Know how to apply different thinking theories in a real classroom.
3. Classify different types of thinking according to their cognitive complexity.
4. Associate the links among different thinking types through the language necessary to generate a scientific task.

Therefore the design of the educative process should aim at:

- Design the steps to be followed by the students to develop thinking in a Primary year 4 Science classroom.
- Identify the language necessary to be used (EFL) in the Science classroom process.
- Create different routines in class associated to the language, necessary to become automatic language and therefore “inner language”.
- Use the Scientific Method to promote a Scientific environment in class.
- Select thinking routines in order to develop a mindset with scientific premises.
- Integrate Natural Science and Foreign Language (EFL) following the premises of the European Language Policy in a Bilingual School, where English is the vehicular language for Sciences.
- Develop “meaningful learning” in year 4 students and “learning by doing”.
- Design and implement different resources and mediators to work with alternative methodologies in the classroom introducing Assessment (AforL and AofL) as an essential part of the process, which also includes the teaching techniques selected.

Therefore the present Work will demonstrate some of the general and specific competencies required for a Primary Teacher:

Among General Competences, I would outstand:
- Know the curricular areas of Primary Education, the interdisciplinary relationship between them, the evaluation criteria, and the body of didactic knowledge about the respective teaching and learning procedures.

- To design, plan, and evaluate teaching-learning processes,including students with specific educational needs, both individually and in collaboration with other teachers and professionals of the center.

- To deal effectively with language learning situations in pluricultural and plurilingual contexts, mainly in bilingual schools . Encourage reading and critical commentary of texts from the various scientific and cultural domains contained in the school curriculum.

- To reflect on classroom practices in order to innovate and improve the techniques the teacher suggest. To acquire habits and skills for autonomous and cooperative learning and to promote it among students.

- To know and apply information and communication technologies in the classroom. To selectively discern audiovisual information that contributes to learning, civic formation, and cultural richness.

Among the Specific Competencies dealt with, as an Bilingual Teacher in a Bilingual School, where the foreign language is being used as a vehicular language to learn other subjects, we are supposed to :

- Know the cognitive, linguistic and communicative bases of language acquisition.
- Plan what is going to be taught/learned and associate it in relation to the corresponding foreign language necessary to follow the suitable steps to create inner thought and express it, as well as select, conceive and develop teaching strategies, types of activities and teaching resources. This competence will involve to:
    - Know the main didactic currents of teaching foreign languages to children and their application to the foreign language classroom at the different levels established in the curriculum, in a Bilingual School where English is used as a vehicular language in the Science Classroom.
    - Know the Primary Education curriculum and the curricular development of the area of foreign languages and its connections to the Process of Thinking.
    - Be able to develop positive attitudes and representations and openness to linguistic and cultural diversity in the classroom.
    - Promote both the development of oral language and written production, paying special attention to the use of new technologies as elements of long-distance communication in a foreign language.
    - Be able to stimulate the development of metalinguistic, metacognitive and cognitive skills to acquire a new language, through relevant and meaningful tasks.
        a. Progressively develop communicative competence, through the integrated practice of the five skills in the foreign language classroom as well as the Science lessons.
        b. Be able to plan the learning process of a Foreign Language associated to the language necessary to develop scientific tasks successfully.

Being a Bilingual environment where Experimental Sciences are studied in English it is required to:

- Use scientific knowledge to understand the physical world, at the same time developing skills and attitudes that facilitate the exploration of natural facts and phenomena as well as their subsequent analysis to interact in an ethical and responsible way when faced with different problems that arise in the field of Experimental Sciences. In short, following the Scientific Method.

- Adequately transform the reference scientific knowledge linked to Experimental Sciences into knowing how to design learning environments where students use a foreign language for Thinking including assessment in all the different moments of the process (AofL and AforL).

3. JUSTIFICATION OF THE TOPIC SELECTED.

The rationale for choosing the topics that are the base of this work is the following:

- The school where I the present proposal was implemented, was included in the 2030 agenda and its SDGs, we focused on SDG number 15 “Life in ecosystems”, in which all sort of lives in terrestrial environment are included.

- This required a combination of language and thinking when applying the scientific method. Considering the various types of intelligences, the activities required to follow a Scientific method as well as the different types of thought that every step required, the selection of the language is one of the axes for the design.

4. THEORETICAL BACKGROUND.

‘Science’ is a central subject in the Primary Curriculum, as well as a good start to work with topics related to the here and now, being this a premise to be followed in the first stages of language acquisition. Science describes both a body of knowledge and the activities that give rise to that knowledge. It can even be thought of as embracing two different types of knowledge: domain-specific knowledge, and domain-general knowledge. Domain-specific knowledge refers to the knowledge of various concepts in the different domains of science;

and domain-general knowledge refers to general skills involved in experimental design and evidence evaluation. (Eshach and Fried, 2005)

There are many reasons that are considered important in order to explain why children should be exposed to Science. The most important methodologies being used to connect learning to real life are:

"Project-based learning is that it is a methodology that enables students to acquire key knowledge and skills in the 21st century through the development of projects that respond to real-life problems (for these students SDG are real life problems). Project-based learning is part of the field of "active learning". Within this field, we find, together with project-based learning, other methodologies such as task-based learning, task-based learning, problem-based learning, discovery learning, or challenge-based learning." Trujillo (2015, p.21)

Also according to Zhou (2023) PBL can positively affect students more than traditional methods. These positive effects include active thinking skills, hands-on skills, and teamwork cooperative skills. PBL improves these abilities by allowing students to enhance their critical thinking skills and creativity, actively understand and learn new knowledge, experience learning content in person, and cooperate with group members. At the same time, PBL can help students develop more comprehensively and adapt to future projects or jobs. PBL can positively affect students because PBL encourages students to Think actively, not passively accept knowledge. From these perspectives, it is worth promoting the adoption of PBL to replace traditional methods because PBL can better meet the needs of society for the comprehensive development of students.

But this is not enough, because working with young students we cannot leave behind the importance of experiencing knowledge. However, this knowledge they experience can be divided into completely different cognitive abilities, one of the most known ones is the Multiple Intelligences by Gardner. As quoted in Davis, et al.(2011), (quote from Gardner 1999), the eight identified intelligences include Linguistic Intelligence, Logical-Mathematical Intelligence, Spatial Intelligence, Musical Intelligence, Bodily-Kinesthetic Intelligence, Naturalistic Intelligence, Interpersonal Intelligence, and Intrapersonal Intelligence. Out of all

of these Intelligences by Gardner, in the sequence designed for this document, the ones we deeply develop the following ones:

- Linguistic Intelligence: This intelligence refers to the ability to understand and produce language. There would be a relationship with 4 of the 5 skills that English learning is divided into: Reading, Listening, Speaking, Writing.

  We are going to develop this intelligence mainly through activities in which we have to analyze information and create products involving oral and written language.

- Interpersonal Intelligence: during the unit, there have been many moments where they have worked in groups in a cooperative way and have learned to work together despite different factors.
  For Johnson and Johnson (2014), "Cooperative learning is the instructional use of small groups so that students work together to maximize their own and each other's learning".
  The way Cooperative Learning has been applied during the intervention below has been to divide the students into heterogeneous groups where they supply one another with positive reinforcement and encouragement, and where they help each other to make academic progress and verify that each member is completing assignments. They also help one another develop cognitively and socially in healthy ways, creating and promoting the development of the interpersonal intelligence by Gardner (Johnson and Johnson, 2014)
  We have also tried for them to hold one another accountable for paying attention and wanting to learn, because they are all fighting to achieve a common goal, that without every member of the group, they can't achieve.

  Inside each group, we have introduced cooperative learning roles in order to increase the individual responsibilities of the members of each group. The roles that have been included in these four people groups are the following:

    - Leader: is in charge of making sure that everybody is doing their job and keeps them accountable in order to finish the project and makes sure nobody slacks off.
    - Scriber: is in charge of doing all of the writing in the project.

    - Spokesperson: is in charge of sharing the opinions and results of the activities to the rest of the classmates.
    - Time and material manager: is in charge of controlling the time the team has to do the activities and tell the team how to organize it; as well as to keep track of the materials used each day and where they are placed so that they don't get lost.

- Intrapersonal Intelligence can be related to the Emotional I ntelligence of David Goleman. We have worked on this intelligence during both, the activities that needed individual participation; because through them our students learn to know themselves better; and the ones in the group, where they needed to control themselves given the behavior of the rest of the members of the group.
- Naturalistic Intelligence: during the whole intervention we worked around the topic of plants, and there are several activities where we worked to create an ability for the students to identify and differentiate among different types of plants. But the most important point in order to develop the Naturalistic Intelligence has been the use of experience-based learning to learn by doing.

As stated in Baena (2019), *Experience-Based Learning* is a process through which knowledge is created by combining understanding and living an experience or situation. During this process, the experiences become a grounding for observation and reflection of the facts that have occurred during it.

According to Mcleod (2023), Kolb set a series of steps to follow for this type of learning that are the following:

1. Concrete Experience – the learner lives a new experience or situation, or a reinterpretation of an already existing experience.
2. Reflective Observation of the Experience – the students reflect on what new knowledge this new experience apports them or if they had already lived this situation before, what has changed.
3. Abstract Conceptualization – through making different logical reflections about the new experience we have gone through, there has been an adjustment or a change in an already existing concept, and that has created a problem that we need to solve.

4. Active Experimentation – the newly created or modified concepts result in experimentation in order to see what happens instead of just observing.

This process builds each stage upon the previous one, making this process based on the Scaffolding and ZPD by Vygotsky (just like the Scientific Method or Design Thinking that will be explained later).
We are going to work in many different ways, not only inside of the classroom, but outside too. And not only that but the fact that we are going to do it in English, so we are going to have: a field booklet, that we are going to use as a tool to take notes, write about our research and write the different observations we make through an observation system where we register and analyze changes; we are going to use a given set of routines in class, etc.

And now, this is the part of the document where it explains how we are going to work on thinking and language:

Vygotsky conceives that language has double surce, social and psychological. As a social device, language allows us to interact with others: it facilitates intermental processes such as communication, knowledge sharing, and knowledge development. As a psychological tool, on the other hand, it enables cognitive and metacognitive interaction with one's self: it helps intramental processes that sort, organize, and categorize one's individual thoughts and ideas. With reference to language as a psychological tool, Vygotsky distinguishes two types of speech: Inner Speech and Private speech. (Vygotski, 1978); (Vygotski, 2000); (Bier, 2015)

Inner Speech is a self-directed speech that the subject addresses to him/herself only. On the other hand, Private Speech is still self-directed but it is externalized and made conscious through verbalization. The difference between the two types of speech is that the message of the first would be incomprehensible by an external listener, while the second would be clearer because it has been verbalized. (Bier, 2015)

So, thanks to the double function we were talking about, language enables the Internalization of concepts and knowledge coming from external influences, thus redefining the overall organization of one's thoughts, but also it allows the externalization of one's ideas, thus turning abstract thoughts into concrete ideas. Therefore a process in which the speaker is

molding his/her thought, and an objective product at the same time, an ‘object’ to share with others and further think upon. (Bier, 2015)

The main component of this theory is “ Interaction”, which happens through language. Language facilitates knowledge sharing and allows us to co-construct shared meaning. The externalization of one’s individual ideas produces concrete ideas and thoughts to share with others and further give consideration to. This continuous exchange between interlocutors guarantees that this process can have a continuous perpetuity. (Bier, 2015)

According to Jones (2009), in Vygotsky’s view, language has a crucial importance in order to develop human patterns of thinking and action in the child. So the process that it would take in order to go from Public or *External Speech* to *Inner Speech* would be an ‘internalization’. External Speech transforms external commands directed to modelate the child’s behavior into ‘Inner Speech’ or self regulation. In this way, the child grows in personal consciousness and self-regulation. The middle step in this internalization process is known as ‘Private Speech’.

This process is also described in Álvarez and Balmaceda (2020), where it says that to Vygotsky, language is partly born by the social interaction of a child, developing a communicative function, but being a form of communication with himself, a form of language that hasn’t been internalized yet. This type of language is called External Speech and progressively when it becomes internalized into Inner Speech, the kid will be able to regulate himself without external manifestations, by automatizing cognitive functions that before were rudimentary.

In order to develop Inner Speech in the classroom for the proposal designed below in this document, we are going to be using different types of thinking in order to achieve different aims, because depending on their complexity, we are going to use one type of thinking or another.

The first way to develop thinking in the class is the creation of daily Classroom Routines and their own respective language and process. As time progresses these routines and their language become automatized for the children. Examples of these routines could be checking in every day, seeing what the weather is like that day, etc. During this unit we have introduced a routine at the beginning of the Science Lessons, where we recount the points

that the different teams obtained from the activities; at the same time we make observations about the vegetable patch in class, registering the changes it suffers.

To add a little more complexity to the type of thinking above we start using activities that involve investigation, where we come across Visible Thinking and Thinking Routines. According to Church Ritchhart, R. (2020), Visible Thinking is a flexible and systematic research-based conceptual framework, which aims to integrate the development of students' thinking with content learning across subject matters.

To promote visible thinking Harvard University created “Project Zero”, a research project addressed to the very young , that has ranged through a lot of curriculums and what is covered in them. (McHugh et al., 2020) After many decades of research, through this project, they created what are called Thinking Routines, which are one of the main core practices to make thinking visible. These Thinking Routines were done by PZ researchers in order to deepen students’ thinking and to help make it “visible.” They also help the teacher to notice the thinking of each student so that they can help them apply these strategies in different contexts and situations.

This team classifies Thinking Routines into different types, which are the following:

- Core Thinking Routines.
- Introducing and Exploring Ideas.
- Digging Deeper Into Ideas.
- Synthesizing and Organizing Ideas.
- Investigating Objects and Systems.
- Perspective-Taking.
- Considering Controversies, Dilemmas, and Perspectives
- Generating Possibilities and Analogies
- Exploring Art, Images, and Objects
- Global Thinking

The Thinking Routines that have been used in the proposal of this document are the following.

- Brainstorming. This routine helps us to either solve problems or generate ideas according to a topic.

- Venn Diagram. A ven diagram is a thinking routine in which we compare and contrast two things finding their differences and similarities.
- Making a Diagram. Making a diagram helps students to synthesize and organize ideas.
- KWL Chart. This routine consists of a graphic organizer with three columns, in the first one the students write what they already knew about a topic, in the second one they write what they have learned and in the third one, they write what they want to learn.

Moving to another level up in terms of cognitive difficulty, we have research activities that involve Experimental Sciences and follow a process called the Scientific Method, that follows guidelines as if it was another routine.

The Scientific Method is a process that we can use as a guide to create Meaningful Science Learning experiences for young children. This Method consists of a set of steps and skills to discover new information about the concept of study (Gerde et al, 2013). The steps that the scientific method follows are:

- Observing
- Asking Questions
- Generating Hypotheses and Predictions
- Experimentation or testing of a Hypothesis
- Summarizing or Analyzing data to draw a Conclusion

If we take a look into these stages, we can see similarities and a clear relationship between the Scientific Method and Design Thinking, which has been explained above; between these similarities, we find that some of the different stages of Design Thinking are similar to the ones in the Scientific Method. For example, the steps of observation and creating a Hypothesis have very similar characteristics to the empathize and define phases of Design Thinking; given that what students do in both sets of phases is to observe a given problem and its characteristics, and try to find a hypothesis or solution to what they have observed. Another set of phases that are basically the same between the two processes are ideate and prototype in Design Thinking, next to experimentation in the scientific method. Finally, the

phase of testing in Design Thinking has the same purpose as drawing conclusions has in the scientific method, which is to evaluate if their ideas and hypothesis were correct or if the need to test/experiment again changes things.

The relationship between both could also be found if we focus on the structure of steps and its organization. Scaffolding is essential to understand this process, it is closely related to ZPD theory by Vygotsky. Bier (2015) describes ZPD (Zone of proximal development) as the difference between the actual level of a pupil's cognitive development and the level of development he could reach under an expert's guidance. Meaning that the student's cannot skip some of the different steps and phases of these processes given the fact that they need to achieve the first one in order to move to the next one.

David Lee (2018), says that in Design Thinking, during the phases of the process, the students need to apply different transdisciplinary knowledge/skills in order to complete each of the phases. Here is where we apply the theory of Thinking Skills, in which the main goal is to develop and promote our students with their own knowledge. According to Dr. Carol McGuiness (2005), the five original Thinking Skills and personal capabilities she proposed were the following ones: Decision-Making, Problem-Solving, Critical Thinking, Creative Thinking, and Searching for Meaning. These Thinking Skills include inside them, important types of thinking that our students should be taught in order for them to become competent thinkers.

Bloom's Taxonomy is another example of theories that classify thinking and cognition abilities. According to Bavli (2023), nowadays cognitive thinking is categorized into two different domains, which are *Higher-Order thinking* (HOT) and *Lower-Order thinking* (LOT). In order to discriminate between one or the other we need to focus on Bloom's Taxonomy of Educational Objectives. This taxonomy is integrated into six different levels: Remember, Understand, Apply, Analyze, Evaluate, And Create.

Tikonova and Kudinova (2015) specify that the domains that correspond to the HOT are the first three: Remember, Understand, and Apply; and the domains that correspond to the LOT are the last three: *Creating, Evaluating, and Analyzing*.

The different domains from this taxonomy are composed of different skills, which if we look closely have a lot in common with the thinking skills described by Carol McGuinness. This means some of the levels of the taxonomy are the same as McGuinness's thinking skills, creating would be related to *creative thinking;* evaluating would be related to *critical thinking;* applying would somehow be related to *problem solving,* and the other three would be included in the skill of *searching for meaning.*

In this enormous range of theories we find around thinking and developing thinking, we come across the term Metacognition, a term which also appears sometimes into a category of its own in Bloom's Taxonomy. According to (Padmanabha, 2020), Metacognition, while a very important component in 21st-century education, keeps getting either forgotten or ignored. The etymology of the word originates from both Greek and Latin words: 'Meta' means "beyond" and the verb 'cognoscere' means "getting to know". So this term is used to describe a person's potential order to be able to evaluate their thinking process and choose the approach they consider the best for them. (InnerDrive, 2023).

According to (Padmanabha,2020), the term Metacognition was first ever brought to our attention by John Flavell, in 1976, and he expanded the meaning of the word so that it included the knowledge of a person about cognitive, affective, perceptual, or motor human features.

In order to get students awareness of the different Thinking Skills and their own metacognition we need to include language of thinking in the classroom. This is the language that helps promote student's thinking. According to Ron Ritchhard (2015), Language of Thinking could be sorted by those words defining processes (for example, justifying, examining, reasoning), products (for example, a hypothesis, a question, a judgment), and epistemic stances that reflect one's attitude toward a bit of knowledge or an idea (for example, agreement, doubt, confirmation). Being more specific in our use of language directs students to specific cognitive acts.

Finally, we add Gamification, as a methodology to engage our students in self awareness and Assessment for Learning. It can also be used in order to create students who learn the different rules of a process and are able to follow them.

According to Kapp (2012), “A Game is a system in which players engage in an abstract challenge, defined by rules, interactivity, and feedback, that results in a quantifiable outcome often eliciting an emotional reaction.” (pg.9)

In order to understand this definition correctly we need to look into the main terms that it is made up of: System, players, abstract, challenge, rules, interactivity and feedback. Once taking into account all of these elements, Kapp (2012) came to the conclusion that:

Together these disparate elements combine to make an event that is larger than the individual elements. A player gets caught up in playing a game because the instant feedback and constant interaction are related to the challenge of the game, which is defined by the rules, which all work within the system to provoke an emotional reaction and, finally, result in a quantifiable outcome within an abstract version of a larger system. (pg.9)

Once revisited the concept of game, Kapp (2012), combined elements from many different research sources and redefined the term gamification as "Gamification is using game-based mechanics, aesthetics and game thinking to engage people, motivate action, promote learning, and solve problems."

There are many different concepts in that definition that need to be scrutinized and made clear, between the we can find:

• Game-Based. The aim of this methodology is to develop a system where learners and players, take part in a challenge, delimited by rules, interactivity, and feedback that results in an outcome that obtains an emotional reaction.

• Mechanics. The mechanics of playing a game include levels, earning badges, point systems, scores, and time constraints. Numerous games include these fundamental elements.

• Aesthetics. The success of this methodology heavily relies on aesthetics and a well-designed experience, because the way a person perceives the experience can make an impact on the way they embrace it.

• Game Thinking. This is maybe the most critical element, because it is turning an everyday experience and transforming it into an activity that has elements of competition, cooperation, exploration and storytelling.

•Engage. The primary aim of gamification is to captivate a person's attention and actively involve them in the process. Engaging individuals is at the core of gamification strategies.

• People. These are the individuals who will be engaged in the created process and who will be motivated to take action.

In the case of this intervention proposal, we are going to attach and combine the theory of affective filter developed by Krashen & Terrel. As revised by Rahman et al.(2020) stress has a significant impact on students and their learning process. This stress can be produced by many different factors, among which we can find environmental factors and family for example. Academic pressure has also been identified as a major reason for causing stress among students. This stress has a negative impact on the performance of students in terms of language acquisition. This means that if the students are stressed, their performance might fall short. At the academic level, stress creates difficulties in learning a second language.

The Affective Filter Theory has four components which: motivation, attitude, self-confidence, and anxiety or stress (Rahman et al, 2020). These components have been included in the intervention sequence presented below in the following way: Trying to change the attitude of the students toward language learning into a more positive one through a proposal that uses elements of interest to them and motivates them to learn. The design of the proposal also tries for them to get more self-confidence during the activities by reducing the levels of stress caused by usually having to get the answers right in just one try; instead, they have several tries in order to achieve the points, which promotes an emotionally safer workspace in the class.

The choice of language used to develop these routines connects Chomsky's and Brunner's theories of linguistic acquisition:

Language Acquisition is the process by which humans acquire the ability to comprehend and produce language. There have been different authors during the last century who developed their own theories developing this topic. The most relevant ones for the development of the proposal in this document are the Innate Theory (Chomsky), and the Social Interaction Theory (Bruner).

The Innate Theory, developed by Chomsky (1957), states that language acquisition is innate to humans, because they are born with all mental structures prepared for this process. (Broad, 2020). He called all of these mental structures that a baby is born with Universal Grammar and then, he coined the term LAD, an acronym for “Language Acquisition Device”, which is the mechanism in charge of regulating all of these structures he thought children were born with in order to learn a language. Chomsky (1957); Barman (2014); Broad (2020).

In contrast to the Innate Theory, Brunner argues that, while the program that Chomsky described was there, there were other factors in this theory that were more important, focusing especially on the social one, (Wanjohi, 2010). In this new hypothesis, he theorized the LASS, an acronym for “Language Acquisition Support System” (Brunner, 1982). Through this LASS, adults and caretakers help the acquisition of language. The whole social factor was a key one for the further development of a child's language. (Ziafar, M et al, 2019).

5. INTERVENTION PROPOSAL.

5.1. CONTEXT

The classroom where this intervention has been developed is a Primary 4th with 24 students in a bilingual school. One of the main reasons why the chosen topic for this intervention is plants, is because one of the principles of this school is to work with different SDGs from the 2030 agenda, one of them being life in terrestrial ecosystems, in which the topic of plants is intrinsic in this objective.

5.2. CURRICULAR FRAMEWORK

- LOMLOE (Real Decrete 157/2022, March 1st, by the one Primary Education regulations and teachings are established.)
- UN General Assembly, *Transforming our world: the 2030 Agenda for Sustainable Development*, 21 October 2015, A/RES/70/1.

5.3. OBJECTIVES

The objectives and goals planned for the kids to be able to achieve by completing this proposal were the following:

- To develop a positive attitude towards learning a new language.
- To identify different types of plants.
- To know and apply the steps of the scientific method.
- To be able to classify plants according to the groups in the plant kingdom.
- To differentiate between deciduous and evergreen trees.
- To know the main needs of a plant.
- To put into practice what has been learned in previous lessons.
- To compare and contrast gymnosperm and angiosperm plants.
- To work in groups in a cooperative way.
- To work in groups to create a display about the topic of plants.
- To know and identify the different stages of the plant cycle.
- To be able to dissect a plant.
- To create a display about the topic of plants.
- To differentiate the parts of a plant and a flower.
- To discover new plants and flowers.
- To be able to make a self-assessment and a peer assessment.

5.4. METHODOLOGIES

As they have been thoroughly explained in the theoretical background the fourth headland of the document, I will just mention them. The methodologies that are going to be used and followed to implement this proposal have been gamification, experience-based learning, project-based learning, and cooperative learning.

5.5. LESSONS DESIGN AND GUIDING THREAD.

The main line of how I have decided to work and develop this proposal has been through the common thread of the videogame of Plants vs Zombies, where the idea for the context is that our planet has been ruined by the zombies, and as the kids are given missions by the zombies, and once they complete each of them, they get points in order to buy little plants in order to reforest our planet, which is going to be a little vegetable patch placed in class.
During this time, I have also tried to implement a new behavior system in which how the students acted in class was going to be determinant to maintain their vegetable patch intact so it kept all of the plants. This system was implemented by all of the teachers because I really

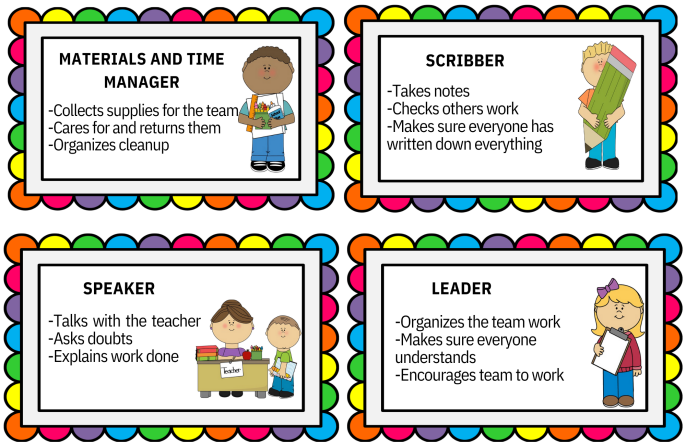
wanted the students to get inside of the context of the unit. The idea was to draw a flower on the blackboard every time the teachers had to scold the students, and for every four flowers, the consequence was that a plant in the classroom vegetable patch was eliminated, even though they had already won it by completing the missions. Examples of how these missions were presented to the students in class will be included in the Appendix 2.

Lesson 1

To start this first lesson, the first thing to do wast to give each of the students the booklet that we were going to be using this unit. Telling them that its purpose was to register everything we were going to learn in this new unit, as well as explaining them how to use it and the rules that we were going to place it under.

Another thing to develop during this first lesson were the roles for cooperative work that the groups in class were going to working with: Leader, time and material manager, scribber/secretary and speaker.

Figure 1. *Cooperative Learning Roles.*



This image has been collected from: A place for sharing (http://aplaceforsharingmar.blogspot.com/2017/10/role-cards-cooperative-learning.html)

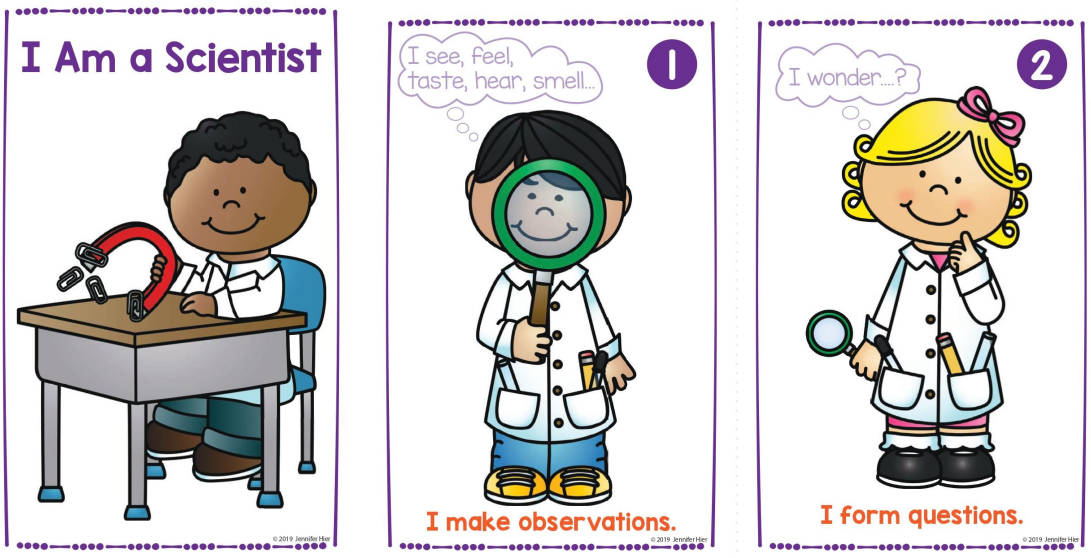
The opening activity of the unit was a brainstorming, in which they had to write all they knew about plants on the first page of their booklet. So, the teacher was able to determine where to start and adapt the contents to their interests and needs. Brainstorming at the beginning of the unit allowed us to start a dialogue and find an approach through the students questions and interests about the topic to be learned.

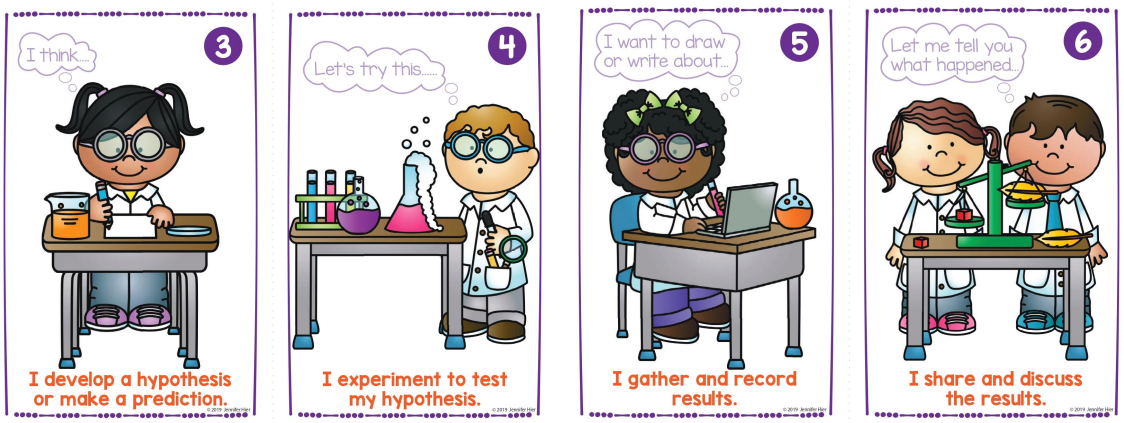
After this, we moved on to an activity that had its focus on the needs of a plants, in order to guide them to the three main ones: water, sunlight, and nutrients, which are going to be the ones that they will have to fulfill when they take care of the vegetable patch in the next lessons. For this activity, they had a page in their booklets where they had to circle the necessities of the plants out of a variety of drawings to choose from. Then working cooperatively in groups they had to share on why they had chosen those. Seeing the ones that they had in common, the student of each group who had the role of spokesperson would be the one in charge of communicating their reasons to the rest of the class.

Lesson 2

To start this lesson, a new routine was introduced to start each lesson. This routine consisted in the recount of the points earned by each team after finishing the different activities. For this routine we used the following mediator:

Figure 2. *Scientific Method*





Note: This image has been collected from: Jennifer. (2023). The Scientific Method https://earlylearningideas.com/scientific-method-for-kids/

The activity led pupils to fill a diagram about the different groups of plants. Once they had analyzed the photos of different types of plants, in groups, they classified them according to a given criteria. This process led them up to complete a mind map that collected the different groups and subgroups that we had already classified moments earlier.

The second activity consisted of the creation of a Venn Diagram, which is a thinking routine that helps make thinking visible in order to compare and contrast ideas as well as to find their similarities. As in the previous activity the kids had been learning about different groups of plants, now they had to compare two of those groups, which are angiosperms and gymnosperms.

At the end of this lesson, we included a practical activity to implement what we had learned in the previous lesson, but applied to a practical setting using the digital competence. This was also going to be a prediction for future lessons. In this activity, working with the classroom chromebooks, they had to be responsible of the growing process of a plant through a video game responding to the different needs of the plants. But they had to consider different variables as well as te conditions in the game itself the speed the plant grew in the game wasn't the same as it would in real life. This activity would also prepare them in order to apply this knowledge into real practice once they were able to start buying plants for the vegetable patch in class with the points given to them as they completed the activities in each lesson.

Lesson 3

As it was introduced in the first lesson the first thing to do was a recount of the points each group had collected through the activities in the previous lessons, once this was done, the topic for this third lesson was presented.

This third lesson revolved around the topic of the growth of the plants and the cycle that this process consists of. First, the scientific method is introduced. As the scientific method is a process, through a mediator we put the different stages of this process on the wall, so that it is near sight for future reference and consultation. Then, an image taken from a video that we were going to watch afterward, this photo was of a seed. After that focusing on the steps of the scientific method, we observed the seed; then we created a hypothesis of what was going to happen with that seed. Then we watched the video, where the experimentation happened, and finally, we came to a conclusion about what happened in the video and why.

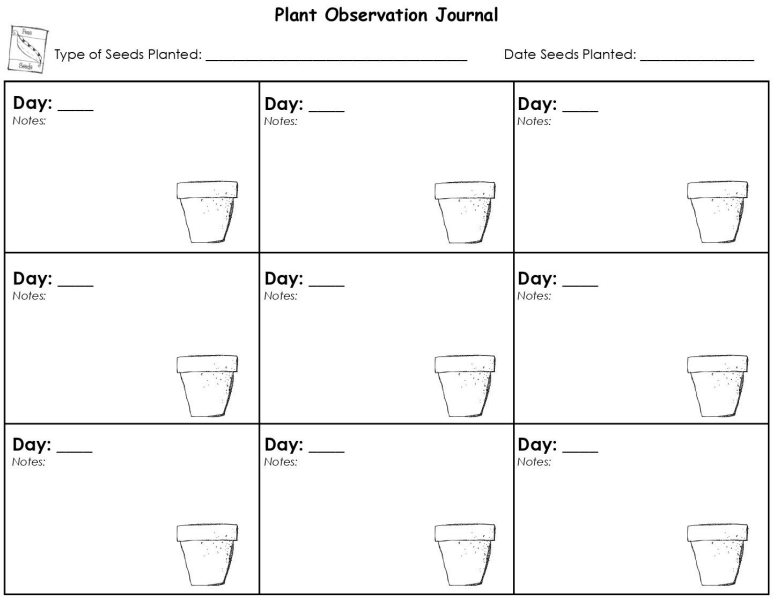
Following the visualization of the video and the plant cycle process, there was another activity that they did in their booklet, in which we had to organize the different stages of the plant process according to the order they had been seen in the video. After that all together in a big group, they were given labels with the name of each stage and had to predict and guess in what image each label belonged. The worksheets used for these activities will be included in the Appendix 3.

Lesson 4

The fourth lesson started by recounting the points they had earned during all of the previous lessons, and finally cashing them out for different plant seeds. Once being given the little plant seed, the student in each group with the leader role in that lesson was the one in charge to put the transfer the seed into the vegetable patch and water it.
After this, it was time to use the scientific method again in order to look for the place where they thought that their plants had the best conditions to grow focusing on the aspect of sunlight. Each group thought of a place and then the spokesperson on each team was the one to communicate the opinion of the group to the rest of the class. Consequently, debating which of the selected spots was the best one, we moved the vegetable patch to that place. In order to keep track of the scientific experimentation process and observe it, each of the groups was provided with an observation sheet, where every day they had to write the date

and write the changes that the seeds had suffered, annotating specifically when the plant changed stages in the plant cycle process and to which stage it changed to.

Figure 3. *Plant Observation Sheet*



Note: This image has been collected from: Chelsey. (2018). Gardening with Kids https://buggyandbuddy.com/gardening-kids-planting-seeds-free-printable/

Changing the direction of the class to a different topic, we talked about plants that we were going to focus on the parts of both plants and flowers. We started by the less complex structure, which is the plant in general. To do this I took advantage of the temporalization to work the plants topic in the classroom of Year 1, so some of those little students came and explained the parts of a plant helping themselves with a drawing on the blackboard.
Later once they finished, each student created a flipbook in which you could see the structure of a plant, and when you lifted the tab corresponding to each part, you had the name of that specific part written.

As a way to finish the lesson, the last activity was about the parts of a flower, which form a more complex structure than just the plant, and first watched a video where each part and its function were explained, and then they labeled all of those parts as a big group in a drawing on the blackboard. Meanwhile, they had to label the same parts on a page in their booklets in order to register new knowledge that was going to be neede for the next lesson.

Lesson 5

As we have deemed it routinary, we check the points of each group in case they want to cash them out, and include a new segment of the routine, where new observations about the vegetable patch in class are written in the observation sheets.

After that, we revised the parts of the flower through an online video game on the class Chromebooks. This game was a Kahoot, where the students were questioned about the parts of the plants and their functions, but focused further on the parts of a flower because they needed to have those fresh for the next activity, which was the dissection a plant.An example of the Kahoot Questions for this game:

Figure 4. *Kahoot activity.*

Note: Image taken from my own creation of a Kahoot Game.

For the next activity we needed to change spaces, so we used the lineup routine to go quietly and without disturbing the rest of the classes to the school laboratory. Once there, everything had been laid out for the activity that was about dissecting a flower while following steps of the Scientific Method. First, observation of the chosen flower where each of the students observed the parts of the flower through either the microscope of the school laboratory or a magnifying glass, to have a closer sight and pointed out some of the parts they identified. Afterwards, given what they observed, as hypothesis they needed to think about whether the plant dissected is going to be a male or female plant given its reproductive parts. Later, through experimentation, they extracted the parts of the flower and identified them. Then, they placed each of them in the square that had the corresponding part name. Finally, to verify and see if their hypothesis were correct or not, they were going to observe the the different flower parts extracted and if they were male or female and get to a conclusion.

Once the activity finished, the clean-up routine was used to clean and put instruments and resources back in its place. Pupils used this routine from the school laboratory, to leave it spotless for the next group of students before going back to class.

Lesson 6

As it was usual by now, the lesson started by checking the points of each group, cashing out some if the teams wanted and writing observations and changes about the vegetable patch in class.

Then we explained what the activity for this lesson consisted of, and gave everybody new pages for their booklets that were going to be used for the activity, and got them to take a pencil and a rubber each. Then each of the groups was given one tablet/Chromebook, reminding them to be careful. Then we did the lineup routine in order to move spaces and not disturb the rest of the school.
The leading activity for this lesson consisted of each group exploring the plants that we had in the playground through the scientific method. The first step of the activity took place in the class, where they wrote a hypothesis of what types of plants they were going to find in the playground, skipping the observation step given that they spend enough time in the playground every day to know this. Classification was the following step: they registered all their observations in a specific booklet page, where they had pictures of different types of the trees, bushes, and flowers, and they had to circle the ones that they could see in the chosen plant.(see Appendix 3).

After that with the tablets, they used a scanning app that recognizes the plants that you scan and tells you what plant is, as well as identifying any problems, the type of care it needed, etc.

Once they had finished we went back upstairs in a lineup formation, and once everyone was quiet and peaceful in their seats, one by one they shared the information that they had collected from both the worksheets and the digital app.

Lesson 7

To start this lesson, we made the necessary observations to fill in the observation sheet from the classroom vegetable patch and we made a recount of how many points each team had, as we did every day as a routine in order for them to be able to cash their points for plants if they had enough.

After that, they were guided through the plant nutrition process and then they had to place their new knowledge into a new page in their booklets, where they had a picture of the photosynthesis process with the labels that were missing.

After that, we moved on to another activity, that consisted of verifying if the plants really have capillaries to transport the water and nutrients for the photosynthesis process. To do this, once more we used the scientific method and worked through its different steps. First, we placed a leek into a transparent vase with water, a fundamental element in the process of photosynthesis. After that we make different observations about how to verify capillaries exist, arriving at the conclusion that maybe using dye is a good idea to see the capillaries. Then we apply the next step and create a hypothesis about what they thought was going to happen. After that, we experiment and add dye to the water in the vase. And as class was over and the process of photosynthesis takes time, we decided that the conclusions would be done in the next lesson. Finally, we cleaned up what we had used for the experiment, and waited for the next teacher.

Lesson 8

As it has become a routine, we start the eighth lesson by making the necessary observations to fill in the observation sheet from the classroom vegetable patch and we recount how many points each team had, in order for them to be able to cash their points for plants when they had enough. If any of them bought a plant the team leader that day was the one in charge of transferring the seeds bought to the vegetable patch.

In this lesson, we were working on the topic of plant reproduction and pollination, and how this process works with the different types of plants. After this, the students will be working in groups, with a Chromebook because for this activity they are going to work with scratch. This scratch is a game where they will face a problem: What would they do if insects were

extinguished on our planet and the pollination process could not come to an end ? To solve this problem we used a scratch game in groups, they need to work together and make decisions to choose from the different options given to them. When all the groups had finished, the game provides an option, according to the answers chosen during the process. The speaker of the day in each group will communicate to the rest of the class the decisions taken and the conclusion or solution that they have arrived at.

Lesson 9

As it has been routine during the lesson during the unit we made observations about the plants in the vegetable patch and what changes they had made, as well as a points recount and a little time in case any team wants to cash points.

After that we spoke about plant adaptations, what they are, examples, etc. Once everything was clear it was time to work in groups. Each group had to come up with ideas and hypotheses of why these plants had adapted a certain way. All of this followed the steps of the scientific method. First, they observed the plant that they were given and through their Chromebooks, they researched about it. Then, they had to give a hypothesis of why they thought this plant had adapted like that. After that, for experimentation, they had to watch a video explaining why these plants had made such changes in order to survive in a different environment. Once they had watched the video, they checked if any of the hypotheses they had made had anything in common with reality. In the end, they arrived at conclusions about where they had gone right or where they had gone wrong.

Lesson 10

In this lesson we did all the routine procedures according to the point system and the observations in the garden in class. Then we did a routine in order to line up and change spaces, in order to go down to the playground area, where we were going to do an escape room. The kids were given a mini booklet in order to fill out the answers to the tests that they had to complete individually to finish the activity. Then each of the groups was given another important piece of paper in which they had to write the correct answer in order to get out of the playground where they had been locked.

As this lesson was going to be one of the main moments for the assessment of the unit, the themes in the different tests of the **escape room** would cover all of the different topics and activities about the plants that we had gone through the previous lessons.
Once all of the teams finished the escape room, we lined up to go back to class, and once there we finished the class by filling out a worksheet that would go on the booklet that consisted of a thinking routine called KWL Chart. It consisted of a table with three columns in which they had to write what they knew before starting this unit, what they had learned during the unit, and in the last one, things that they wanted to learn. After that, in a big group, the students shared their answers and given the fact that for the next lesson, a florist was coming to give us a talk, what most of them had written in the last column was going to be the topics to be explained in it.

Lesson 11

For this lesson we did the routine procedure for the plants and the points quickly because we had a special guest coming to talk to us about the subject of study in this unit, plants. After that, we listened closely and paid attention to what she said because in order to verify that we had listened while she spoke, she was going to ask the kids some questions.

Lesson 12

For this last lesson as it has been routine up until this lesson, we have made observations in order to see the changes in the plants in our vegetable patch and give their growth, we had finalized the scientific method process for this experiment given that drawing conclusions is the last step. The conclusion that we arrived at was that we had placed our vegetable patch in a good place given the fact that all of the plants that we had planted had grown considerably in a very short period of time.

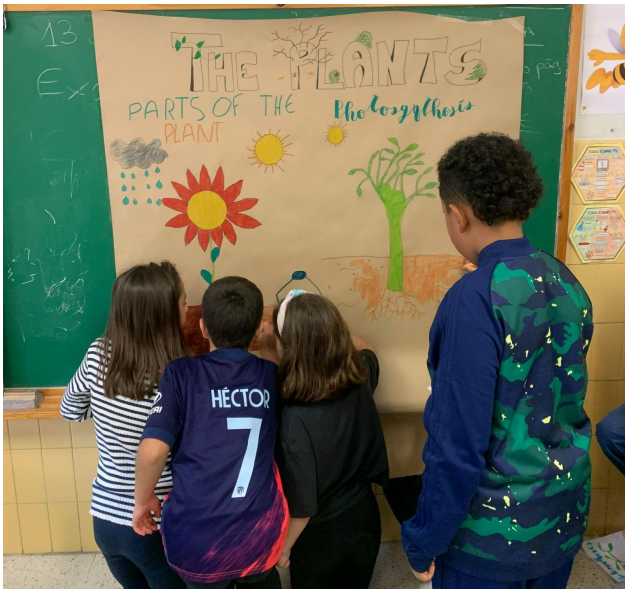
Figure 5. *Classroom vegetable patch.*

Note: This image is from my own creation.

After that, in groups, they had to create a display about the different topics of plants that we had been working on during the unit. To make sure there weren't any fights in order to choose the theme, we made a draw with pieces of paper. Once decided on the theme each group had, they got to work. To create the display we tried to use as many steps of the scientific method as it was possible, given that we were creating a non-fiction information work related to activities where they had used the scientific method to experiment.

First, they had to decide on a catchy title in order for their display to catch people's attention. Then they had to introduce their experiment to the readers of their display, with a hypothesis section that described what they have been testing during the different lessons of this unit. Then they placed the experimental procedure that they had followed in each of the experiments as well as the materials they had used in order to sustain the projects.

Figures 6, 7, 8 and 9. *Making of a plants display.*



Note: This image is from my own creation.

6. CONCLUSIONS.

After designing the sequence that is described above, and having stablished a relationship with the theoretical background that is based on the development of thinking in a Primary year 4 classroom through experience-based learning, various types of thought and a clearly selected language in order to develop them; I have been able to reach concise conclusions about these aspects.

The process of guiding Science through a set process as the Scientific Method and with the help of some other thinking theories help our students develop a clear thinking pattern that follows a series of steps that are quickly internalized and made part of their inner language.

Using the Scientific Method as a process helps the students lo live their learning hands on in an experiential way that helps them use meaningful language.

The importance of the selection of language used during the routines and the students thinking and learning processes that we are applying in a class.

The teacher's role in the process of the students learning is really important, and it has to evolve from being the holder of the knowledge that the kids need to learn, to being a guide to provide the mediators kids would need to achieve this knowledge.

In conclusion, to design a sequence that develops thinking through processes like the Scientific Method, the teacher's role has to evolve and become a guide through the learning process and do this by choosing very carefully the language that will be used in class.

Finally, using English as a vehicular language in the subject of Natural Sciences allows the students to investigate future opportunities that this language can give them being the Universal Language in reference to the world of science.

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7. APPENDIX

APPENDIX 1. COMPLETE UNIT AND LESSON PLANS.

COMPLETE UNIT PLAN AND LESSONS OVERVIEW.

About the unit/ Where this unit fits
This unit fits perfectly to work on the school work project to discover and work though the SDGs from the 2030 agenda.

Prior Learning	Language used in the unit	Important Resources
PLANTS	- Instrucctional text to develop a scientific process. - Scientific language related to the topic of plants.	The most important resources used in this unit have been the following: - Vegetable patch and seeds brought by the teacher. - Escape room booklets brought by the teacher - Continuous paper for the display brought by the teacher. - Booklets and worksheets brought by the teacher. - Materials for different experiments. - Etc.

Expectations	
At the end of this unit all the children must	- Know the different subgroups of plants that there are with the help of a diagram. - Develop an ethical conduct to respect their environment, and the plants on it. - Know and differentiate the steps of the process of growth of a plant. - Understand the concept of “Autotroph” . - Know the different parts of the flower. - Explain the process of photosynthesis with the help of a teacher or the images in the book. - Understand the process of plant nutrition and what capillaries are. - Know the process of pollination and why is it so important. - Have a conscience about how different types of plants help humans and provide benefits.
At the end of this unit most of the children should	- Know the different subgroups of plants that there are. - Develop an ethical conduct to respect their environment, and the plants on it. - Know and differentiate the steps of the process of growth of a plant with the help of a teacher.. - Understand the concept of “Autotroph” . - Know the different parts of the flower. - Explain the process of photosynthesis with the help of a teacher or the image in the book.. - Explain the process of plant nutrition and what capillaries are with the teacher's help. - Be able to explain the process of pollination and why is it so important. - Have a conscience about how different types of plants help humans and provide benefits.

At the end of this unit some of the children could	- Know and differentiate between the different subgroups of plants that there are. - Develop an ethical conduct to respect their environment, and the plants on it. - Know and differentiate the steps of the process of growth of a plant. Identify these steps on the plants that we have in class with the help of an observation sheet - Understand the concept of "Autotroph" and be able to explain its meaning. - Know the different parts of the flower and be able to complete a diagram about it. - Explain the process of photosynthesis by themselves without help. - Explain the process of plant nutrition and what capillaries are. - Provide and design a solution to a process given that is related to the process of pollination and why is it so important. - Have a conscience about how different types of plants help humans and provide benefits.

Lessons Overview

	Learning goals.	Learning outcomes.	Main activity.
1	- Remember all the things the kids know about plants. - See the text level the kids have in the area of writing. - Promote a safe class environment.	- Remember previous knowledge about a topic. - Identify the student's text level. - Try to promote a safe class environment.	- Brainstorming about plants. - Plants needs

	- Show respect to all of their classmates' opinions. - Search for the knowledge they have from previous years. - Know the basic needs of a plant.	- Develop respectful attitudes. - Making a brainstorming - Know what a brainstorming is. - Distinguish the needs of plants from other species' needs.	
2	- Differentiate the different groups and subgroups of the plant kingdom. - Understand that there are different groups of plants. - Know some examples about each subgroup of plants. - Know examples of gymnosperms and angiosperms. - Differenciate and compare between gymnosperm and angiosperm plants.	- Difference the groups in the plant kingdom. -Identify examples of the different groups of plants. - Be able to tell differences and similarities between different groups of plants. - Differences and similarities between gymnosperm and angiosperm plants.	- Diagram about the types of plants. - Compare and contrast angiosperms and gymnosperms. - Taking care of a plant videogame.
3	- Discuss the different stages of a plant's life cycle. - Know the order of the stages in the plant cycle. - Identify through direct observation the stage of the plant cycle that a plant is in. -Know the steps that the scientific method follows.	- Know the phases of the plant cycle - Identify the phases of the plant cycle - Introduce the scientific method in a process - Know the steps of the scientific method.	- Life cycle of a plant.
4	- Recognise the parts of a plant. - Know the parts of a plant.	- Recognise the parts of a plant. - Identify the parts of a flower in a diagram.	- Parts of a plant flipbook.

	- Understand that not all plants have the same parts. - Know the parts of a flower. - Identify different parts of a flower in a diagram.	- Know the parts of a plant. - Understand that not all plants have the same parts.	- Parts of a flower diagram.
5	- Dissect a plant. - Recognise the parts of a plant. - Identify the parts of a plant while dissecting one. - Knowing the steps of the scientific method, and how to apply them in the process of dissecting a flower.	- Plant dissection. - Identification of the parts of a plant. - Application of the scientific method.	- Plant Dissection
6	- Understand different physical characteristics about plants. - Observe their environment for plants and trees with different characteristics. - Compare plants that have different physical characteristics. - Explain the characteristics of the plant they have selected. - Select and scan a plant through a digital app. - Identify the physical characteristics of a plant in a worksheet with a lot of different ones.	- To understand different physical characteristics about plants. - Identify plants and trees with different characteristics. - Compare plants that have different physical characteristics. - Learn how to use a digital app to scan plants.	- Plant Detectives
7	- Understand the process of photosynthesis. - Be able to explain the process of photosynthesis with their own words. - Identify the main elements that take part in the process of photosynthesis.	- Understand the process of photosynthesis. - Explain the process of photosynthesis. - Identify and explain elements involved in the process of photosynthesis. - Explain what capillaries are.	- Plant nutrition - Photosynthesis - Capillaries Experiment

	- Know that the plants have capillaries. - Be able to explain what capillaries are. - Know the steps of the scientific process. - Be able to apply the scientific method steps in an experiment.	- Know that capillaries exist through a scientific experiment. - Know the steps of the scientific method. - Be able to apply the steps in the scientific method.	
8	Understand pollination. - Differentiate between cross-pollination and self-pollination. - Recognize the components of a flower and their roles in the pollination process. - Exploring Plant-Pollinator Relationships - Appreciating Pollination's Significance - Awareness of Threats to Pollination - Recognize factors endangering pollination and methods to safeguard it.	- Grasp the concept and process of pollination. - Identification of Floral Parts - Understand the vital role of pollination in biodiversity and food production. - Be aware of the threats to pollination.	- Pollination
9	- Understand why plants adapt. - Know some examples of plants that have adaptations.	- Students know types of plant adaptations. - Students differentiate between different plant adaptations.	- Plant adaptations

	- Identify a part of a plant that can have an adaptation. - Research about plant adaptations.	- Identification of the parts of a plant.	
10	- Elements plants need to grow. - Identify parts of the flower in a list. - Complete a diagram with the parts of the plants. - Identifies the gasses in the photosynthesis.	- Identifies the main elements a plant needs to grow. - Can explain why a plant needs certain element with his own words. - Identifies correct words as the parts of a flower - Completes a flower parts diagram - Knows where each part of a plant is located. - Identifies the gasses in the respiration process. - Differences the gasses in the respiration process.	- Escape room.
11	- Listen to a talk about flowers given by a professional. - Know new types of plants. - Show interest and respect in the professional giving the talk. - Participating and making questions about the topic spoken.	- Learn new things about plants. - Show attention about the topic of the talk. - Participate and ask questions to the speaker. - Take notes about what is said. - Know new species of plants. - Express knowledge through making questions related to the talk.	- Talk about plants with a specialist

12	- Create a display with the contents we have been learning class about plants. - Use visual thinking to show their knowledge about a certain topic about plants. - Develop creative aspects in a project about plants.	- Create a display. - Show creative thinking. - Use visual thinking - Develop the cultural and artistic competence through drawing about a certain topic. - Explain a topic about plants through visual thinking. - Express knowledge about a certain plant topic.	- Creating a display.

Lesson #1 - INTRODUCTION, BRAINSTORMING AND PLANTS NEEDS.

Learning objectives	Learning outcomes	Evidence for Assessment
- Remember all the things the kids know about plants. - See the text level the kids have in the area of writing. - Promote a safe class environment. - Show respect to all of their classmates' opinions.	- Remember previous knowledge about a topic. - Identify the student's text level. - Try to promote a safe class environment. - Develop respectful attitudes. - Making a brainstorming	- Direct observation. - Making questions in class. - Booklet and resources made in class. - Oral exposition in several activities.

- Search for the knowledge they have from previous years. - Know the basic needs of a plant.	- Know what a brainstorming is. - Distinguish the needs of plants from other species' needs.	

Discourse/Text targeted	Language targeted- Non-verbal L Targeted
Non-fiction and instructional	Paranguage and illustrators

Outline of leading activities

1. To start the class and introduce a new unit, the teacher projects an image related to the topic this unit is going to be about.
2. After the kids express their opinions and have the space to do so without any criticism of their classmates.
3. The teacher either introduces the correct topic or if the students have guessed correctly, he/she confirms it.
4. The teacher explains what a brainstorming is.
5. The teacher gives the students the first page of the booklet that will be used to assess this unit.
6. The teacher sets a 5-minute timer in order to give the students time to clarify their ideas.
7. The students write their ideas in the corresponding place in the booklet.
8. The teacher makes the students stop and tells the students that now they are going to put all of what they wrote in common.
9. The students raise their hands and wait for their teacher to indicate whose time is to speak.
10. The students share their ideas with their classmates.
11. The teacher gives a worksheet for the kids to work in groups.
12. The kids do the worksheet where they have to choose the correct needs of a plant.

13. Clean up routine and get ready for the next class.

Assessment Criteria

All children must be able to	**Most of the children will be able to**	**Some of the children could**
- Try to remember concepts about the plants taught in previous years. - Know the needs of the plants.	- Remember at least a few concepts about plants taught in previous years. - Distinguish the needs form plants from the ones from other living beings.	- Remember complicated contents about the plants taught in natural science the previous years.

Lesson #2 - THE DIFFERENT GROUPS OF PLANTS

Learning objectives	Learning outcomes	Evidence for Assessment
- Differentiate the different groups and subgroups of the plant kingdom.	- Difference the groups in the plant kingdom.	- Direct observation. - Making questions in class.

- Understand that there are different groups of plants. - Know some examples about each subgroup of plants. - Know examples of gymnosperms and angiosperms. - Differenciate and compare between gymnosperm and angiosperm plants.	-Identify examples of the different groups of plants. - Be able to tell differences and similarities between different groups of plants. - Differences and similarities between gymnosperm and angiosperm plants.	- Booklet and resources made in class. - Oral exposition in several activities.

Discourse/Text targeted	Language targeted- Non-verbal L Targeted
Non-fiction and instruccional	Paranguage and illustrators

Outline of leading activities

1. Starting from the beginning, as in the previous lesson there was the initial brainstorming, we are going to explain and talk about the different groups that plants can be divided in.
2. After that we all together create a diagram on the blackboard that is going to summarize what we have been talking about.
3. Once the diagram is finished, the teacher makes two interconnected circles on the blackboard and asks the students what they think we are going to do next.
4. We listen to the students' opinions and when they finish, the teacher explains what a Venn diagram is and what are we going to use it for.
5. After that, all together we will complete the venn diagram on the board, while the kids take note of this on the corresponding page on their booklet.
6. Finally, to finish the class the kids play an online game in which they have to take care of a plant.

Assessment Criteria		
All children must be able to - Create together a diagram together in the board about the different groups of plants. - Distinguish some of the differences between angiosperm and gymnosperm plants with the guidance of the teacher.	**Most of the children will be able to** - Create a diagram about the different groups of plants with the help of the teacher and the classmates. - Distinguish some of the differences between angiosperm and gymnosperm plants.	**Some of the children could** - Create by themselves a diagram about the different groups of plants. - Distinguish most of the differences

Lesson #3 - PLANT'S LIFE CYCLE AND THE SCIENTIFIC METHOD

Learning objectives	Learning outcomes	Evidence for Assessment
- Discuss the different stages of a plant's life cycle. - Know the order of the stages in the plant cycle. - Identify through direct observation the stage of the plant cycle that a plant is in. -Know the steps that the scientific method follows.	- Know the phases of the plant cycle - Identify the phases of the plant cycle - Introduce the scientific method in a process - Know the steps of the scientific method.	- Direct observation. - Making questions in class. - Booklet and resources made in class. - Oral exposition in several activities.

Discourse/Text targeted	Language targeted- Non-verbal L Targeted
Non-fiction and instructional	Paranguage and illustrators

Outline of leading activities

1. For today's lesson the teacher will start the class by using an attention catching routine and and once all of the students are paying attention, they will start the lesson by showing the students a photo of a seed in the digital board in class.
2. Then, the students will create a hypothesis according to what they think is going to happen with this seed and will write it down on their booklets.
3. Next, a timelapse video of how the seed has grown will be projected on the board.
4. After the video, the teacher will make questions about its contents to the students, and once all of them are answered, they will write their conclusions about the process of experimentation they have seen.
5. After this, the teacher will distribute a worksheet about the plant's cycle, in which they will have to place the name of the stages in the right picture.
6. Once the activity is finished by all of the students they will clean up their spaces, add this photocopy to their booklets, and wait patiently for the next teacher to come.

Assessment Criteria

All children must be able to	**Most of the children will be able to**	**Some of the children could**
- Place in the correct order the different stages of the plant cycle with the help of the teacher or the classmates. - Know some of the stages that a plant goes though during its life cycle.	- Place in the correct order some or all of the different stages of the plant cycle by themselves. - Identify the stage of the plants in the vegetable patch in class and place it on an observation sheet.	- Be able to explain the plant cycle to classmates by themselves. - Know the scientific method steps and how to apply them to a real situation without the teacher's help.

- Know the scientific method steps.	- Know the scientific method steps and how to apply them to a real situation with the teacher's help.	

Lesson #4 - CLASSROOM VEGETABLE PATCH, PARTS OF A PLANT, AND PARTS OF A FLOWER

Learning objectives	Learning outcomes	Evidence for Assessment
- Recognise the parts of a plant. - Know the parts of a plant. - Understand that not all plants have the same parts. - Know the parts of a flower. - Identify different parts of a flower in a diagram.	- Recognise the parts of a plant. - Identify the parts of a flower in a diagram. - Know the parts of a plant. - Understand that not all plants have the same parts.	- Direct observation. - Making questions in class. - Booklet and resources made in class. - Oral exposition in several activities.

Discourse/Text targeted	Language targeted- Non-verbal L Targeted
Non-fiction and instruccional	Paranguage and illustrators

Outline of leading activities
1. The teacher arrives at the class and doesn't need to make an attention getting strategy to attract the kids attention today, because she has the presence of a couple of students from Year 1. 2. As the students are seated in their regular work groups, the teacher tells them that we have some special guests, who have come to explain to us the different parts of a plant. After this she lets the two children from 1st start showing the kids in Year 4 the parts of a flower, with the help of a drawing of a flower on the blackboard. After that the teacher writes the names of the parts with an arrow pointing to the correct place on the drawing. After explaining the kids from Year 1 go back to their class. 3. After this the teacher presents to the students the vegetable patch in which they are going to be planting the seeds that they cash out with the points they get form the activities. They will have a little bit of time to chash out the points they have gotten until now and to quickie plant the seeds in the vegetable patch. 4. Each student will be given an observation sheet so that they annotate the changes the seed makes as it grows and the phases of the plant cycle it reaches. 5. After that the teacher guides the kids through the next activity which is a flipbook. It has a drawing of a flower and when you open each of the different sections, you can find the name of that part of the plant. 6. Finally, to finish the lesson, we work on the parts that a flower has, using a drawing in the blackboard to label these parts, that we will work with on the next lesson.

Assessment Criteria

All children must be able to	**Most of the children will be able to**	**Some of the children could**
- Know the names of the parts of the plants. - Know some of the names of the parts of a flower. - Create a flipbook that displays the parts of a flower.	- Place some of the names of the parts of the plants in the correct place in a diagram or a drawing. - Place some of the names of the parts of the flower in the correct place in a diagram or a drawing.	- Place all of the parts of the plants and the flower in the correct place in a diagram or a drawing. - See the differences in the parts that a flower and a plant have.

	- Distinguish between different types of plants (grass, bush, tree, etc)	

Lesson #5 -PLANT DISSECTION

Learning objectives	Learning outcomes	Evidence for Assessment
- Dissect a plant. - Recognise the parts of a plant. - Identify the parts of a plant while dissecting one. - Knowing the steps of the scientific method, and how to apply them in the process of dissecting a flower.	- Plant dissection. - Identification of the parts of a plant. - Application of the scientific method.	- Direct observation. - Making questions in class. - Booklet and resources made in class. - Oral exposition in several activities.

Discourse/Text targeted	Language targeted- Non-verbal L Targeted
Non-fiction and instruccional	Paranguage and illustrators

Outline of leading activities

1. The teacher appears in class and starts to do the new daily routine where we take notes and observations on the plants in the vegetable patch, as well as to cash our points for more seeds if we have enough.
2. Then in groups with the classroom chromebooks, they will play a game of kahoot about the parts of a flower, which they will need to use in the next activity.
3. After this the students line up and they quietly go to the school laboratory where they find the materials for that day's class spread out.
4. The students who have volunteered to write one of the parts of the plants, come out one by one to the board and complete the drawing or diagram in the board.
5. Once this activity is finished and each student is quiet and back on their spot, the teacher then chooses another volunteer to distribute the worksheet that is going to collect the different parts of the flower we are dissecting. This worksheet is going to be later attached into their booklets. Meanwhile the teacher is going to give a flower to each one of the students, but they cannot touch it until she says.
6. After that the teacher will guide the kids through the process of dissecting the flower and identifying the different parts of it guiding them though the steps of the scientific method that has become so familiar in class.
7. Once the activity is finished the students clean up the laboratory and pick up the materials used, and make a line to go back to class for the next period.

Assessment Criteria

All children must be able to	**Most of the children will be able to**	**Some of the children could**
- Dissect a flower with the teacher's help. - Identify some parts of a flower after dissecting a plant.	- Know most of the parts that a flower is made of. - Identify the main parts of a flower in a diagram.	- Know all of the parts that a flower is made of. - Identify all the parts of a flower in a diagram.

Lesson #6 - PLANT DETECTIVES

Learning objectives	Learning outcomes	Evidence for Assessment
- Understand different physical characteristics about plants. - Observe their environment for plants and trees with different characteristics. - Compare plants that have different physical characteristics. - Explain the characteristics of the plant they have selected. - Select and scan a plant through a digital app. - Identify the physical characteristics of a plant in a worksheet with a lot of different ones.	- To understand different physical characteristics about plants. - Identify plants and trees with different characteristics. - Compare plants that have different physical characteristics. - Learn how to use a digital app to scan plants.	- Direct observation. - Making questions in class. - Booklet and resources made in class. - Oral exposition in several activities.

Discourse/Text targeted	Language targeted- Non-verbal L Targeted
Non-fiction and instruccional	Paranguage and illustrators

Outline of leading activities

1. The teacher arrives at class and does the point counting for each of the teams in class; as well as she leaves a bit of time to do the observations of the day of the class patch.
2. After that, she explains the activity that is going to be done today.
3. The teacher asks to clean up and leave a pen and a rubber out of their pencil case, and gives each group a chromebook, because this activity has a digital twist, where they are going to scan a plant though a digital app in order to know which type it is.
4. The kids go from the class to the playground, avoiding to make noise in the halls to not disturb the rest of the people in the school.
5. The teacher will explain the activity once again and give the students a new photocopy that will be included in the unit's booklet.
6. The students will have time to do the activity and complete their worksheet where they become tree detectives.
7. The students go back to where the teacher is and they sit down on the floor.
8. Each of the students has a speaking time to share the results of their investigation as well as the conclusions they have arrived at and why.
9. Finally, we will all go back to class.

Assessment Criteria

All children must be able to	**Most of the children will be able to**	**Some of the children could**
- Notice differences between different plants and trees with the help of the worksheet given to them by the teacher. - Use a digital app in order to scan a plant and identify it. - Recount their discovery to their classmates with help of the teacher.	- Notice differences between different plants and trees without the worksheet given by the teacher. - Identify types of plants in the playground in the categories of grass, bush, tree, etc. - Recount their discovery to their classmates using the worksheet as a mediator to guide themselves.	- Identify some of the plants in the playground. - Recount their discovery to their classmates without any problems.

- Respect the presentation and discovery from the rest of their classmates.		

Lesson #7 -PHOTOSYNTHESIS, PLANT NUTRITION AND CAPILLARIES

Learning objectives	Learning outcomes	Evidence for Assessment
- Understand the process of photosynthesis. - Be able to explain the process of photosynthesis with their own words. - Identify the main elements that take part in the process of photosynthesis. - Know that the plants have capillaries. - Be able to explain what capillaries are. - Know the steps of the scientific process. - Be able to apply the scientific method steps in an experiment.	- Understand the process of photosynthesis. - Explain the process of photosynthesis. - Identify and explain elements involved in the process of photosynthesis. - Explain what capillaries are. - Know that capillaries exist through a scientific experiment. - Know the steps of the scientific method. - Be able to apply the steps in the scientific method.	- Direct observation. - Making questions in class. - Booklet and resources made in class. - Oral exposition in several activities.

Discourse/Text targeted	Language targeted- Non-verbal L Targeted
Non-fiction and instruccional	Paranguage and illustrators

Outline of leading activities

1. The teacher arrives to the class and makes an attention getting strategy in order to keep the students quiet and paying attention in order to start the day with the already known routine to check the point system, and make the observations on the plant patch in class.
2. As in the beginning of the class the students are relaxed and concentrated, the teacher introduces and explains the topic that we are going to introduce and work on this lesson, the process of photosynthesis, next to all of the aspects about plants nutrition.
3. After that we are going to focus on one element that is key to these processes, the capillaries, and we are going to investigate if they are in fact real.
4. First, we will put a keel on a cristal vase and the kids will be asked to write a hypothesis about what they think is going to happen with this vegetable at the end of the process, does it have capillaries, the contrary, etc.
5. After that we add dye to the vase, because the capillaries absorb water and if it is coloured, this can be an indicator of the existence of capillaries.
6. We revise the different steps of the scientific method, and what they have consisted on for this experiment.
7. As the process of plant nutrition and photosynthesis takes a long time to happen, the conclusions will be done in the next lesson.
8. Once the activity is finished by all of the students they will clean up their spaces, and wait patiently for the next teacher to come.

Assessment Criteria

All children must be able to	Most of the children will be able to	Some of the children could
- Understand the process of photosynthesis. - Identify all of the main elements that take part in the process of photosynthesis.	- Explain the process of the photosynthesis with the help of the teacher or the classmates.	- Explain the process of the photosynthesis by themselves.

Lesson #8 -PLANT REPRODUCTION AND POLLINATION PROCESS

Learning objectives	Learning outcomes	Evidence for Assessment
- Understand pollination. - Differentiate between cross-pollination and self-pollination. - Recognize the components of a flower and their roles in the pollination process.	- Grasp the concept and process of pollination. - Identification of Floral Parts - Understand the vital role of pollination in biodiversity and food production. - Be aware of the threats to pollination.	- Direct observation. - Making questions in class. - Booklet and resources made in class. - Oral exposition in several activities.

- Exploring Plant-Pollinator Relationships - Appreciating Pollination's Significance - Awareness of Threats to Pollination - Recognize factors endangering pollination and methods to safeguard it.		

Discourse/Text targeted	**Language targeted- Non-verbal L Targeted**
Non-fiction and instruccional	Paranguage and illustrators

Outline of leading activities

1. The teacher arrives and does the rutinary point recount in case any team wants to cash out poins for new seeds from the classroom patch.
2. As there wasnt’t enough time the past lesson, they will write about the conclusions they have extracted from the experiment thet they did about capillaries once observing the keel on the crystal jar that is still in class.
3. Then they will include this observations in the worksheet from the previous lesson, kept in their booklet.
4. After that, we move on to a new and interesting topic, as is they way plants reproduce. The teacher explains this process, helped by videos and images.
5. When the teacher finishes explaining, gives each group a chromebook, where they have to access the classroom wiki, that has a link to a scratch game that we are going to play with.
6. The teacher explains what they have to do in this scratch activity.
7. Once they finish, the scribber of each group will have to communicate the conclusions that they have arrived to once they finished the activity.

Assessment Criteria		
All children must be able to - Understand pollination. - Explore Plant-Pollinator Relationships - Appreciate Pollination's Significance - Awareness of Threats to Pollination	**Most of the children will be able to** - Understand pollination and explain it. - Differentiate between cross-pollination and self-pollination. - Work in groups tt solve a problem that has to do with pollination.	**Some of the children could** - Recognize the components of a flower and their roles in the pollination process. - Recognize factors endangering pollination and methods to safeguard it.

Lesson #9 - PLANT ADAPTATIONS

Learning objectives	Learning outcomes	Evidence for Assessment
- Understand why plants adapt. - Know some examples of plants that have adaptations. - Identify a part of a plant that can have an adaptation. - Research about plant adaptations.	- Students know types of plant adaptations. - Students differentiate between different plant adaptations. - Identification of the parts of a plant.	- Direct observation. - Making questions in class. - Booklet and resources made in class. - Oral exposition in several activities.

Discourse/Text targeted	Language targeted- Non-verbal L Targeted
Non-fiction and instruccional	Paranguage and illustrators

Outline of leading activities

1. The teacher arrives at class and does an attention getting strategy in order for the kids to listen and pay attention, as well as recounts the points of each team, and makes the necessary observations from the vegetable patch in class.
2. The teacher then moves on to explaining the topic of the day, as are the plant adaptations.
3. After that, in each group they had to come up with ideas and hypotheses of how some plants shown in the board had adapted, because of this was going to follow the steps of the scientific method.
4. First, they observed the plant that they were given and through their Chromebooks, they researched about it.
5. Then, they had to give a hypothesis of what they thought would happen to this plant in another set of conditions.
6. After that, for experimentation, they had to see a video of the real adaptations these plants had made in order to survive in a different environment.
7. Once they had seen the video, they checked if any of the hypotheses they had made had anything in common with what had happened in reality, and came to conclusions about where they had gone right or where they had gone wrong.
8. Finally as it was the end of the class, it's time to do the clean up routine.

Assessment Criteria

All children must be able to	Most of the children will be able to	Some of the children could
- Know at least one example of types of plant adaptations. - Identification of the parts of a plant. - Share information with the classmates. - Speak the results of their investigation in public. - Select the information from the internet carefully.	- Differentiate between different plant adaptations. - Identify the different parts of the parts of a plant and distinguish if it has adaptations. - Retell the information that they have searched with the teacher's help.	- Differentiate between different plant adaptations and explain this difference. - Retell the information that they have searched by themselves without help. - Be able to distinguish the most appropriate and safe websites in order to search for information about plant adaptations.

Lesson #10 - PLANTS ESCAPE ROOM

Learning objectives	Learning outcomes	Evidence for Assessment
- Elements plants need to grow. - Identify parts of the flower in a list. - Complete a diagram with the parts of the plants.	- Identifies the main elements a plant needs to grow. - Can explain why a plant needs certain element with his own words.	- Direct observation. - Making questions in class. - Booklet and resources made in class. - Oral exposition in several activities.

- Identifies the gasses in the photosynthesis.	- Identifies correct words as the parts of a flower - Completes a flower parts diagram - Knows where each part of a plant is located. - Identifies the gasses in the respiration process. - Differences the gasses in the respiration process.	

Discourse/Text targeted	Language targeted- Non-verbal L Targeted
Non-fiction and instructional	Paralanguage and illustrators

Outline of leading activities

1. The teacher arrives to class and keeps quiet so that the students stop talking and pay attention.
2. The students listen to the teacher's explanation about what they are doing today.
3. The kids take a pencil and a rubber, and they make a line in order to go to the playground quietly.
4. The kids go from the class to the playground, avoiding making noise in the halls to not disturb the rest of the people in the school.
5. Once in the playground will explain the activity again and will make sure that she gives a copy of the escape room booklet to each of the students.
6. The teacher divides the students in groups so that they do the escape room with that organization.
7. The students in groups will search the tasks and clues that they will need to complete the activity, which are scattered around the playground.
8. Once each group finishes, they come to where the teacher is, and they tell her what they think the password is.
9. Once all of the groups have finished, they go back to class.

10. Thinking routine called KWL Chart. It consists of a table with three columns in which they have to write what they knew before starting this unit, what they have learned during the unit, and in the last one, things that they want to learn in the talk with specialist in the next lesson.

Assessment Criteria

All children must be able to	**Most of the children will be able to**	**Some of the children could**
- Organize the different stages of the plant's cycle with the help of their classmates. - Complete a diagram about the parts of a flower with help of the classmates. - Be able to recognize the main elements that take part in the process of photosynthesis. - Fill in a diagram about the types of plants with the help of a classmate.	- Organize the different stages of the plant's cycle with the help of their classmates. - Know some of the parts that a flower is made of. - Place some of the parts a flower is made of in a drawing. - Identify the main parts of a flower in a diagram. - Distinguish the different groups of plants through a photo.	- Organize all of the different stages of the plant's cycle by themselves. - Know all of the parts that a flower is made of. - Place all of the parts of a flower in a - Identify all the parts of a flower in a drawing by themselves. - Know the differences between the different groups of plants and be able to classify them through photos.

Lesson #11 - TALK ABOUT FLOWERS BY AN SPECIALIST

Learning objectives	Learning outcomes	Evidence for Assessment

- Listen to a talk about flowers given by a professional. - Know new types of plants. - Show interest and respect in the professional giving the talk. - Participating and making questions about the topic spoken.	- Learn new things about plants. - Show attention about the topic of the talk. - Participate and ask questions to the speaker. - Take notes about what is said. - Know new species of plants. - Express knowledge through making questions related to the talk.	- Direct observation. - Making questions in class. - Oral exposition while making questions to the professional who is giving the talk.

Discourse/Text targeted	Language targeted- Non-verbal L Targeted
Non-fiction and instruccional	Paranguage and illustrators

Outline of leading activities

1. The teacher arrives at class with some people who are going to give us a talk about the topic we have been studying in this unit.
2. The teacher presents the people that are going to give the talk, in this case, the mothers of some of our students who own a flower shop.
3. The talk will begin and the students will be quiet and take in all the information they can, so that they can ask questions later.
4. The specialist asks questions about what she has been telling the students, to see if they had paid attention.
5. The kids ask doubts about the talk.
6. The person who has come has a present for the kids.

Assessment Criteria

All children must be able to	**Most of the children will be able to**	**Some of the children could**
- Listen and pay attention during a talk about plants. - Connect some of the topics of this talk with the contents learned in the unit.	- Create a question to ask the specialist about a curiosity about plants.	- Retell all of the information that the plant specialist has told us.

Lesson #12 - CREATING A DISPLAY.

Learning objectives	Learning outcomes	Evidence for Assessment
- Create a display with the contents we have been learning class about plants. - Use visual thinking to show their knowledge about a certain topic about plants. - Develop creative aspects in a project about plants.	- Create a display. - Show creative thinking. - Use visual thinking - Develop the cultural and artistic competence through drawing about a certain topic. - Explain a topic about plants through visual thinking. - Express knowledge about a certain plant topic.	- Direct observation. - Making questions in class. - Booklet and resources made in class. - Oral exposition in several activities.

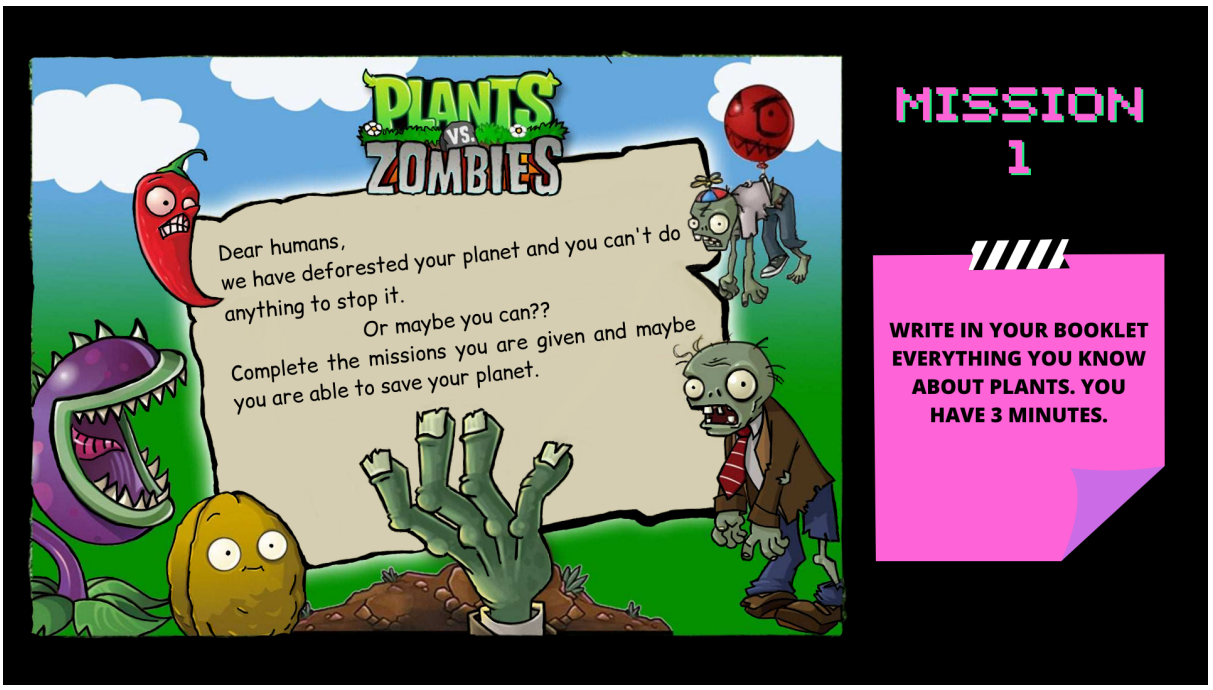
Discourse/Text targeted	Language targeted- Non-verbal L Targeted
Non-fiction and instruccional	Paranguage and illustrators

Outline of leading activities
1. The teacher will arrive to class with several long pieces of continuous paper and will put each of them in a space either on the board or the wall as support. 2. Then the teacher will divide the class into different groups. 3. After that each group will have to select one of the members as a spokesman, to participate in the raffle that is going to say what topic each group has to work on to create the display. 4. Once the raffle is done, each group has 10 minutes to do a sketch of what they are going to do then in the continuous paper. 5. After finishing the sketches, it is time for each group to start working on their definitive display. 6. The rest of the lesson will be used for the students to work on their projects that will be placed in the halls of the school for the rest of the students to see.

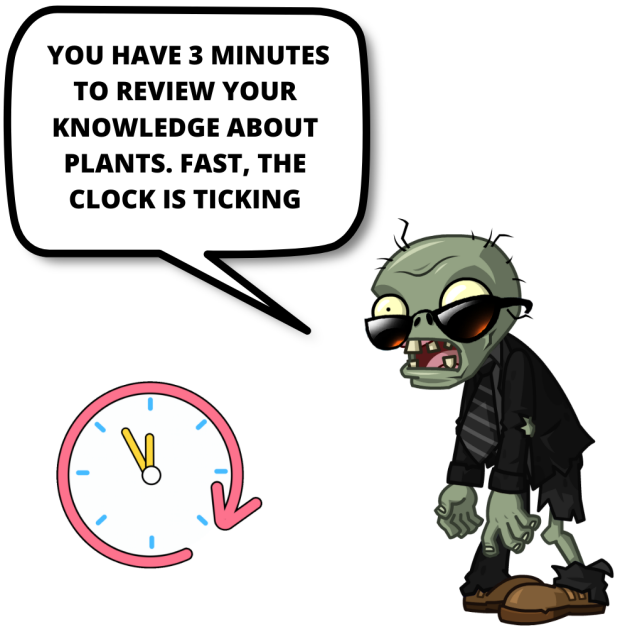
Assessment Criteria

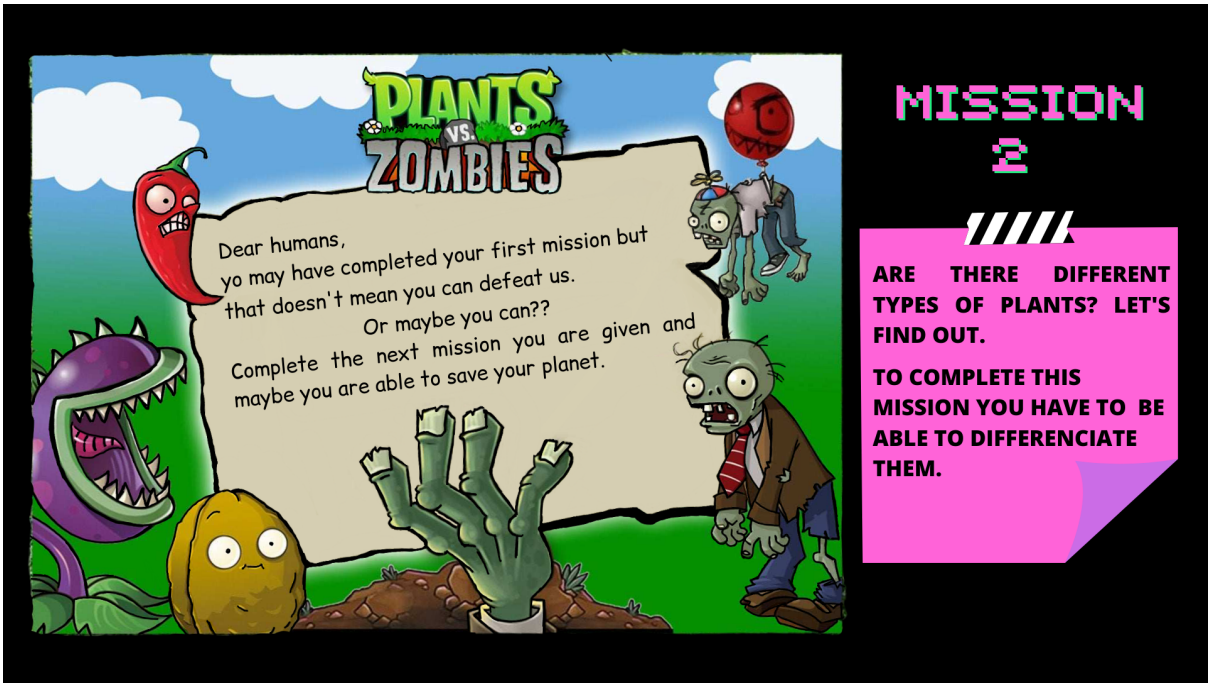
All children must be able to	**Most of the children will be able to**	**Some of the children could**
- Create a display. - Show creative thinking. - Use visual thinking	- Explain a topic about plants through visual thinking. - Create a display working in a cooperative way with the members of the group. - Showing respect to the creations of the other classmates.	- Express knowledge about a certain plant topic without needing to collaborate. - Develop the cultural and artistic competence through drawing about a certain topic.

APPENDIX 2. EXAMPLES OF SOME OF THE PRESENTATIONS FOR THE ACTIVITIES ACCORDING TO THE CONTEXT.



Brainstorming





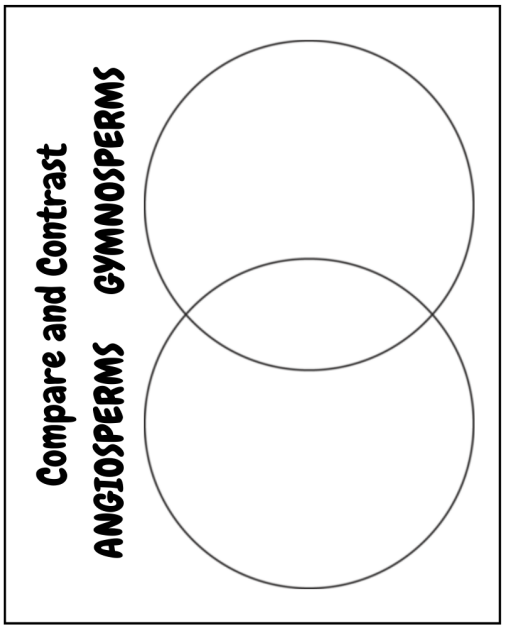
MISSION 2

ARE THERE DIFFERENT TYPES OF PLANTS? LET'S FIND OUT.

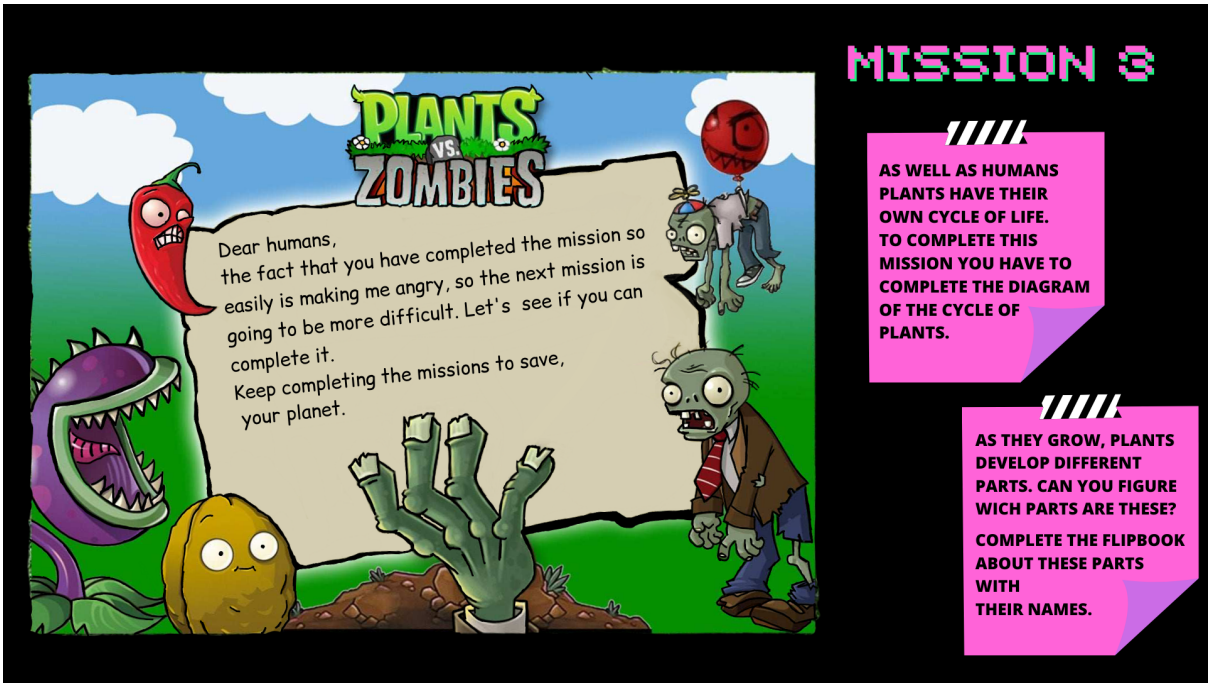
TO COMPLETE THIS MISSION YOU HAVE TO BE ABLE TO DIFFERENCIATE THEM.

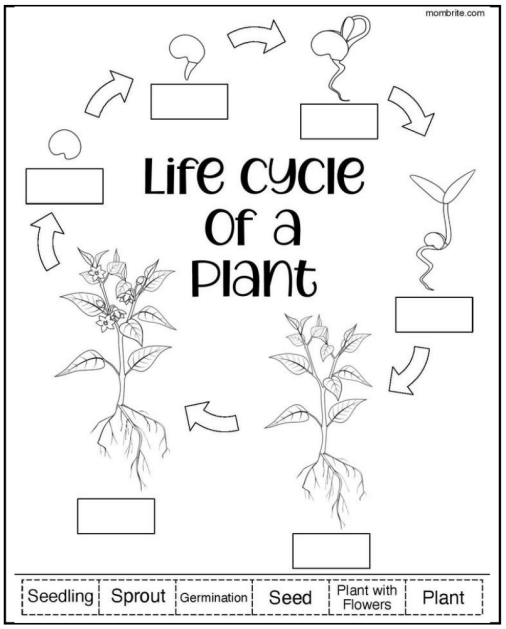
Compare and Contrast

ANGIOSPERMS **GYMNOSPERMS**



DISSCUSS IN CLASS THE DIFFERENCES AND SIMILARITIES OF THESE TYPES OF PLANTS.


PLANTS VS. ZOMBIES
Dear humans,
the fact that you have completed the mission so easily is making me angry, so the next mission is going to be more difficult. Let's see if you can complete it.
Keep completing the missions to save, your planet.
MISSION 3
AS WELL AS HUMANS PLANTS HAVE THEIR OWN CYCLE OF LIFE. TO COMPLETE THIS MISSION YOU HAVE TO COMPLETE THE DIAGRAM OF THE CYCLE OF PLANTS.
AS THEY GROW, PLANTS DEVELOP DIFFERENT PARTS. CAN YOU FIGURE WICH PARTS ARE THESE?
COMPLETE THE FLIPBOOK ABOUT THESE PARTS WITH THEIR NAMES.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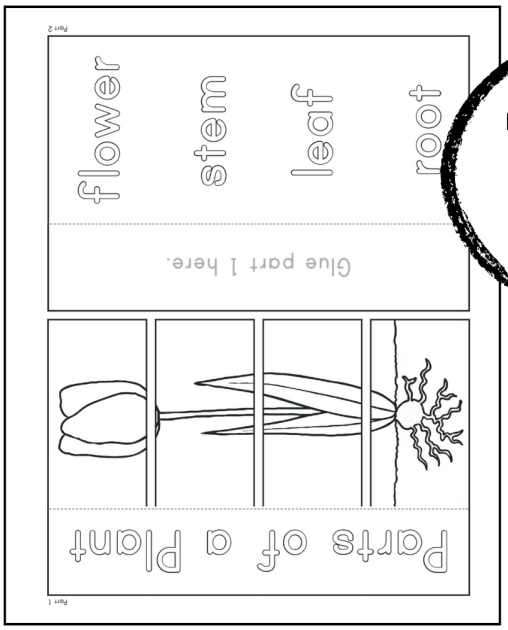
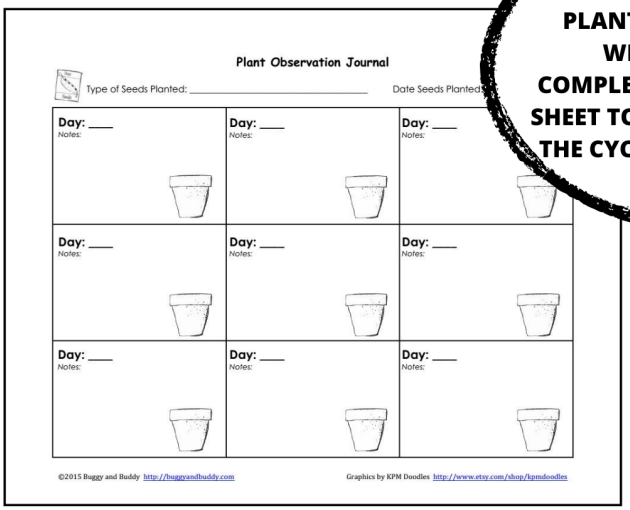
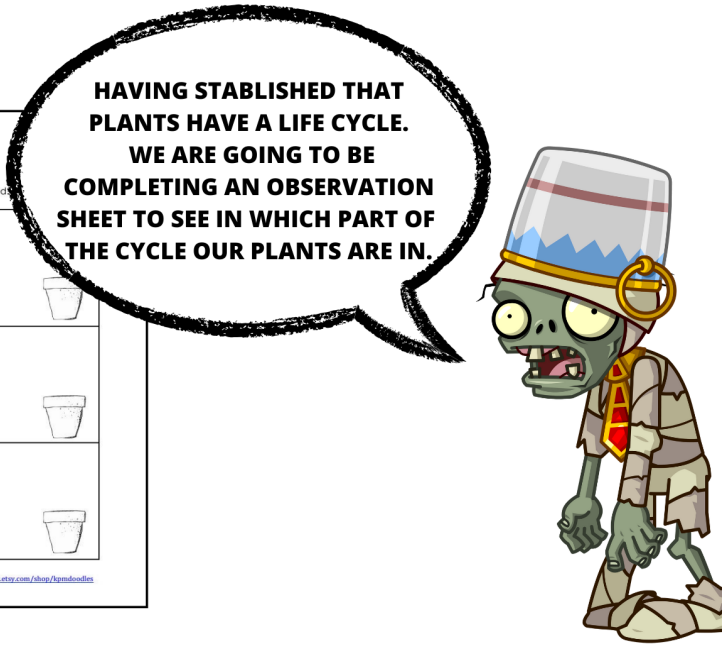
Life cycle of a Plant
Seedling
Sprout
Germination
Seed
Plant with Flowers
Plant


OH LOOK! A PLANTS LIFE CYCLE WORKSHEET. COMPLETE IT WITH WHAT WE ARE LEARNING TODAY.


flower
stem
leaf
root
Glue part 1 here.
Parts of a Plant


HAVING STABLISHED THAT PLANTS DEVELOP, WE NEED TO STABLISH WHICH PARTS ARE THOSE.
WE ARE GOING TO BE COMPLETING A LAPBOOK TO LEARN ABOUT THEM .


Plant Observation Journal
Type of Seeds Planted:
Date Seeds Planted
Day:
Notes:
©2015 Buggy and Buddy http://buggyandbuddy.com
Graphics by KPM Doodles http://www.etsy.com/shop/kpmdoodles


HAVING STABLISHED THAT PLANTS HAVE A LIFE CYCLE.
WE ARE GOING TO BE COMPLETING AN OBSERVATION SHEET TO SEE IN WHICH PART OF THE CYCLE OUR PLANTS ARE IN.

MISSION 4

AS YOU MAY HAVE HEARD BEFORE, PLANTS CAN CREATE THEIR OWN FOOD. AFTER LEARNING IN CLASS, COMPLATE THE FOLLOWING WORKSHEET.

THE OTHER DAY YOU STARTED READING ABOUT PHOTOSINTHESIS. WHAT DO YOU REMEMBER ABOUT THIS PROCESS??

MISSION 5

HUMANS HAVE VEINS AND ARTERIES TO MOVE BLOOD THROUGH THE BODY. THE PLANTS HAVE A SIMILAR SYSTEM. LEARN ABOUT IT TO REVIEW A SCIENCE EXPERIMENT

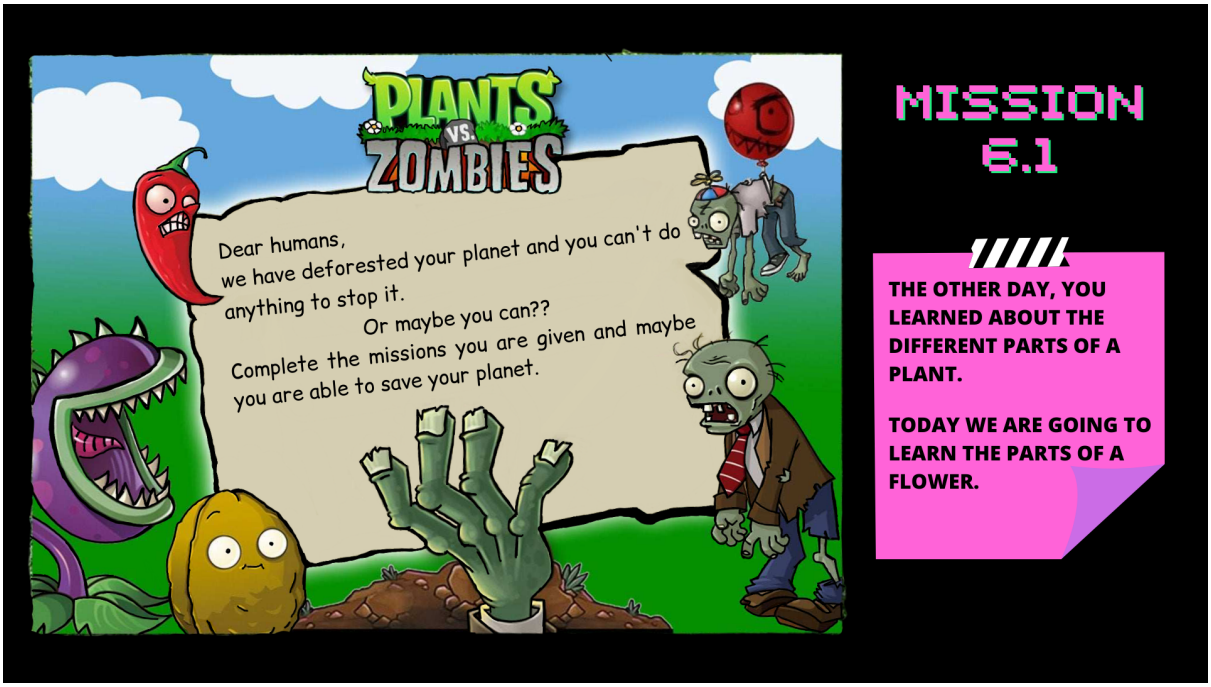
DYEING A PLANT EXPERIMENT

HYPOTHESIS

PROCEDURE

CONCLUSIONS

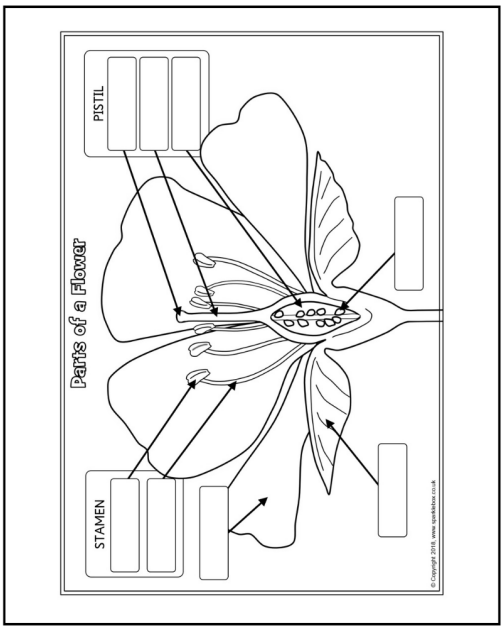
COMPLETE THE WORKSHEET ABOUT THE EXPERIMENT.

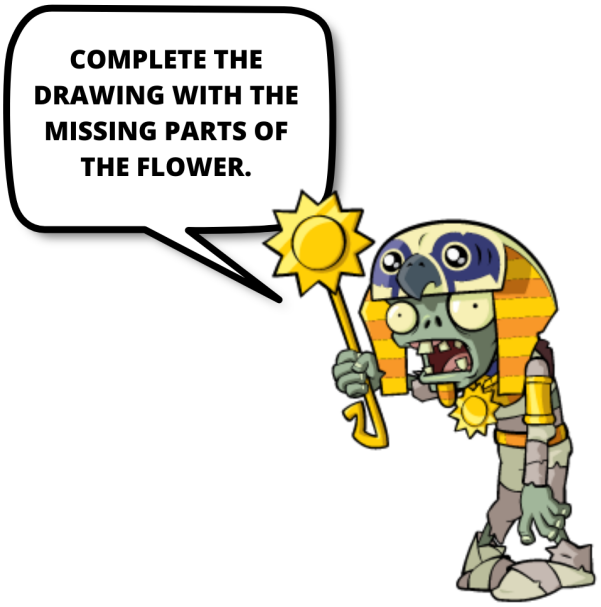


MISSION 6.1

THE OTHER DAY, YOU LEARNED ABOUT THE DIFFERENT PARTS OF A PLANT.

TODAY WE ARE GOING TO LEARN THE PARTS OF A FLOWER.

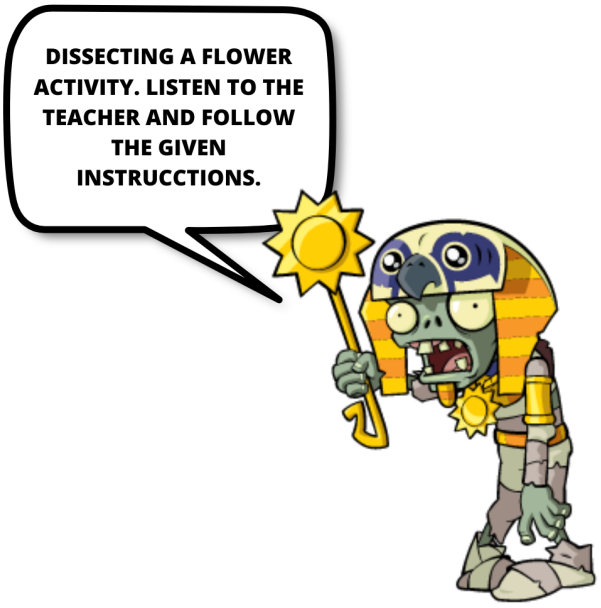




Colegio San José
ARENALES RED EDUCATIVA

NAME: _____

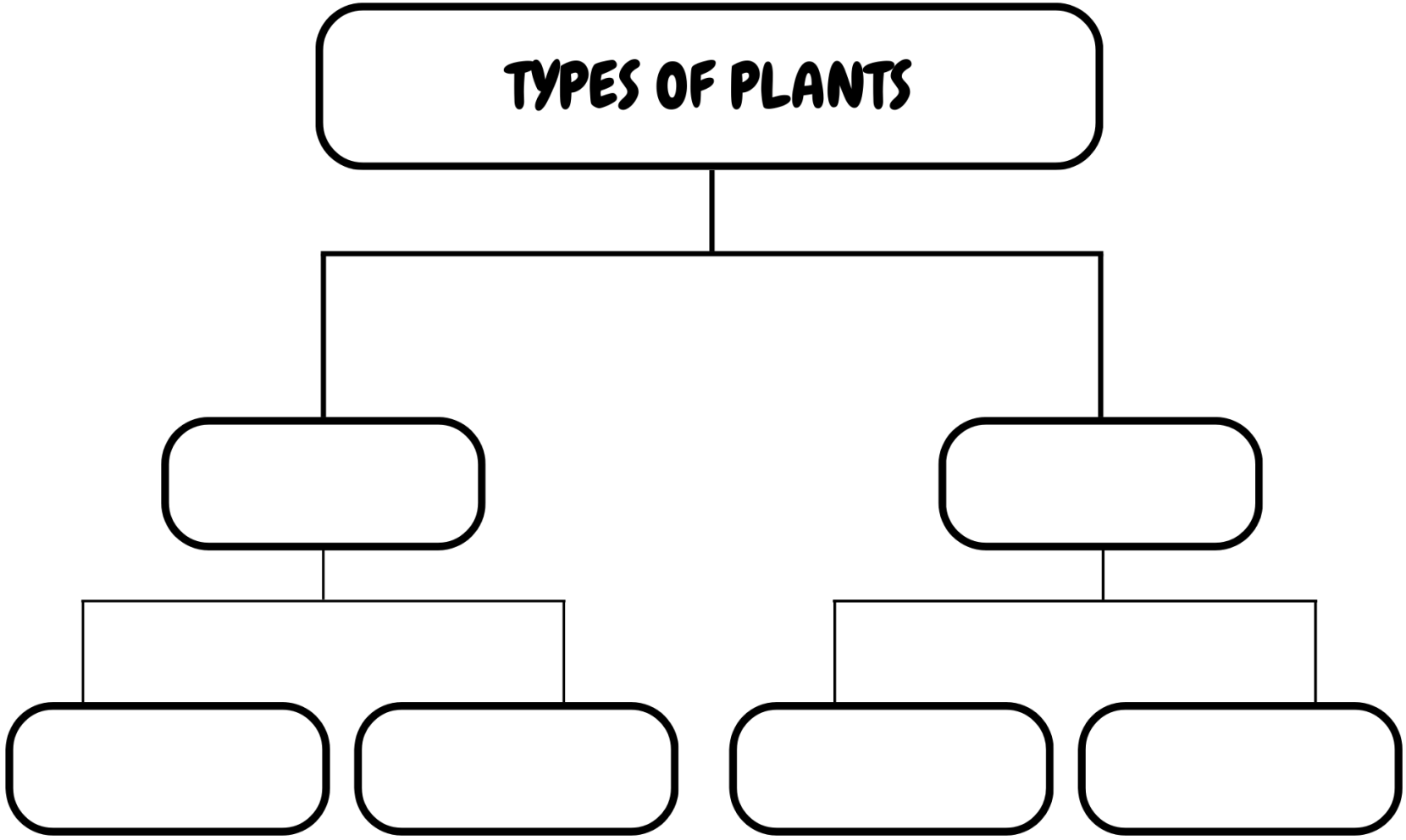
FLOWER DISSECTION



APPENDIX 3. BOOKLET ACTIVITIES.

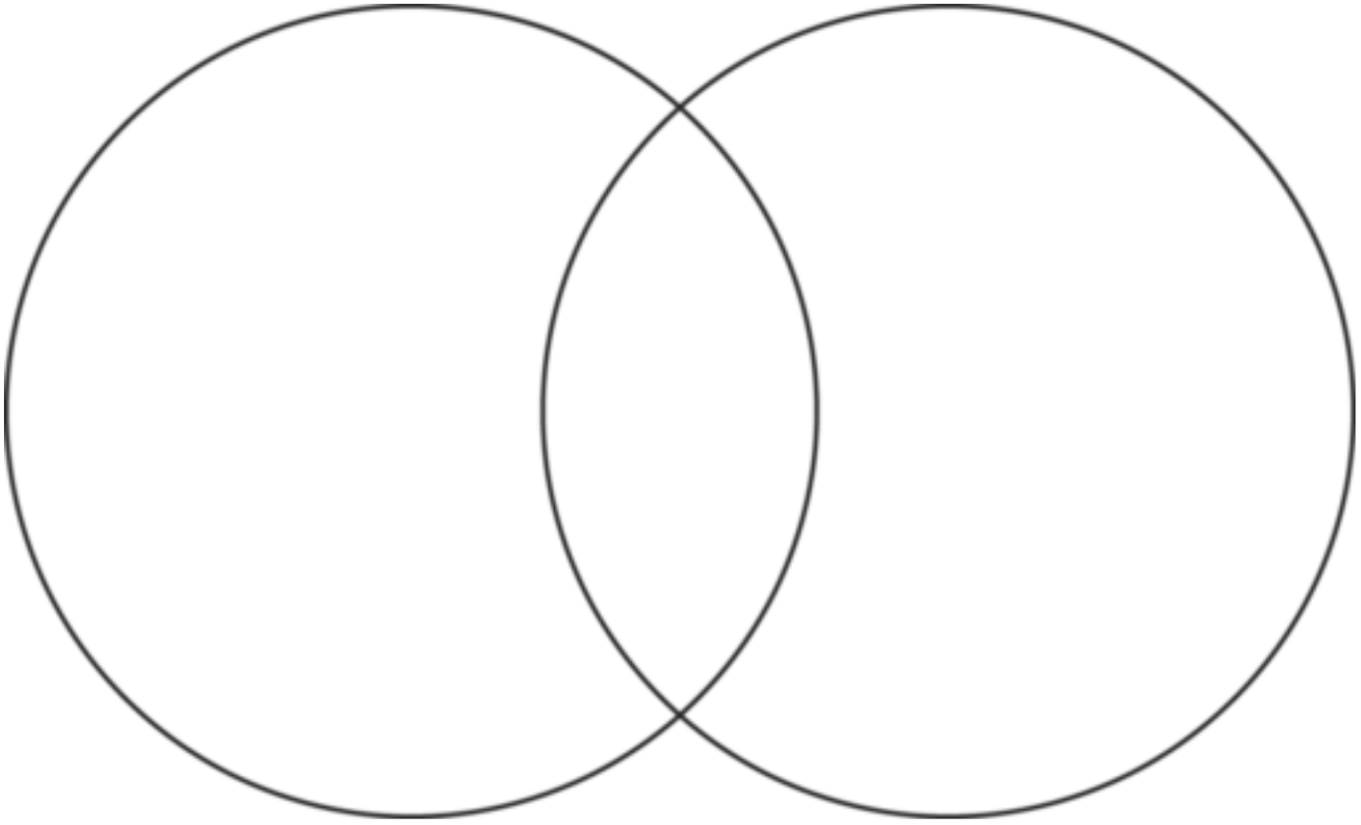
What do plants need?

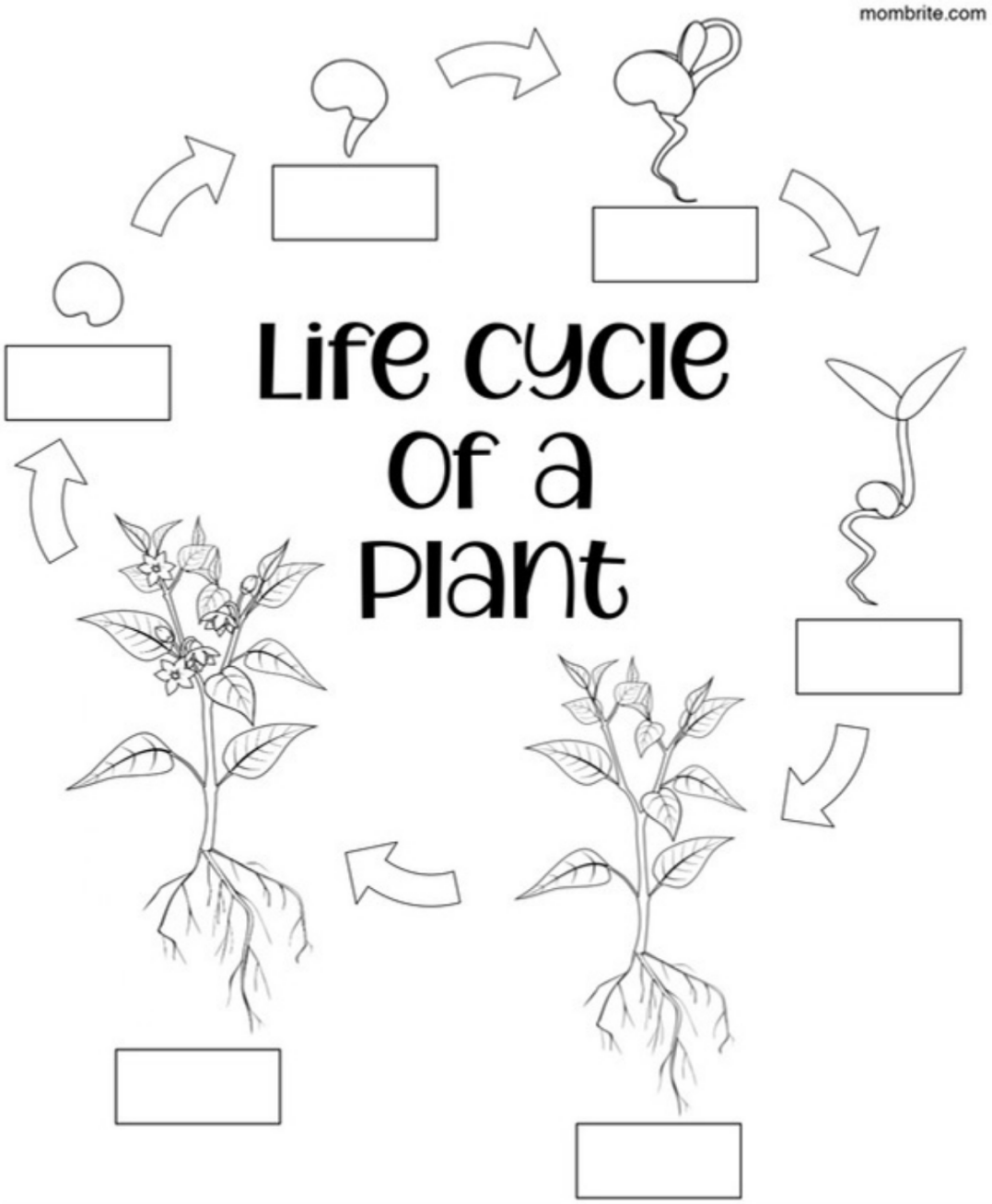
CIRCLE 4 THINGS THE PLANTS NEED TO GROW.


TYPES OF PLANTS

Compare and Contrast

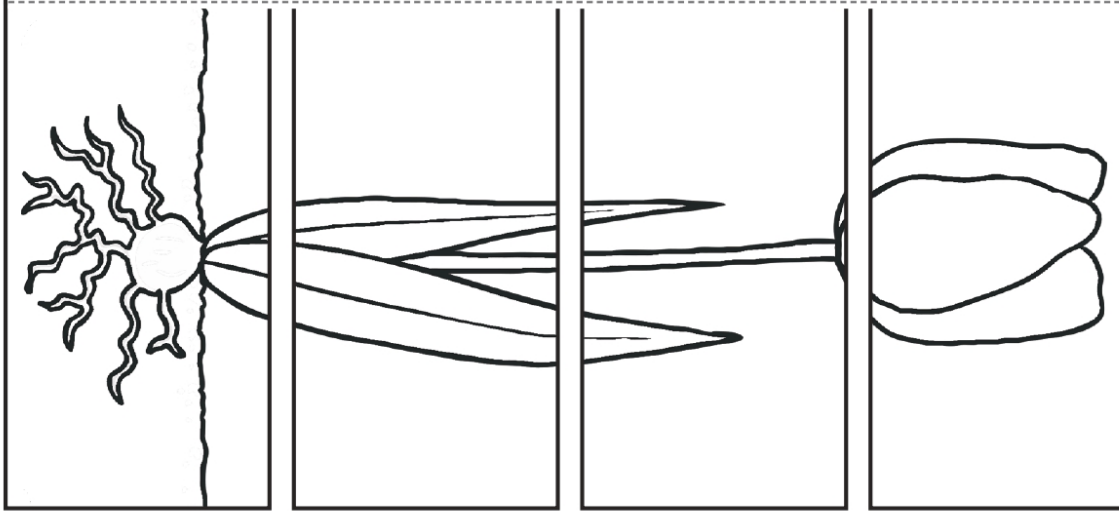
ANGIOSPERMS GYMNOSPERMS




mombrite.com
Life cycle of a plant

Part 1

Parts of a Plant



Glue part 1 here.

flower

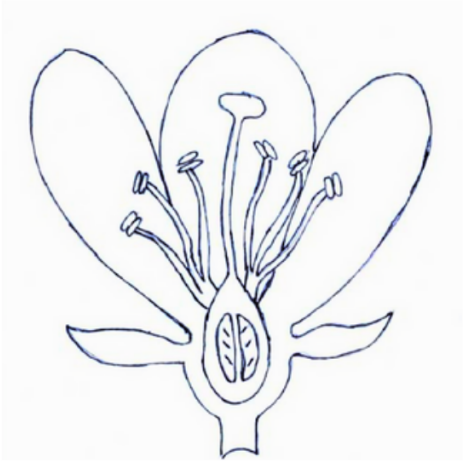
stem

leaf

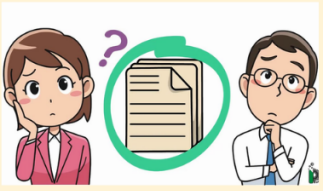
root

Part 2

FLOWER DISSECTION



CAPILLARIES EXPERIMENT



HYPOTHESIS

PROCEDURE

CONCLUSIONS

Tree Detective

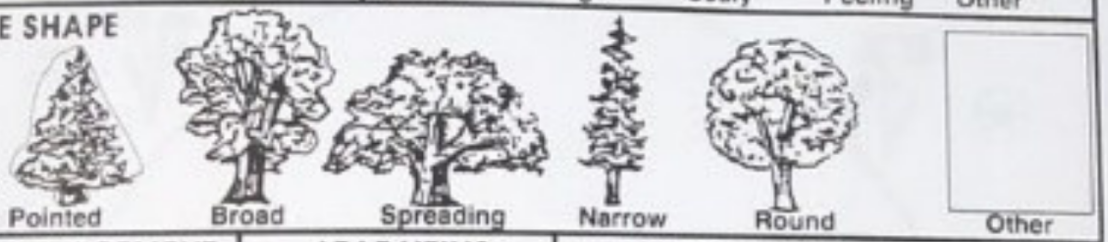
Tree Name _____

Tree Type:

- ❑ Deciduous (broadleaf, hardwood)
- ❑ Evergreen (narrow leaf, softwood)
- ❑ Tropical (broadleaf evergreen)

BARK TYPE

TREE SHAPE

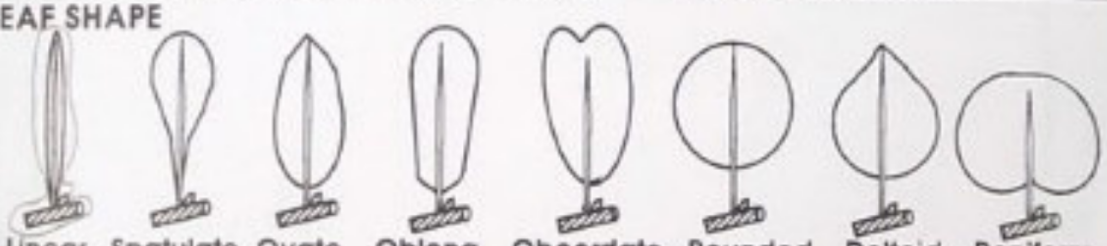


LEAF PLACEMENT

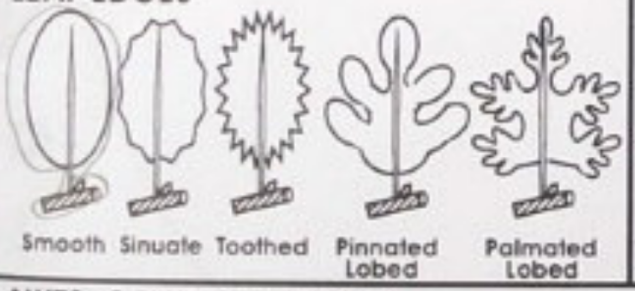
LEAF VEINS

EVERGREEN LEAVES

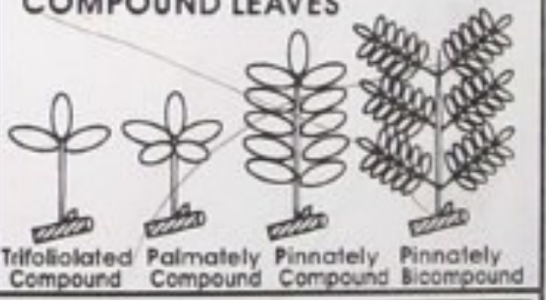
LEAF SHAPE



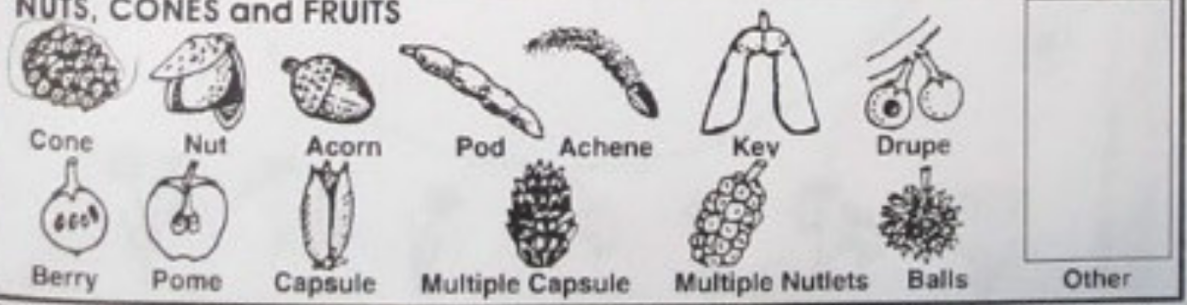
LEAF EDGES



COMPOUND LEAVES

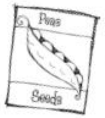


NUTS, CONES and FRUITS



Choose a tree and analyze its leaves, shape, trunk and structure. Color the closest match in each category. Draw or place pressed leaves

Plant Observation Journal



Type of Seeds Planted: ______________________ Date Seeds Planted: __________

Day: ____ *Notes:* 	**Day:** ____ *Notes:* 	**Day:** ____ *Notes:* 
Day: ____ *Notes:* 	**Day:** ____ *Notes:* 	**Day:** ____ *Notes:* 
Day: ____ *Notes:* 	**Day:** ____ *Notes:* 	**Day:** ____ *Notes:*