SeLFiE

STEAM educational approach and foreign language learning in Europe

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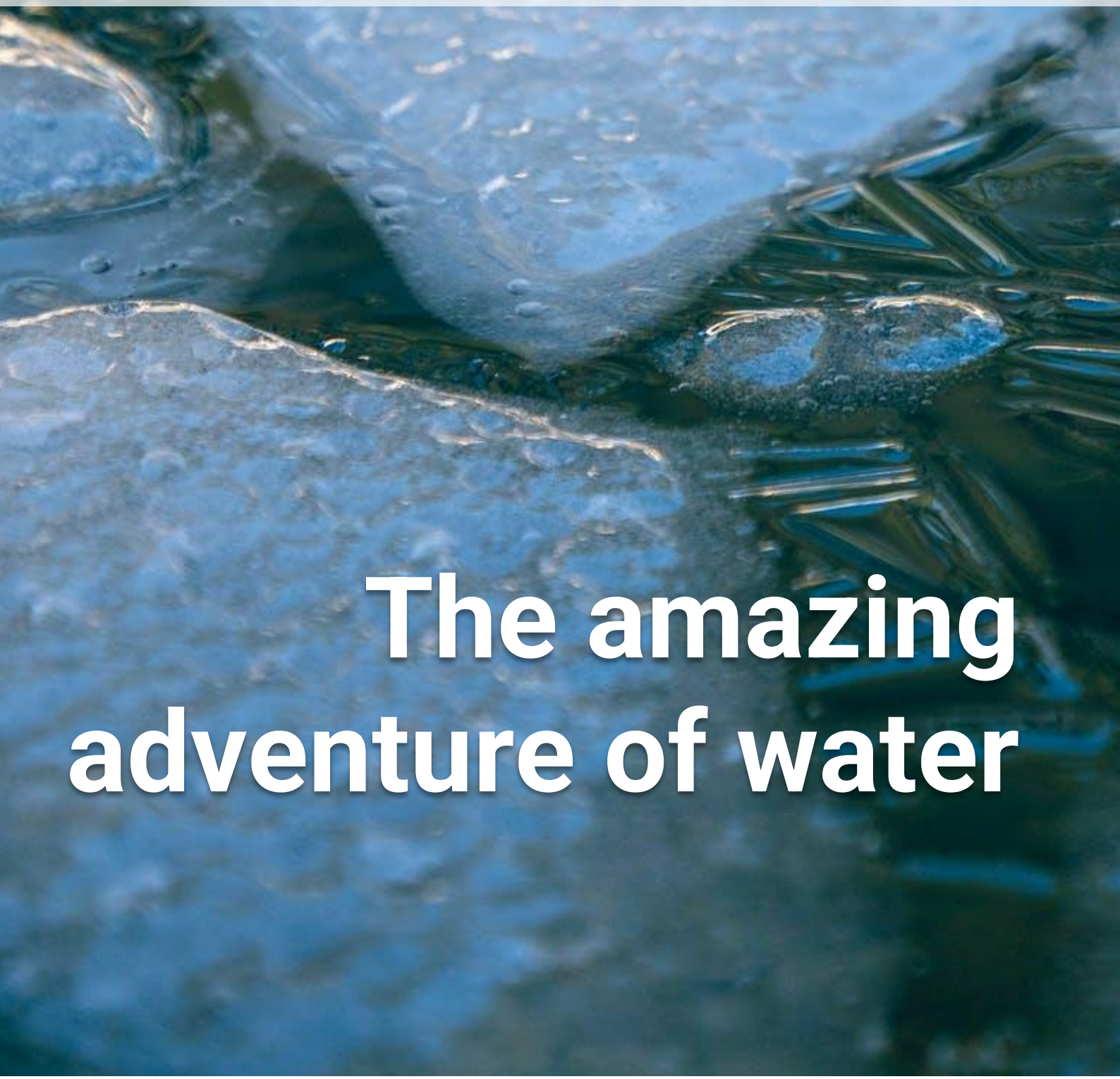

The amazing adventure of water

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The amazing adventure of water

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Consortium SELFIE - STEAM Educational Approach And Foreign Language Learning In Europe

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Theoretical aspects of the SelFie model

SeLFiE Model

The set of SeLFiE tools that are presented in this booklet take the innovative didactic approaches of STEAM (Science, Technology, Engineering, Art and Mathematics) and integrate them with approaches to learning a second language. The radically innovative potential of the SeLFiE model is found in its capacity to integrate scientific language, which tends to be simpler and easier to understand for students, with the rich daily language and practical vocabulary of the Content and Language Integrated Learning (CLIL) framework.

An integrated approach is proposed, based on the completion of projects through the use of stories that link up different curricular areas. In this way, attractive learning experiences are achieved through teaching models such as Research-Based Learning (RBL) and engineering design.

Project partners

This project was coordinated at the University of Burgos working in collaboration with two other universities: the University of Malta (UM), Malta, and the University of Granada (UGR), Spain. The International Trilingual School of Warsaw (ITSW), Poland, also participated; the Centre for Teacher Training and Educational Innovation (CFIE) of Burgos, Spain, a public teacher-training institute that forms part of the Regional Government in Spain for training infant, primary and secondary school teachers; and Kveloce R&D+I, an expert consultancy for the implementation of European projects.

The partners have worked together to develop the SeLFiE model and to compile examples of good practice among working teachers across Europe. See the following websites to find these and other information on the Project and on its YouTube channel:

project-selfie.eu/

www.youtube.com/channel/UCjF4_Jhz0gcbIV2cJpHkmiw/featured

Characteristics and focus of the SeLFiE model

With regard to the characteristics of the project, its main objective is to improve the competences of bilingual infant and primary education teachers for the application of STEAM teaching methods to further the learning of a second language; as well as to improve the general STEAM and foreign-language-related competencies of student teachers of infant and primary education across Europe. Thus, a new method emerges for teaching STEAM in a bilingual context: the SeLFiE model.

This model seeks to promote a wholistic approach for the acquisition of skills in a second language (English, Spanish, French or any other second language in the first stage of education) through STEAM topics at the same time as integrating a series of active teaching methods, mainly: the Project-Based Learning (PBL) approach; Inquiry-Based Learning (IBL); Engineering Design Process (EDP) in scientific education; and, Content and Language Integrated Learning (CLIL).

In this way, the narration of stories is used to provide a context that links up the content areas. Thanks to which, the learning is really authentic; it will better reflect the real world and will adapt the learning to different contexts, as well as stimulating emotions and motivation that are so important to achieve significant learning.

Balance between language and content in the SeLFiE model

The SeLFiE model combines the learning of STEAM materials with the learning of a second language through the use of different methods: active, inquiry-centered, student-centered and collaborative learning. The model reflects the complexity of reality, combining CLIL and integrated learning of STEAM areas.

In this context, the narration of stories, in its broadest sense, is used as a guiding thread that motivates children to commit themselves to approaching a topic, connecting one investigation with another, as the children inquire into different aspects of a story or focus themselves on a particular topic. The participation of the children in investigations that may or may not be conducted in a second language creates opportunities in which the children can communicate and collaborate while they are working, and share their conclusions with others in a language that is not their mother tongue.

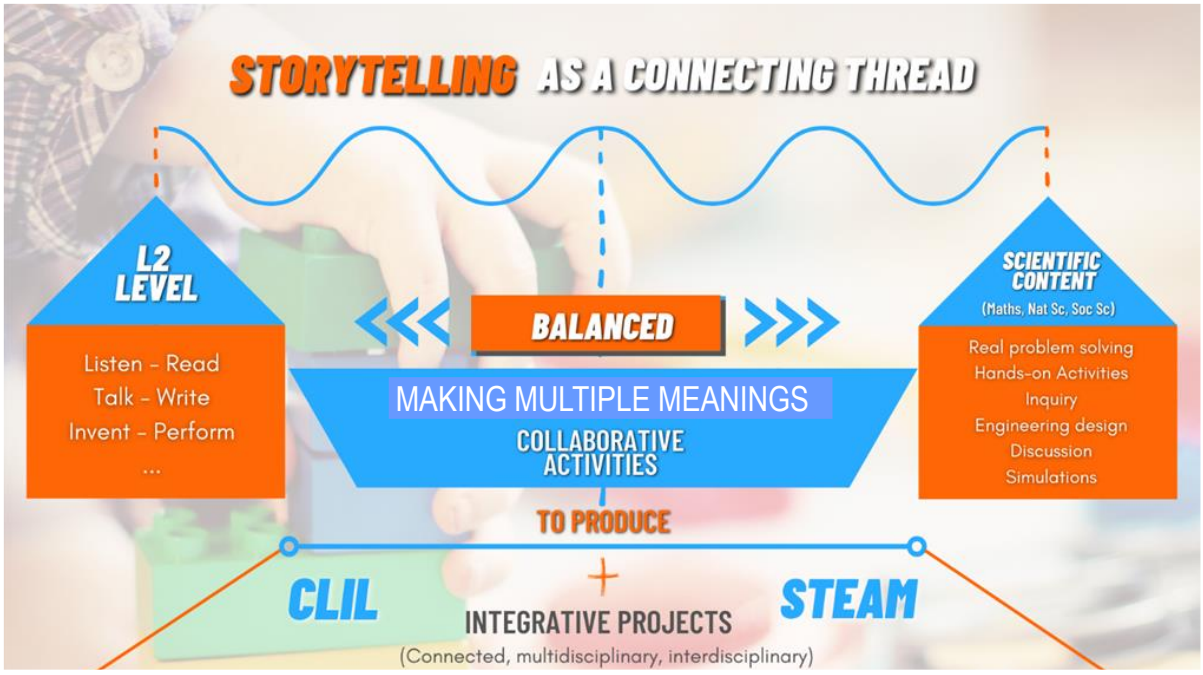

Figure 1. The SeLFiE model for learning STEAM+L2 at primary school level.

Co-teaching within the SelFiE model

In the same way that different topical areas in the SelFiE model are presented in a holistic way, teachers must also work together, in order to guarantee that the project continues to be a unified whole, which requires co-teaching. This collaboration can be with other professionals, such as specialist subject teachers, but also perhaps with the teachers of the same course, the teaching assistants and the management of the center.

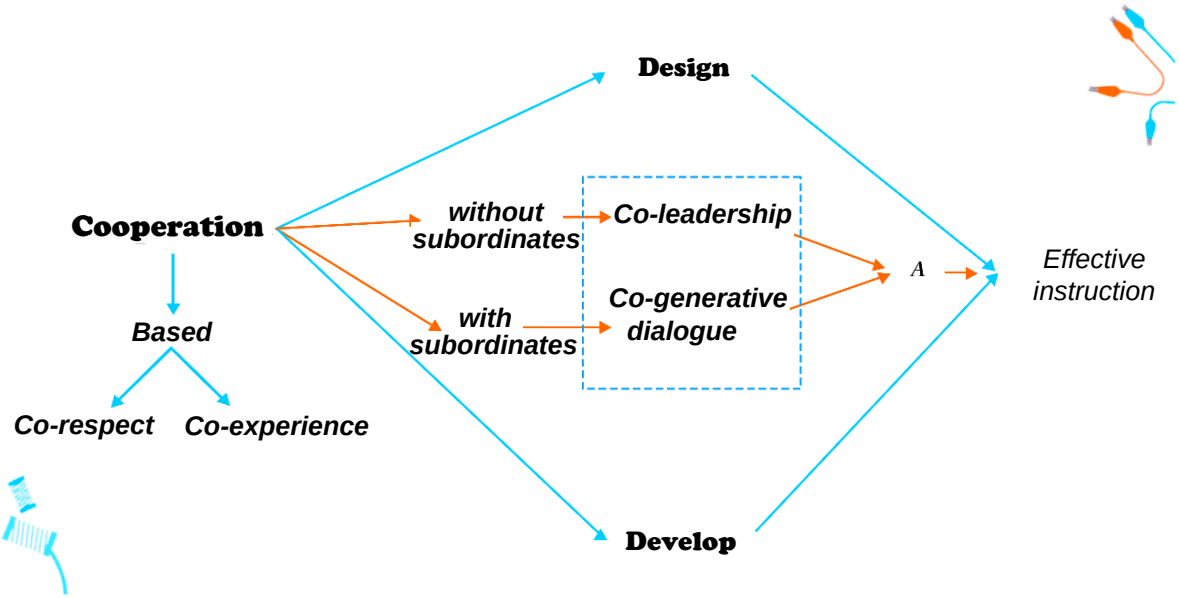

Figure 2. Relation between the different factors that determine the efficiency of co-teaching.

Co-teaching is, therefore, an integral aspect of the SeLFiE model, because it is also necessary to collaborate with other teachers, if the model is really to be integrated in teaching. It must also be applied in a holistic manner, so that the learning process is also a holistic experience. Whether you speak or share the possibility of collaboration with your colleagues, the important thing is that you work together in a democratic and respectful manner, using the strong pedagogical points of each person so that learning is meaningful, creative, and fun for the students.

The SeLFiE team invite you to read the set of proposals that we are presenting to you in this book, organized in the form of a project that has a storybook as its guide. As you will see, the examples of teaching experiences that we are offering you are varied and adaptable, which is why we hope that you will find the inspiration to test and to adapt some of them, in accordance with your needs.

The project

Introduction

In this project, the book Ice Boy (Ezra, 2017) will be used as a connecting thread to strengthen the development of communicative skills and comprehension of two very important phenomena for students: the state of matter and the cycle of water. It is important to point out that an understanding of natural phenomena implies the use of methodologies, so that students can experiment with the situation; it is not sufficient to listen to it or to imagine it. Children have to crystallize this abstract knowledge and to find the relations with their daily routines.

The students will discover how matter changes in response to different situations and how this knowledge is necessary to make, for example, an ice-lolly following scientific methods and Engineering Design. This objective requires the learning of concepts on changes in the state of matter, learning to reach agreements and to think in critical and creative ways as engineers do, to design the ice-lolly that we wish or a miniature "water cycle". Likewise, students will have to apply mathematical knowledge to count, to quantify, and to measure the devices, and to employ their technological skills to take photos and to create time-lapse videos.

Reading area

Books may be placed in this area, whether fictional or non-fictional, on the water cycle and the states of matter, as well as the keywords of the story. The students can also bring books that they have at home or that they have borrowed from a public library. The children can access the area during the time that is assigned to them, attending alone or in pairs and then sharing their opinions on the reading with their classmates.

Topic Table

Students may bring objects and toys that have some relation with the story and the content they have learnt on this project. These objects are placed on the Topic Table, a place to which the children can go to play and to go over the story or the experiments, making use of the materials.

Characteristics

Book

Ezra, D. (2017). Ice Boy. Candlewick Press.

- Título: *Ice Boy*.
- Autora: David Ezra Stein.
- Año: 2017.
- Editorial: Candlewick Press.
- ISBN 13: 9780763682033

School year

- This project is suitable from the 3rd-year of primary education and if working with older children, the concepts can be explored in some depth.

Subjects

- Natural and social sciences, English language, plastic arts and musical education.

Methodologies

- Cooperative learning.
- Content and Language Integrated Learning (CLIL).
- Inquiry-based Science Teaching (IBST).
- Engineering Design.
- Problem-based learning.

Competencies

- Communication in a foreign language.
- Mathematical competence.
- Basic competencies in science and technology.
- Learning to learn.
- Digital skills.
- Social and civic skills.
- Awareness and cultural expressions.

Objectives

- Describe the states of matter.
- Identify the water cycle.
- Understand the general history of books.
- Repeat and internalize the keywords reading.
- Formulate and answer questions.
- Participate in songs.
- Improve reading understanding.
- Develop written expression to write a short story.
- Properly complete cooperative assignments to prepare the final task.
- Use English as a language for learning.

Evaluation

✓ Tecniques
- Systematic observation.
- Metacognition.
- Analysis of student productions.
- Specific test.

✓ Tools
- Rubrics and list of assignments.
- Worksheets.
- Oral presentations and Kahoot.

Approaching the needs

- Individualization of the learning process.
- Activities when finishing rapidly.
- Scaffolding activities.
- Rewards for active participation.
- Different types of groupings.
- Activities for students with visual, auditive and kinetic orientations.

Framework

- Model and demonstration.
- Different ways of describing concepts.
- Inclusion of visual help.
- Giving the student time to speak.
- Continuous testing of student comprehension.
- Activate previous knowledge.

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Before reading

Preparation

Before reading the book, it is important that you try to create a pleasant atmosphere that stimulates curiosity, that motivates and that interests the students. In doing so, you can use decorations related with the theme of the story, with cotton-wool clouds that cover the notice boards of the classroom and raindrops suspended from the ceiling.

In this way, the students experience different sensations, make numerous deductions and propose a stream of questions that provide insight for you into their previous ideas, their willingness to learn and interest in learning.

It is likewise convenient that you have all the materials prepared that you will need during the session. Their sequential arrangement in a specific part of the classroom will give you easy access to them, favoring dynamism during the activities and reducing the time between one task and another.

NOTE: As a motivational exercise, personalized identity cards can be created for each student, showing their photo and personal data, as if it were an accreditation for a scientific laboratory.

Implementation in the classroom

Activity 1. A different music

Music is a resource through which the topic of the project may be introduced at the same time as working on emotional education.

MAIN EXPERIENCES

- Understand the musical potential of water in its different states.
- Discuss previous experience with somewhat unconventional instruments.
- Reflect upon and share the emotions that music awakens.
- Reflect on climate change and its implications.

PREPARATION

TIMING

- Play the video once with no images.
- 2-3 minutes for individual reflection on listening.
- 5 minutes for jointly sharing ideas, opinions, emotions...
- Play the video again with audio and image.
- 2-3 minutes to comment on final reflections.

MATERIALS

Everything necessary to project the video and listen to the sound track of *Ocean Memories: Greenpeace presents the world's most northerly ice music concert*.
https://www.youtube.com/watch?v=YvXiSGbfxUI

NOTE: It is recommended that the students sit on the floor in a circle, closing their eyes and speaking in a low tone of voice.

CONNECTION WITH FAMILIES

- Send regular newsletters to the families detailing student progress and learning.
- Encourage family members to reinforce the activities within the classroom at home, which can stimulate curiosity and exploration.
- Prepare a folder with activities and proposals to work on at weekends.

NOTE: At the same time as listening to the music, invite the students to repeat the rhythm with claps, clicks, beats ...

Then invite him to reflect on what he has heard.

TEACHING PLAN

DEVELOPMENT

Reproduction and reflection on the video.

Play the video with no image, only listening to the soundtrack, allowing students to listen closely, so that they ask their own questions and reproduce the rhythm with body percussion.

- What instruments are playing? What materials could be used to make them?
- What is the sound like? Have you listened to something like this before?
- Where is this concert taking place? Could it be done anywhere else?

- How do you feel? What does this music transmit? In which situations do you feel like that?

After sharing the responses and commenting on the opinions of the students, play the video again with images and sound.

- What do you think now? Had you seen these or other similar instruments before?
- Does it change your perception of the sound? Does it continue to transmit the same feelings?
- Where do you think the musicians are? How do the musicians feel?
- Would you like to participate in this concert?

Some minutes will be put aside for reflection, allowing students to express their surprise and curiosity and to discuss what they have seen and heard.

Geolocalization

Beginning with these comments, the location of the concert, at Svalbard, can be explored.

With the help of the Google Maps program, the students must situate this archipelago on the map, measuring its distance from other cities such as Helsinki, Prague and Paris.

- Is Svalbard where you thought? What do you think it is like living there? Would you like to visit Svalbard?
- Do you think the concert could be held in Poland? And in the Canary Islands? Why?

In this way, the concept of climate change may be introduced, approaching its consequences and the need to care for the planet.

Activity 2. Welcome, Ice Boy!

When presenting the reading, it is important to create an intriguing atmosphere, awakening curiosity and emotion that entices the students to learn more. You can start with an 'Escape Room' or with a treasure trail that leads the students to the book, the title of which is covered up. In this way, looking only at the drawing on the cover,

3rd-year primary-school student: "Seemed like a very fun and special activity".

NOTE: In addition to ice, water can generate other different sounds. The students may be invited to reflect on it.

Some responses:

- The pitter-patter of rain on the window.
- Snowballs falling on the ground.
- Water flowing in a river.
- Waves breaking on a cliff face.
- The pattering of rain on the window.
- Snowballs hitting the ground.
- The water of a river.
- The breaking of the waves on the cliff.

new titles can be invented and the adventures hidden within it can be imagined from the drawing on the cover.

MAIN EXPERIENCES

- Invent a title for a story.
- Make predictions, giving reasons in written work.
- Communicate and orally share your own ideas with others.

PREPARATION

TIMING

- 15-20 minutes to find the book.
- 2-3 minutes to observe and to reflect on the cover of the book.
- 5 minutes to invent a title and to justify it.
- 5-7 minutes to put in place ideas, opinions, arguments...

MATERIALS

- Book *Ice Boy (*Ezra, 2017) with the title covered.
- Worksheets to fill in with different options.
- Writing materials.

CONNECTION WITH THE UNITED NATIONS SUSTAINABILITY DEVELOPMENT GOALS

- Propose activities for inquiry and exploration that strengthen the awareness of students and their responsibility for a better planet.
- Play the videos that show the students what the actual situation of the planet is and what the relevance of the SDGs is.

TEACHING PLAN

DEVELOPMENT

The search for the lost book

In the first place, it is important to prepare a scheme of the tests to be completed and their order. A relation between them is recommendable, so that the activity is more dynamic, intuitive and

NOTE: When working cooperatively, it must be taken into account that two groups do not coincide in the same test. To do this, different starting points can be established, so that the challenges are the same, but in different order until you reach the book. Another option would be to have several books which will be assigned a color that will match that of the group that must find it, in this way each group follows the path of its colour.

self-controlled. In addition, you can use riddles to work on previous knowledge, to reinforce concepts, and to improve procedures.

With regard to the groups, cooperative work in groups of around four members will be central. It is important to recall the norms of conviviality and classroom norms to maintain an atmosphere that is conducive to learning.

Taking all the above aspects into consideration, it could be proposed that the solution to mathematical operations is the key to open a padlock that will give access to a box in which the disordered parts of a news report is found. Once having ordered it, the students can read the text that will lead them to the following step and so on successively until the book is found.

You must not forget to cover up the title on the book cover, for which purpose you can use a sheet and a piece of adhesive tape.

Discovering the book

Having found the book, invite the students to sit on the ground forming a semi-circle. Arranged in this way, students can see the book cover without difficulty.

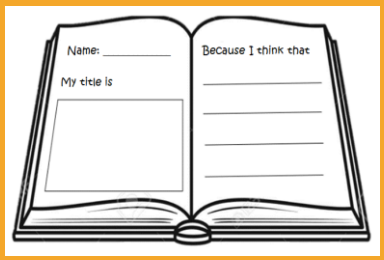
Keeping the title covered up, propose questions that favor reflection on the story that they will discover later on.

- What is this drawing? Why does it appear on the cover?
- What sort of book could it be? An adventure book? A horror story? A mystery story?...
- Where will the story take place? Do more people appear in it?

After giving oral answers to the questions, the students are handed a worksheet on which they must individually invent their own titles and justify them, each student setting out an idea of what the story will be.

Subsequently, a few minutes will be given over to sharing their proposals, expressing the different points of view and options. In addition, the written work can be placed on a classroom noticeboard as a way of decorating the classroom.

NOTE: The activity can be complemented by drawing an alternative book cover following their proposals.



Activity 3. The music of water

Having presented the book, some activities can be carried out to finish work on the title and to play with the topic of the story. In addition, rhythm and body percussion are ideal means of working both musical and kinesthetic intelligence, simultaneously.

MAIN EXPERIENCES

- Reproduce musical rhythm with body percussion.
- Reflect on the pitter-patter sound of raindrops.
- Understand the concept of musical intensity

PREPARATION

TIMING

- 5 minutes for questions on previous ideas.
- 3 minutes to explain the activity.
- 5 minutes to play with the rhythms.
- 5-7 minutes to play with body percussion rhythms.

MATERIALS

All you need is your own body.

NOTE: It is recommendable that the students sit on the ground forming a semi-circle, in such a way that they can all see the faces of their companions.

You can suggest that the students invent their own rhythmic beats.

The instructions from the orchestra director can help to work on repetition, and synchronization, as well as imagination and creativity, at the same time as strengthening the spirit of the group.

CONNECTION WITH THE RESPONSIBLE CITIZENSHIP

- Remind the students of the importance of respecting the norms of conviviality, in the school environment and family and social life.
- Use debates and role plays to present reality-based situations that raise student awareness, in relation to their responsibility for improving their physical and social environment. Ask them to propose actions to solve or to improve those situations.
- Set out visits and programs of shared events with local associations, so that the students collaborate in the search for solutions within their real environment.

TEACHING PLAN

DEVELOPMENT

Body percussion rhythms

As an introduction to the activity, questions can be asked on the sound of rainfall.

- What is the sound when it rains? Does rainfall always sound the same when it rains? What differences are there? What do they depend upon?
- What sounds do hailstones make when they fall? And when it snows?

On the basis of the responses from the students, invite them to imitate the sounds that they have described using their own body. At the same time, they must repeat the title of the book, varying the intensity of their voice in accordance with the intensity of the rainfall.

You can start with increasing and decreasing variations and having understood the dynamic, perform it at random.

EXAMPLE: Drizzle is tapping the palm with a finger, whispering the title; a downpour could be clapping while shouting out the title of the book.

Activity 4. How is Ice Boy?

Continuing with the parts on the book cover, we will center attention on the picture of Ice Boy. It is important that the students are familiar with the protagonist, can imagine what the drop of water is like and what it feels. This closeness favors empathy and enthusiasm to know more, to advance through the book and to discover what happens to Ice Boy, the drop of water, through its journey.

NOTE: That activity can be done either before or after the reading, it being possible to include it at both times. Before reading, make predictions on what the character is like, which after the reading can be evaluated and modified, whenever not in accordance with the storyline.

MAIN EXPERIENCES

- Provide descriptions of people: personal appearance, profiles, and portraits of the protagonist of the book.
- Improve the lexical orthography related with physical features, personality traits, emotions, and feelings.
- Predict and describe the characteristics of the person.

PREPARATION

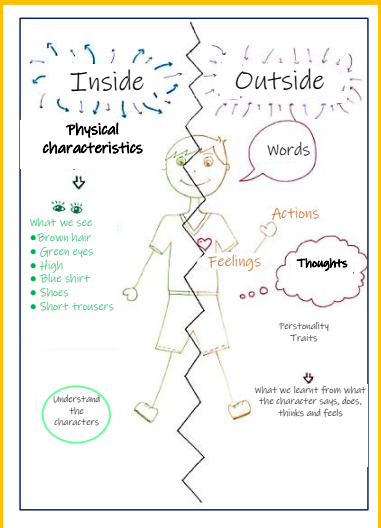
TIMING

- 3-5 minutes to differentiate between physical features and personality traits.
- 10 minutes to describe Ice Boy.
- 5 minutes to reflect upon and to go over the results.

MATERIALS

- Poster of Ice Boy (A3 size).
- Post-its.
- Pencils, markers,....

NOTE: Preparing a scheme of the principal differences will help to consolidate the concepts, at the same time as providing visual support during the activity.



CONNECTION WITH INCLUSION

- Actively promote respect for student diversity.
- Identify possible (physical, social, cultural) barriers and take them into account when organizing the class.
- Offer the same opportunities to everyone, but move away from uniformity; the methodologies that we propose in this project will help you with this goal.
- Organize the students into heterogeneous groups in which they can develop their own capabilities and experience the possibility of helping their companions to develop both academically and personally.

TEACHING PLAN

DEVELOPMENT

Getting to know Ice Boy

Before completing the descriptions, it is important for students to understand the need to include not only physical features, but also features related with personality, the emotions, and the feelings of the person.

In relation with those aspects, you can explain that descriptions of people are different in accordance with the content that is included.

- Personal appearance: physical features.
- Moral profile: character and feelings.
- Portraiture: physical features, character and feelings.

The next step is to invite the students to apply what they have learnt and to draw a portrait of Ice Boy. To do so, pin an A3 size poster of Ice Boy to a noticeboard or the blackboard so that all the details can easily be well appreciated and hand out various post-its to each student. You can in this way use two colors to differentiate the internal and the external features, which will help you to check understanding of both concepts.

Each student must write a word on the post-it that describes Ice Boy in the mind of that student, being able to accompany it with a drawing. Once you have it ready, stick it around the poster.

You can ask questions to help them think such as:

- What shape is it? Is it round? Is it square?
- Is it soft or hard? Is it fragile or durable?

It is important to try not to repeat words and to involve all students in the exercise, using words within a lexical range that they already know or can enlarge with the help of a dictionary.

When the students have stuck at least one post-it, it is a good idea to read over all the words, once again to emphasize the differences between the physical features and the character descriptions.

On the other hand, the activity can be focused on working each sort of personal description in an isolated way. In this case, the task could be to include or only to read the words of each category.

5th-year primary-school student: "I liked it a lot, it's a different way of describing things".

3rd-year primary-student: "Using post-its was real fun."

Activity 5. How we learn!

Metacognitive processes are fundamental so that the students become aware of their own cognitive processes and their regulation.

To do so, you can use thinking routines or metacognitive staircases with which to promote self-reflection among the students on their experiences and previous ideas, so that they inquire into their concerns and interests and in consequence set goals to be achieved.

NOTE: It is recommended that this activity be carried out at times before and after learning, to gain a globalized vision of the process.

It is important to drive critical thought and analysis of the tasks, the achievements and the improvements that have been achieved, as well as the difficulties and the problems, seeing them as future learning opportunities.

In this way, the students will visualize the progress of their learning more clearly, will interrelate concepts and skills, and will strengthen their ontogenetic development.

MAIN EXPERIENCES

- Reflect on what you have already learnt or know about the topic.
- Set out what you want to learn, including conceptual, attitudinal and procedural knowledge.
- Reflect on what and how you have learnt.

PREPARATION

TIMING

- 3 minutes for explaining the parts that integrate the thinking routines or metacognitive staircase.
- 5-7 minutes to complete one of the sections.
- 5 minutes to share the responses together.

MATERIALS

- Photocopy of worksheet with the structure that students have to complete.
- Pencils, paints, markers, etc.

CONNECTION WITH GENDER QUESTIONS

- Remember to incentivize student participation and motivation. Use positive language and reinforcement.
- Encourage students to participate during the classes and to assume responsibilities within the dynamics of the classroom.
- Create heterogeneous groupings organizing rotating roles in which the students and their companions have specific responsibilities.
- Include figures with female references in the explanations. Highlight their relevance and their involvement in their work.

DEVELOPMENT

Knowing my learning with the KWL routine

Start explaining the importance of knowing what, how and why we learn to the students. Let them talk about it and explain their point of view. Knowing their positions will help you to adapt the routine to their needs.

Subsequently, relating their ideas with the task, suggest that they complete a thinking routine or a metacognitive staircase. The Know Want Learn (KWL) routine is proposed here: what I know (K), what I want (W) and what I have learnt (L). KWL (Know, Want, Learn).

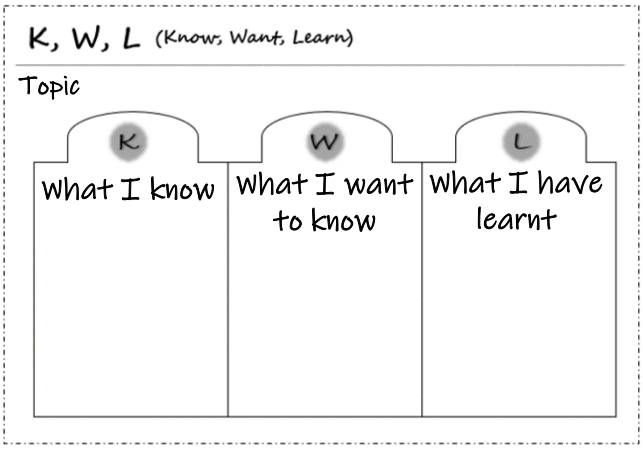
Encourage the students to express their earlier ideas on the photocopied worksheet, while explaining that in this way after some time has elapsed, they will be able to recall the starting point, which will help them appreciate their progress.

Remember to point out that in addition to concepts, they can also write procedures and attitudes.

After a few minutes, invite the students to share their worksheets. It is important for them to know that there are no wrong answers, that each student will have different proposals, all of which will be equally valid.

Throughout the project, they continue to complete the different parts, for which purpose it is recommendable that the new contributions will be completed without seeing what had already been written, so that the students are not influenced by their previous ideas and interests. The subsequent analysis will show them everything that they have learnt, it being important to highlight their progress, their improvements and the capabilities they have developed.

NOTE: The activity could be done in small groups, nevertheless, it is recommendable that the students complete it individually, because the progress for each individual will be different, which will let you highlight each person's good points, and progress, improving self-esteem and self-concept.



NOTE: The reading of the book does not have to be done in a single session, but can be divided up to cover various classes. In this way, the related activities can continue to be interspersed with each part of the story (see the After Reading section), which will help the students to understand the links and the contextualization of the different parts better.

In addition, before returning to the reading, a few minutes must be dedicated to asking questions, performing dramatizations or jointly preparing summaries. What was previously read can be reviewed with them, going over the key words and the most relevant events and making deductions about what is going to happen.

During the reading

Preparation

During the reading of the book, it is important to create a calm and relaxed atmosphere that lends itself to paying attention, listening and enjoying the story. In addition, it has to be remembered that all the students must be able to see the book, for which reason sitting on the floor in a semi-circle is the ideal arrangement.

With regard to the materials, you must have all those resources that you are going to use within reach, to avoid losing time and above all so as not to distract your students. It is likewise recommendable to have read the book beforehand, so that you are familiar with its content and its learning possibilities.

With this information and taking into account the characteristics of your students, a plan that will guide you during the reading can be drawn up. In this way, you will know which questions to ask, where to place the emphasis and at which times it is necessary to pause and to clarify some concept or event.

Implementation in the classroom

2nd-year primary-school student: "The story seemed very funny to me and was a very entertaining way of learning new content".

5th-year primary-school student: "It seemed very funny and amusing. It was a topic that I really liked a lot".

"The topic of Ice Boy seemed like good fun to me, and a way of learning with games and different activities that we were doing with the topic. My opinion is... I liked it".

Activity 6. Storytelling

During the reading, remember that it is important that students show their interest, are attentive and participate in the dynamic. Some routines, dynamics and strategies are presented that will help you to achieve it.

PREPARATION

TIMING

- 2-3 minutes to introduce the book, analyzing the cover, describing the lead character ...
- 20 minutes for reading.
- 5 minutes for the final reflection.

MATERIALS

The book to be read "*Ice Boy*" and the materials that you need for the dynamic exercises to capture student attention.

CONNECTION WITH THE RESPONSIBLE CITIZENSHIP

- Remind the students of the importance of respecting the norms of conviviality, in the school environment and family and social life.
- Use debates and role plays to present reality-based situations that raise student awareness, in relation to their responsibility for improving their physical and social environment. Ask them to propose actions to solve or to improve those situations.
- Set out visits and programs of shared events with local associations, so that the students collaborate in the search for solutions within their real environment.

TEACHING PLAN

DEVELOPMENT

You can return once again to the cover of the book, in order to present the book, reviewing the title and the author on the cover. You can also ask the students for a brief description of Ice Boy, recalling physical and psychological aspects.

Once you start reading, you must bear in mind various points. In the first place, try to show the book at all times, so that the students observe the illustrations, which will help to understand the oral text.

With regard to oral expression, you have to lend attention to pronunciation and modulation of the voice. It is important to stress and to emphasize those words and expressions that are the most important for the story and for subsequent activities. You can, once again, resort to gestures and facial expressions.

On the other hand, it is important to ask questions throughout the reading. You can bring students to reflect on what is going to happen afterwards. They will, in this way, make hypotheses and

NOTE: You can partially change the text of the book, using simpler structures and include concepts and key words related with the topic, which appear at other points in the original story.

predictions, practicing syntactic structures and grammar in the corresponding foreign language.

Likewise, with the objective of dynamizing the reading and making it more participative, invite the students to make gestures, complete phrases or expressions that regularly crop up throughout the reading and that they might know ...

In addition, you can include dynamics to consolidate key vocabulary and to encourage active listening among the students. For example, using cards in which words and images relate a concept. One can be handed out to each student, who every time the same word is heard, has to stand up. In this activity, it is recommendable to set a word so that all the students stand up when it is said, achieving a feeling of unity and group cohesion.

Finally, having finished the reading it is important to stimulate reflection, take time to go over the most important moments and to emphasize those situations that will be basis of the following activities. Do not forget to propose questions on whether they liked or did not like the reading, which has been your favorite part or whether they would recommend the book to their friends.

NOTE: You can glue the cards to wooden lollipop sticks to facilitate their use. Try to make the drawings visual and simple. Repeat the words a lot to ensure they are reinforced.

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After reading

Preparation

The reading of the book will include various activities with which to work numerous concepts, contents and procedures from different disciplines.

Establishing relations between the story in the book and what was worked in each activity or exercise is important. Doing so will make it much easier for the students to connect and to interrelate what is learnt, at the same time as giving them an important role when reading.

In the same way as with the episodes previously pointed out, you must create a relaxed, participative environment that motivates and interests the students. In addition, as you already know, it is recommendable that you have all the materials and the resources within reach that you will need for each situation. Likewise, drawing up a plan will help you to reach all your objectives and to use the available time to the utmost.

NOTE: Leaving the book in the reading corner, the students can go over to it whenever they may need to read it.

Implementation in the classroom

Activity 7. Journey to the interior of the story

All stories have some parts that characterize them. Inquiring into the characters, the scenography and the succession of events can be a way of reviewing what has been read, confirming whether the story has been understood and at the same time, establishing a generic foundation that will help the students to create their own stories with coherence and correction. It is important that the whole process is guided with questions that favor reflection with reasoned proposals.

PREPARATION

TIMING

- 8-10 minutes to introduce the components of the story and to talk about them.
- 15 minutes to complete a mental map.
- 5 minutes to reflect on the activity.

MATERIALS

- Photocopies with schemes of the mental map to be completed.
- Pencils, pens, paints, etc.
- And if possible: digital device with an internet connection.

CONNECTION WITH DIGITAL WORLD

- Create a blog with restricted access in which there are curiosities on the topics that are worked, proposals for additional activities and reinforcement exercises.
- Use digital platforms such as Padlet to strengthen the debate and the divulgation of ideas and opinions among the students.
- Strengthen the search for information in digital sources. It is fundamental to emphasize the importance of comparing data.
- Work on the positive aspects (sustainability, agility, etc.), but also on the negative aspects of the networks (cyber bullying, digital dependency, identity phishing, etc.) and propose, together with families, simple actions to minimize them.

3rd-year primary-school student: "I liked the topic a lot, although it lasted quite a long time and it was, at first, more difficult than other projects. It was very funny and the activities were very good for learning what the stories were like".

TEACHING PLAN

DEVELOPMENT

The structure of a story

The Pencils-in-the-center technique can be used to approach the structure of the story, in this way, split into groups of 4 to 5 students, the students talk for a few minutes about what they consider are the shared aspects of all the stories. Once that time has elapsed, each individual member will write a proposal.

NOTE: You can use visual aids to help the students to recall all the elements and their characteristics.

Subsequently, they all share their material in the group and they reach a consensus.

The mental map

After getting to know the principal elements, you can suggest that the students complete a mental map, in other words, a scheme in which all the characteristics will be included, relating them with the book that has been read.

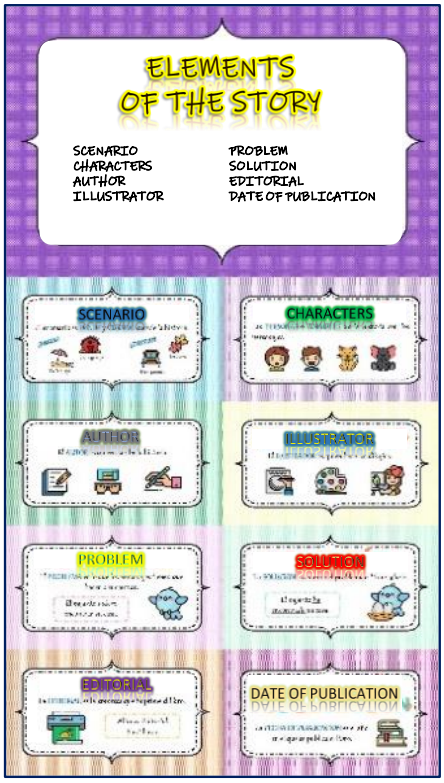
You can ask questions to help them in the process such as:

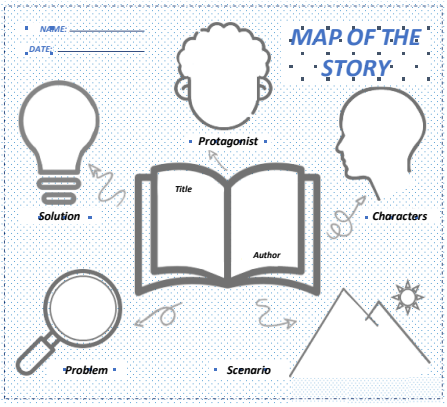
- What is the beginning of the story? What is the outcome? And the end?
- Who is the leading character? And the secondary characters? What do like about them? Who is your favorite character? Why?
- Where does the story take place?
- Is there any problem in the story? If so, how is it resolved?
- What do you think of the end? Do you like it? Would you change anything? What?
- Is there a relation between the beginning and the end?

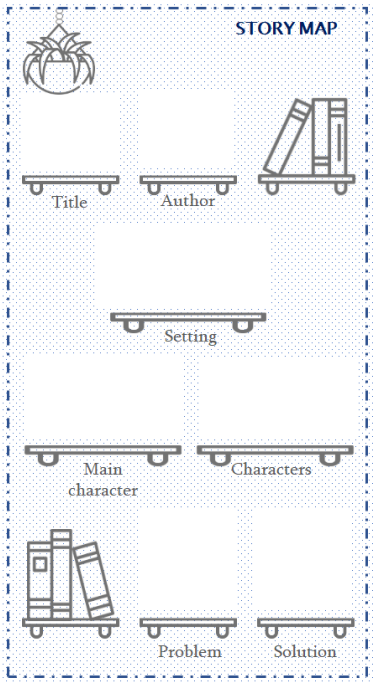
Each student can complete a mental map or, if preferred, can draw it in small groups. A guided proposal of a mental map is shown here in which the students only have to complete specific information from the book, nevertheless, you can invite them to draw the template as well, thereby strengthening creativity and independence.

On the other hand, if you have digital devices, you can use the Mindomo application, thereby working on digital skills.

Talking about and discussing the maps are recommendable to draw the activity to a close, incentivizing reasoning and presentation. It is important that the students are shown the importance of summarizing and organizing the information in a visual and piece-by-piece approach. This process will help to summarize the topic under study and in general to understand the texts better.







Activity 8. Observing changes in the state of matter

NOTE: The experiments are an approach to the different changes in state: melting, solidification, evaporation and condensation. Their organization coincides with the explanations on this activity.

In this activity, the students are introduced to the scientific world through the story. It is important to follow the steps that the scientists use, at least approximately, and to repeat the same structure in all the experiments. In this way, the students will know beforehand how they should organize themselves and will become familiar with operational scientific procedures.

Remember that manipulative skills are essential and offer your students the possibility of experimenting, making mistakes, and learning for themselves. Ask questions and make them reflect on each phase of the process.

PREPARATION

TIMING

- 5-7 minutes to introduce the scientific method and its phases.
- 5-7 minutes to propose, observe and to analyze what happened in the book, going so far as to propose the research hypothesis.
- The experimental time will vary for each change of state.
- 20 minutes to set out the process to follow and to discuss the events.

MATERIALS

To carry out the experiment on melting:

- Four ice cubes of different colors (for example: two blue and two red).
- Two containers.
- Paper, pencils and paints.
- A camera.

CONNECTION WITH EVALUATION

- Remember to use evaluative methods and instruments that are in accordance with the proposal for the development of competences and the active and collaborative methodologies that have been proposed. These

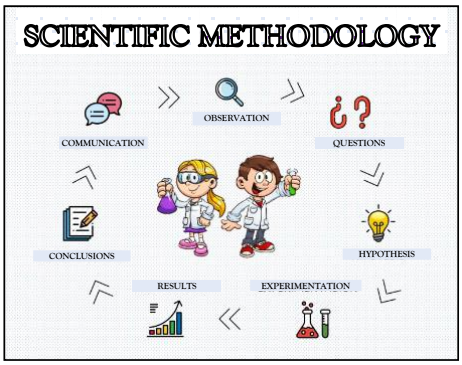
frameworks will strengthen self-evaluation and involve the students in the evaluation process.

- It is important to carry out an initial evaluation, another one during the activities and a final one to perceive the progress of the students.

TEACHING PLAN

DEVELOPMENT

Inquiry into sciences



You can explain to the students when introducing the experimentation that they are in fact going to perform experiments, but to do so they have to follow the steps that scientists follow. You can raise questions that lead them to think about this process and to deduce in a collaborative manner the different phases of the scientific method.

- Think of a laboratory. What is the first thing a scientist does? And then?
- Once the scientist has the experimental results, what happens?

Having mentioned all the phases, repeat them in the corresponding order. You can play rapid repetitive games to consolidate those concepts. Songs and visual schemes can likewise be used.

Experimenting

As mentioned, it is important to begin with the reading book, so go back to the time when springtime arrives, asking students questions that will help to reflect upon what happened and what they see in the illustration.

- What is happening to Ice Boy? Why do you think this is happening?
- What will happen afterwards?

The responses to these questions will help the students to define a research question. What will happen if we leave an ice cube in a sunny spot?

3rd-year primary-school student: "The topic was very interesting. The form of working was very amusing and educational. I understood the states of water perfectly".

2nd year primary school student: "I enjoyed experimenting, the sciences are easier like that and more fun".

NOTE: The conditional tense should be used to write the report, so the fixed structure can remain in place and the other words can be completed with pictograms that indicate the different concepts, such as states of the matter, rising and falling temperatures...

Then, returning to the phases of inquiry, the students will know that hypotheses have to be formulated: if the temperature is increased, then the ice melts and is converted into liquid water. In this way, the states of matter are also reviewed.

Having established the research question and the hypothesis, it is time to start to experiment. To do so, divide the class into groups of four or five members who will work cooperatively and give to each group all the materials that they will need.

The procedure for the experiment is as follows:

NOTE: During the experimentation, it is important to ask questions and to give simple, concrete and sequential instructions. In this way, it will be easier for the students to follow the process properly.

1. Take two ice cubes of different colors and place them at opposite ends of one of the containers. Repeat the process in the second container.
2. Place one of the containers close to a source of heat, such as a radiator, and the other recipient at some distance from it.
3. Take photos and draw the position and the color of the ice, distinguishing between both containers.
4. As time passes by, repeat the earlier step, noting the changes that are observed and the time that has elapsed.
5. Having melted the ice cubes in both containers, take photographs and sketch the final drawings.

After finishing the experiment, ask the students to summarize what has happened and to write out their results and conclusions.

- What has happened? Why?
- Are there differences between one container and another? What are they?
- What is the process called? Between which two states of matter does it take place. What is the cause?

NOTE: You can use the flashcards to help the students to visualize the state changes.

Time-lapse

Return to the scientific method, to end the experiment, and remind your students of the importance of communicating conclusions, for which purpose you can create a time-lapsed video with the photos and the drawings that they have been preparing throughout the experiment.

You can ask questions to inquire a little more about what happened.

- What has happened with the water? Is it still water?
- Why does it change its state?
- Why do the ice cubes that were closer to the radiator melt earlier? Does the same thing happen with the sun? What other sources of heat do you know?

Actividad 9. Ice Boy's changes

It is fundamental to consolidate concepts and internalize them to achieve meaningful learning. Some methodologies can be used to do so such as gamification, which transposes the dynamics and mechanics of games into the educational area.

In this way, not only is conceptual development improved, but procedural and attitudinal learning can be approached, including multiple intelligences: in this case, kinesthetic intelligence and naturalist intelligence when approaching the changes of state through gestures and bodily movements.

PREPARATION

TIMING

- 5-7 minutes to identify the changes of state and to associate them with a gesture.
- 10 minutes to play Ice Boy says.
- 5 minutes for reflection on what has been learnt.

MATERIALS

- Reading book.
- Visual aids with flashcards and posters.

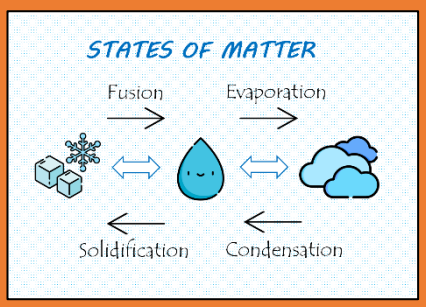
CONNECTION WITH FAMILIES

- Send regular newsletters to the families detailing student progress and learning.
- Encourage family members to reinforce the activities within the classroom at home, which can stimulate curiosity and exploration.

- Prepare a folder with activities and proposals to work on at weekends.

TEACHING PLAN

NOTE: You can use posters or flashcards so that the students visualize the changes of state and thei names.



DEVELOPMENT

Identification of changes of state in the story

Returning to the story of Ice Boy, invite the students to closely listen so that every time they perceive that a change of state has taken place, they name it and make a specific gesture.

The gestures have to be different for each change of state, and you can set them or let the students invent them. In both cases, it is important that you also participate.

Some examples of proposals are:

- Melting (solid to liquid):

  Lower your hands making wave shapes from the head to the waist.

- Evaporation (liquid to gas):

  Press your fists together on your chest and then open your hands moving your arms outwards.

- Condensation (gas to a liquid):

  Open your arms with your palms upwards, then close your fists as you move your arms until reaching the middle of your chest (as if you were gripping something).

You can give the floor to only one speaker, to avoid all the students intervening at once, so that the speaker at first responds and the rest of the group or class repeat the instruction. In this way, it will be easier to maintain order and simultaneously to strengthen group cohesiveness.

Playing 'Ice Boy says ...'

Once all the students know the movements, they are invited to play a variant of Simon says. Explain to them that you will say two states of matter following the expression: "from ... to ...". But they should

only say the change of state and make the corresponding gesture, if you start the sentence with "Ice Boy says".

One example is as follows:

- Teacher: "Ice Boy says from solid to liquid".
- Students: "Melting", and they make the movements with their body.
- Teacher: "From gas to liquid".
- Students: must remain silent.

After a few rounds, you can invite a student to give the orders on the changes of state. In addition, the speed can progressively be increased, to make the task more difficult.

Besides, the student who misunderstands will lose a turn and has to sit on the chair or if you prefer the whole class to participate, you can establish a points system. Each student begins with 10 points and a point is lost each time a student makes a mistake. In this way, it will be easier to know who has made the most mistakes and, therefore, who is perhaps in need of reinforcement activities.

5th-year primary-school student: "I laughed a lot, it's very easy to learn the changes of state like that. I love the different activities like this".

3rd-year primary-school student: "It seemed like great fun to work on this topic like that, because it is a much simpler way of learning the changes of state and we did loads of amusing activities".

Activity 10. The disordered story

In the same way as it was important to know each part of the story, the students also have to be capable of sequencing the events and acts that take place in them. This organization will help you once again to go over the text that was read and to improve student understanding at the same time as reinforcing the concepts and ideas related with matter and its states and changes.

NOTE: The activity can be done both in an individual manner and in small-sized groups. In addition, it can be developed during the reading or as a method of correction.

PREPARATION

TIMING

- 5 minutes to identify and to order all the changes of state that are in the story.
- 15 minutes to write out and complete the photocopied worksheets.
- 5 minutes to share the proposals.

MATERIALS

- Reading book.
- Pictures of parts of the story.
- Photocopies to complete the sequence of events.
- Pencils, pens, paints.

CONNECTION WITH THE UNITED NATIONS SUSTAINABILITY DEVELOPMENT GOALS

- Propose activities for inquiry and exploration that strengthen the awareness of students and their responsibility for a better planet.
- Play the videos that show the students what the actual situation of the planet is and what the relevance of the SDGs is.

TEACHING PLAN

DEVELOPMENT

The changes of state of Ice Boy

Returning to the story of Ice Boy, invite the students to think of the changes of state that take place in the story. To help the students, you can ask questions that encourage them to relate these changes to different events that are simpler to recall.

- Where does Ice Boy live? What is the first place to which he travels? What does he do there?
- Afterwards, where will he end up? What will he be converted into?
- Once in the air, what happens to Ice Boy?
- How does he return home? Where does he land? With whom does he find himself?

Through these questions, not only will the changes of state be revised, but also the most relevant facts of the story.

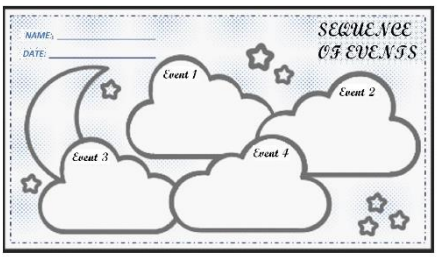
Ordering the story

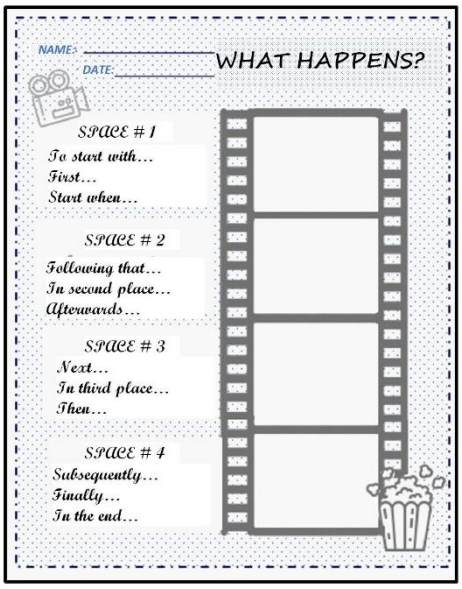
It is recommendable for the students to try to follow the temporal sequence, which will facilitate recording all the information without forgetting any aspect of importance.

You can hand images with scenes from the story that are not in the right order to each group or student, to help them in this process. Let them put them in order for a few minutes, indicating the order of the changes of state that take place and which conditions should arise for that to happen.

You can invite the students to design their own chronological line of the facts of use templates such as those that are shown here to guide them through the process.

On the other hand, it is important to reinforce the vocabulary on the changes of state of the matter and the scientific method. Remind students of the importance of including the states in which they are found and the name of the change of state that takes place.





Activity 11. What is its state?

Contextualizing the learning is fundamental to achieve significative learning in which the concepts assume meaning in a dynamic reality. In this sense, relating the states of the matter with everyday elements or objects will help the students to extrapolate the learning in the classroom to other contexts that are closer to it.

NOTE: You can ask the students to select objects and snippets from a journal or magazine and work with them instead of creating a photocopy.

PREPARATION

TIMING

- 5 minutes to give examples of states of the matter.
- 5-10 minutes to classify different elements.
- 5 minutes to reflect on the proposals together.

MATERIALES

- Photocopy with elements.
- Pencils, pens, paints.

CONNECTION WITH THE RESPONSIBLE CITIZENSHIP

- Remind the students of the importance of respecting the norms of conviviality, in the school environment and family and social life.
- Use debates and role plays to present reality-based situations that raise student awareness, in relation to their responsibility for improving their physical and social environment. Ask them to propose actions to solve or to improve those situations.
- Set out visits and programs of shared events with local associations, so that the students collaborate in the search for solutions within their real environment.

TEACHING PLAN

DEVELOPMENT

Examples of states of the matter

Using the Pencils-in-the-Center technique, invite the students to think of daily activities in small groups on the different states of matter. Initially, they will talk in a moderate tone of voice, then the students will individually write it up in their notebooks and will share it with the group or the class. You can suggest to the students that they draw their answers, creating a collective mural, to strengthen their artistic and drafting skills.

2nd-year primary-school student: "I liked it a lot, because I've learnt more Spanish like this and about the changes of state in a different way. It was fun".

In what state are they found?

Continuing with the activity, instead of proposing examples, ask the students to classify elements or objects that they have been given. As has been mentioned, you can create a worksheet for photocopying, such as the one shown here, or let it be the students who select the random items from a journal or a newspaper.

Having selected them, a table must be drawn in which the objects can be classified according to their state. During the process, try to incentivize their reflective thought, their curiosity and motivation by asking questions such as:

- How do you know the state in which it is found?
- Could it change state? What would it have to do?

- Can all the objects/items change their state? Why? Do you know any examples?

Environmental consequences

Using the images that have been selected, you can introduce the topic of environmental care, highlighting the importance of protecting and respecting nature and reducing our impact to a minimum.

- Do you think some pictures of what you see are bad for nature? Why?
- What effect can it have on nature?
- How can it be improved?
- Do you know what the greenhouse effect is? What effects does it have? What is a carbon footprint?
- Have you heard of the plastic island in the Pacific?
- What can you do to reduce it?

Do you know of any measure or proposal from the government or some administration or institution?

NOTE: Introduce the United Nations Sustainable Development Goals (SDGs) 2030 and propose investigative projects and reflection on the importance of these types of measures and initiatives.

Activity 12. Fracturing the story

Imagination and creativity have to form part of the student development process. Progress in these skills will strengthen the capabilities of the students, preparing them to confront and to resolve day-to-day problems more easily. In this sense, one proposal is that students change (fracture) the story of Ice Boy, which will simultaneously let them go over the concepts that have previously been covered.

3rd-year primary-school student: "It seems to me to be a very dynamic fun project where the work is amusing and we learn Spanish much better".

2nd-year primary-school student: "I really liked it, because it is a different way of learning English and we played a lot of games".

PREPARATION

TIMING

- 5 minutes to explain the different possibilities.
- 10 minutes to introduce the modifications.
- 5-7 minutes to share the proposals together.
- 25 minutes to invent your own story.
- 5-7 minutes to share the proposed stories together.

MATERIALS

- Photocopied worksheets with the mock-up of the comic or minibook.
- Pencils, pens, paints.

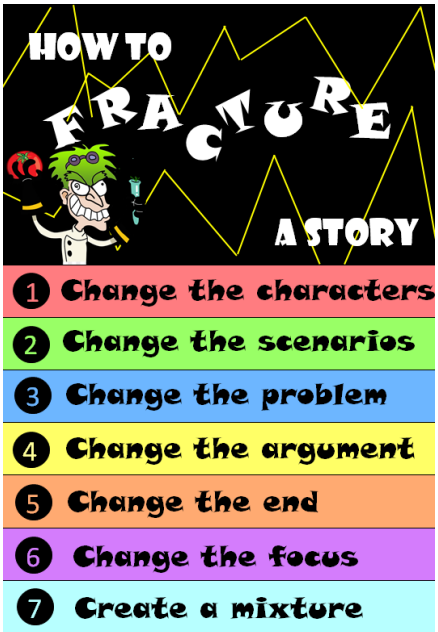
CONNECTION WITH INCLUSION

- Actively promote respect for student diversity.
- Identify possible (physical, social, cultural) barriers and take them into account when organizing the class.
- Offer the same opportunities to everyone, but move away from uniformity; the methodologies that we propose in this project will help you with this goal.
- Organize the students into heterogeneous groups in which they can develop their own capabilities and experience the possibility of helping their companions to develop both academically and personally.

TEACHING PLAN

DEVELOPMENT

Dividing up the story



Explain to the students the possible ways of fracturing a story. To do so, you can use the different parts of the story, reviewing the concepts previously worked upon and introducing them as new content (explained in depth in activity 7).

In this way, the students may select one or various elements to be modified, such as the characters, the scenery, the problem, the argument, the end, or the approach. During this process of creation, try to give very general guidelines that do not condition the development of their creativity and imagination.

It is important to remind the students that there are no incorrect responses, that all the modifications are valid provided that that they follow the rules on orthography and internal cohesion.

Once all the students have prepared their stories, they can be shared in the reading area of the classroom.

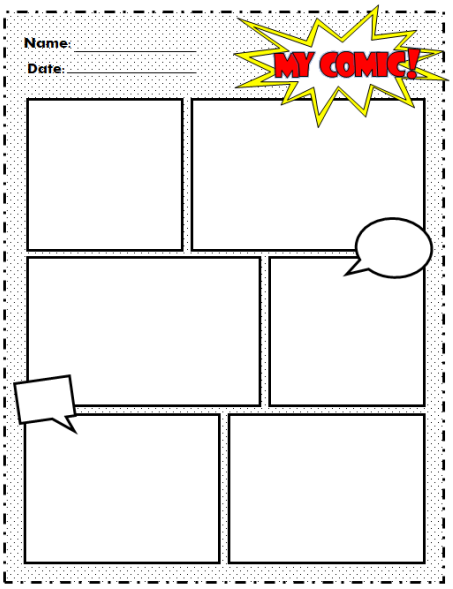
Creating a comic or minibook

Subsequently, based on the contributions of the students, invite them to reflect on the changes of state of different materials, because not all of them are found in a solid, liquid and gaseous state.

Invite them to work on a comic, using this template or another one of their own, in which the protagonist could be, for example, Choc, the chocolatine traveler.

Another option, will be to create a minibook in which the design of the text will be similar to the comic when divided into comic strips, helping the students to structure their story and reflect it through drawings and illustrations.

In both cases, it is important to give a few minutes to sharing the proposals, highlighting the positive aspects and pointing to improvements.



Activity 13. The cycle of water

Linking the contents of the classroom to the natural environment is fundamental, so that students connect their learning to the surrounding reality. Strengthening this relation will help them to understand the concepts better and to convert them into lasting knowledge over time. In this sense, the water cycle will be turned into the contextualization of the changes of state of matter.

NOTE: It is important to begin with the previous knowledge of the students, so that they learn the phases and can relate them with the changes of state, in case they are unfamiliar with the water-cycle process. The activities relating to singing, dancing and rhythm will be perfect for this purpose.

PREPARATION

TIMING

- 5-7 minutes to observe and to analyze events in the book, even setting out the research hypothesis.
- 5 minutes to prepare the experiment.
- 15 minutes to observe and note what happens.
- 5 minutes to reflect on the events.

MATERIALS

- A jar.
- Plants.

- A bottle top.
- Earth.
- Sand.
- Small stones.
- Pencils, pens, paints.
- A camera.

CONNECTION WITH GENDER QUESTIONS

- Remember to incentivize student participation and motivation. Use positive language and reinforcement.
- Encourage students to participate during the classes and to assume responsibilities within the dynamics of the classroom.
- Create heterogeneous groupings organizing rotating roles in which the students and their companions have specific responsibilities.
- Include figures with female references in the explanations. Highlight their relevance and their involvement in their work.

TEACHING PLAN

DEVELOPMENT

Create your own water cycle

6th-year primary-school student: "It seemed very interesting to me, because it was a different way of learning about the cycle of water. There should be more topics like that, because it helps us to learn vocabulary in a different way to the way we always use it".

As mentioned, it is important to start with the reading book. Ensure that the students remember what happened in the story, emphasize the cyclic character of the adventure, in the presence of precipitations and changes of state.

- What changes arise in the story? Can they happen in another order?
- Is there some natural process in which all the changes of state take place? What are the phases of this process?

The responses to these questions will help to present the water cycle. You have to take into account that it may be difficult for some students to think of the complete process, for which reason it is

necessary that you work on the phases that make it up, how they are sequenced and what happens to them.

Having established a conceptual basis, it will be easier for the students to establish a research question: how can the water cycle be reproduced in a jar?

The children must reflect on this question, having been told to use water and heat, and ice cubes and heat. On the basis of their contributions, hypotheses can be formulated, such as: a source of heat is necessary to make the water change its state. In addition, is it important to compile their responses, so that they can guess how the experiment will turn out.

Then the experiment is prepared. To do so, divide the class into groups of four or five members who will work in a cooperative way and give all the materials that will be needed to the members of each group.

The procedure of this experiment is:

1. Fill the jar in such a way that stones are lain at the bottom of the recipient, on to which sand is poured and then the soil on top. At one side place the plants and on the other side the bottle top with the opening facing upwards. Once everything is in place, close the jar with the lid. Draw what you see.
2. Place the jar in a sunny place and observe what happens. Note and draw what happens.

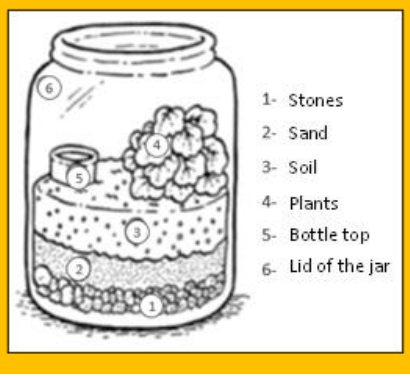
After finishing the experiment, ask the students to summarize what has happened and write up their results and conclusions.

- What has happened? Why did it happen?
- How long can the process continue? Afterwards, what will happen?
- What changes of state have taken place?

Time-lapse and awareness

Return to the inquiry to end the experimentation and remind students of the importance of communicating the conclusions, for

NOTE: A visual scheme can help you to indicate to the students the order in which they have to place the elements.



NOTE: You can refer to the United Nations Agenda 2030 Sustainable Development Goals. In particular, the sixth goal sets out to 'Ensure availability and sustainable management of water and sanitation for all'.

You can stimulate a debate, letting students express their points of view and make contributions on which measures are for them the ones that should be taken to improve the situation. It can all be presented on posters to decorate the classroom.

which they can make a time-lapse video with the photos and drawings that they have been working upon throughout the experiment. This material will serve as visual support for an oral presentation that will be evaluated with a rubric such as the example in the evaluation section.

On the other hand, you can ask questions to inquire a little deeper into what happened.

- Where does the water come from? Why does it change state?
- What would happen if we distanced the jar from the source of heat? And if we moved it closer?
- Why is it important that the water cycle is completed? What is achieved?

On the basis of the responses to these questions, you can stress the importance of responsible consumption and use of water. It is important that the student knows that water is not available from a tap everywhere and that not all water can be drunk or is, in other words, drinkable. You can show the students how water is stored in reservoirs and the process to which it is subjected in water purifiers.

Activity 14. Miming!

NOTE: You can also use dramatization as an ice-breaker technique, before starting a session, or between two sessions of different subjects. Movement will help the students to disconnect for some minutes, to relax and to be more centered on the tasks that will subsequently be carried out.

Including dramatization in your teaching activity will stimulate the creativity of the students, will help them develop empathy and psychmotor skills, and will develop mental agility and will strengthen non-verbal communication.

Due to its open character, you can use it as a motivational technique, whatever the content to be covered. In this case, a proposal to approach the concepts related with the water cycle.

PREPARACIÓN

TIMING

- 3 minutes to explain the activity and to form the groups.
- 10 minutes to dramatize the cards.
- 5 minutes to dramatize the water cycle.

- 5 minutes to reflect on what has happened.

MATERIALS

- Cards with images and drawings.

NOTE: Include phases on the cards, but also changes of state, natural elements and rainfall. You can include the graph of the word as a spelling aid.

CONNECTION WITH THE RESPONSIBLE CITIZENSHIP

- Remind the students of the importance of respecting the norms of conviviality, in the school environment and family and social life.
- Use debates and role plays to present reality-based situations that raise student awareness, in relation to their responsibility for improving their physical and social environment. Ask them to propose actions to solve or to improve those situations.
- Set out visits and programs of shared events with local associations, so that the students collaborate in the search for solutions within their real environment.

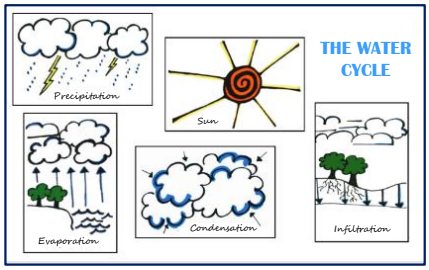
TEACHING PLAN

DEVELOPMENT

We are miming

Hand a card to each student, who must act out in mime in front of the other classmates, who have to guess the word. As the short acts or charades are completed, the students will be grouped with those classmates who have the same card.

Having completed the groups, each group will choose a representative to act out the word again. Subsequently, they are asked to organize themselves to act out the cycle of water, having to order their act as the phases and the changes of state take place.



Consider that the students could place themselves in a line and express a start and an end to the process. It is important to encourage reflection on the cyclic nature of the water cycle and to help them to understand that there is no beginning nor end and, therefore, the best way of organizing themselves is to form a circle.

In addition, you can remind them that it is not a bidimensional process, in other words, upwards and downward variations can be made. So, students set out to prove and to debate their proposals and should know that there are many possibilities, without there being one right answer. You can inquire a little deeper and awaken their reflexive thought and curiosity, asking questions:

NOTE: On the basis of their responses, you can include concepts related with the cycle of matter, trophic chains and their importance to the development of ecosystems.

- What might happen if a phase is omitted? And if the sun disappeared?
- What other natural processes are cyclical? Do you know the cycle of the matter? What happens to it?

Activity 15. Let's do Art!

The completion of artistic activities is fundamental for working transversal aspects and capabilities such as creativity, concentration, coordination and fine motor skills, among others.

4th-year primary-school student: "I liked the activity because they explained what the water cycle is like for people who don't understand it or find it boring, so they understand it more and aren't so bored".

These sorts of activities do not have to be completed alone in the area of artistic education, but can be included in other areas to work the contents such as the water cycle in a dynamic manner.

In particular, through artistic activity you can help the students to model. This activity assumes great importance in the scientific world, as it consists of representing a process beginning with an understanding of it. That representation can be physical, mathematical, graphical, analogical... and it is an excellent way of evaluating what the student has learnt.

PREPARATION

TIMING

- 10 minutes to share the ideas together and to finish the design.
- 30 minutes to construct the proposed design.
- 10 minutes to share the productions together and to explain them to the class.

MATERIALS

- Recycled materials such as bottle tops, milk cartons and biscuits, toilet paper rolls, plastic and expanded polystyrene (polyspan)...
- Pencils, rubber, markers, paints, brushes.
- Scissors, glue, ruler.

CONNECTION WITH DIGITAL WORLD

- Create a blog with restricted access in which there are curiosities on the topics that are worked, proposals for additional activities and reinforcement exercises.
- Use digital platforms such as Padlet to strengthen the debate and the divulgation of ideas and opinions among the students.
- Strengthen the search for information in digital sources. It is fundamental to emphasize the importance of comparing data.
- Work on the positive aspects (sustainability, agility, etc.), but also on the negative aspects of the networks (cyber bullying, digital dependency, identity phishing, etc.) and propose, together with families, simple actions to minimize them.

TEACHING PLAN

DEVELOPMENT

We all become artists

Divide the students into small groups and show them the available material to complete the mock-ups and designs. Point out that they must create a mock-up in which all the phases of the water cycle are represented. Taking into account these requirements, they have to propose ideas and designs.

Once they have a clear idea of what they are going to do, leave them some time to create it. You have to remind them that they must cooperate, work in a team and be respectful towards their classmates.

NOTE: Let each group develop their own ideas, although you can show them some models that will serve as inspiration. The students should know that they will not have to copy these mock-ups.

In addition to preparing the mock-ups you can also include the preparation of dynamic and interactive wheels in which they can, in a cyclical and progressive way, see the different phases.

One example of a template can be downloaded from the following link:

https://www.teacherspayteachers.com/Product/Water-Cycle-Water-Cycle-Activity-Wheel-FREE-Sample-4989200

Let's explain our creations

Having completed their creations, invite all the groups to present both the steps they took to prepare their design and the water cycle process to their classmates.

Emphasize that they must point to all the phases and changes of state that take place. In addition, remind them that they can start the explanation at any of the phases, as it is a cyclical process and they can question their classmates.

Activity 16. Let's sing

In the same way as the rhythms of body percussion, the songs will make the teaching activity dynamic and fluid. In doing so, not only is the rhythmic part worked, but oral expression is also worked, improving intonation, pronunciation, rhythm... as well as bodily expression, completing controlled movements and facial expressions in accordance with the message that you wish to transmit.

Working these aspects at the same time as going over the content that was previously approached will be very beneficial to improve the oral expression of the students while the concepts are consolidated.

NOTE: The activity can be used as an ice breaker in the routine at different times. The more times they listen to the song, the more they will be familiar with it and, probably, the more they will participate.

PREPARATION

TIMING

- Reproduction of the video as many times as wished.

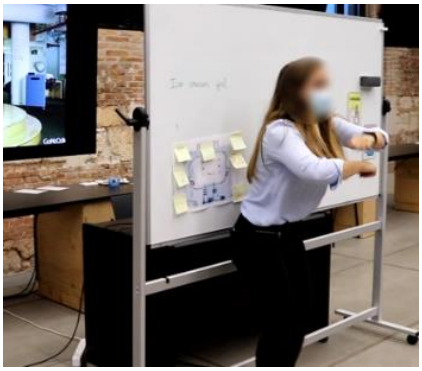
MATERIALS

- Audiovisual device for playing back and listening to the video of the song.

CONNECTION CON EVALUATION

- Remember to use evaluative methods and instruments that are in accordance with the proposal for the development of competences and the active and collaborative methodologies that have been proposed. These frameworks will strengthen self-evaluation and involve the students in the evaluation process.
- It is important to carry out an initial evaluation, another one during the activities and a final one to perceive the progress of the students.

2nd-year primary-school student: "I really liked it a lot, we have learnt the vocabulary that we never knew before".



TEACHING PLAN

DEVELOPMENT

Invite the students to get up from their chairs and randomly stand around the classroom.

Once all the students have found a place, play the video that you can find at the following link https://youtu.be/KM-59ljA4Bs. During the singing, invite the students to participate, singing those parts that they know and inventing a dance in harmony with the lyrics.

It is important that you also intervene, singing and dancing. Remember that you move around the classroom and that they must not imitate you, everyone has their own style and can freely move around provided they show respect and education.

Activity 17. Engineering power

In this activity, you will introduce the students to engineering design, a didactic method that brings the prototype design process to the classroom.

It is important to follow all the steps that have been established, connecting the learning and reflecting on the process that has been completed.

Remember that it is essential that they use their hands and offer your students the possibility of experimenting, making mistakes, and learning for themselves. Ask them questions and make them reflect on each phase of the process.

PREPARATION

TIMING

- 5-7 minutes to introduce the engineering design method.
- 5-7 minutes to set out the problem and the design to be completed.
- 5 minutes to prepare the mixture and to place it in the freezer.
- 5 minutes after testing the result to discuss the process.

MATERIALS AND INGREDIENTS

Strawberry and vanilla ice-lollies:

- 600 g of clean strawberries.
- 100 g of sugar.
- 1 teaspoon of vanilla essence.
- 1 spoonful of lemon juice.

NOTE: Ice-lolly flavors can be varied. Let the students choose their own recipe and ensure that they have no food-related allergies.

CONNECTION WITH FAMILIES

- Send regular newsletters to the families detailing student Encourage family members to reinforce the activities within the classroom at home, which can stimulate curiosity and exploration.
- Prepare a folder with activities and proposals to work on at weekends.

DEVELOPMENT

The design of engineering

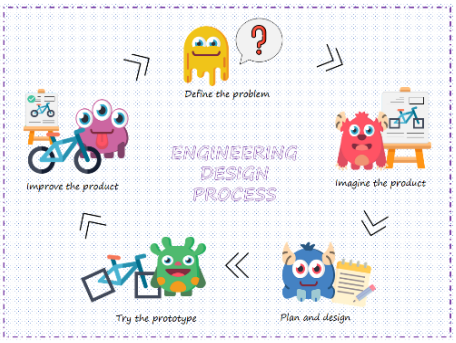
Explain to the students that they are going to design a prototype, but to do so they have to follow the engineering design steps. You can ask them questions that will help them to think about that process and in collaboration work out the different phases of the scientific method.

- When someone wishes to construct or to create something, what is the first step? And afterwards?
- Once an initial design has been constructed, what does the person do?

Once all the phases have been mentioned, repeat them in the corresponding order. You can complete rapid repetition games to complete the consolidation of those concepts. Likewise, you can use songs or visual schemes.

3rd-year primary-school student: "It was great fun, although I had to wait a long time to be able to taste the ice-lolly".

2nd year primary school student: "I really liked watching how the ice-lolly was made, it was very easy".



Experimenting

As has been mentioned, it is important to begin with the reading book, for which reason we return to the time at which Ice Boy was on the beach, asking the students questions that made them think about whether Ice Boy would like to have an ice-lolly. It is important for them to learn to ask questions:

- What will the taste of the ice-lolly be like? What ingredients do you need?
- What are the steps to follow?
- What will its form be like?

The answers to these questions will help the students to define a research problem. How can you make an ice-lolly?

The next step is to divide the class into groups of four or five members who will work in a cooperative way and, returning to the engineering design phases, the students will know that they have to imagine, plan and design the product that they wish to obtain.

They should take into account the ingredients and utensils that they need, as well as the procedure that they must follow.

To do so, invite the students to brainstorm ideas on the taste of ice-lollies, leaving them to share their preferences and opinions on the matter.

Having established a plan, it is time to start to experiment. Give all the materials to each group that they will need according to their plan, as well a sequence of images, muddling up the phases of the processes, which they must place in the right order following the ordinal numbers assigned to each one.

The experimental procedure, which is explained below will permit you to work the content and the measurement scales and the way they are employed.

1. Squeeze a lemon and pour a spoonful of fruit juice into the mixer. Add the strawberries, the sugar, the vanilla and mix them all together.
2. Pour the mixture into a bowl and leave it to rest in the freezer for at least 1 hour.
3. Pour the mixture back into the mixer for mixing to break up the ice crystals and then leave the mixture in the freezer for 2 hours.
4. Gently remove the ice-lolly from the mold a few minutes before serving and ... taste the lolly!

Ice-lollies that do not melt

Subsequently, ask the students to look at the ice-lollies that their group has made, as well as the rest of their classmates. Invite them to draw the shapes in their workbooks and to model them with plasticene so that they last over time.

Invite the students to summarize what happened in the experiment as a way of ending it and ask one student to explain the process that they followed to the other classmates and the result that they obtained, which they can do with the help of the plasticene models.

- How does the liquid change to a solid? What did they need for it to do so?

- Why have they chosen that flavor? And that form? How have they managed to do so?
- What ice-lolly did you like most of all? Why was the texture different?
- Have there been any disagreements? How did they reach a consensus?

Evaluation

Preparation

Evaluation is a fundamental tool in the teaching-learning process. It has to be integrated in the daily activities of the classroom, because that is the only way it will be turned into a reference point for correcting and improving the educational process.

It is important that it is conceived from a global perspective, in which not only are the conceptual concepts taken into account, but also the procedural and the attitudinal contents. Likewise, it is recommendable to include a skills evaluation, taking into account the previously established objectives.

In this sense, the incorporation of all those elements must not be centered on mastery of the foreign language or the scientific contents that have been worked, but on their progress and learning with respect to the previous knowledge of each student.

Implementation in the classroom

Kahoot

The use of Kahoot is proposed as an evaluative instrument of the water cycle and changes of state.

It is a digital application with which you can create test-style competitions. The possibilities are numerous, because you can edit the questions and answers, modify the time and response options, and include photographs and videos.

Due to its ludic and dynamic nature, it will lower the stress levels of the students that are linked to the completion of conventional tests, such as exams, which will improve academic results.

NOTE: In case of not having sufficient digital devices for all students, you can use Plickers, a similar application in which the selection of responses is done by turning a QR-type code and scanning it with a bar-code reader application installed on a smart phone with a camera.

PREPARATION

TIMIMG

- The time will vary in accordance with the number of questions and the time that is allowed for each answer. In the option that is proposed here, the maximum time will be 7 minutes.

MATERIALS

- Computer and projector to display the questions in the classroom.
- Digital device to select the answers.

CONNECTION WITH THE UNITED NATIONS SUSTAINABILITY DEVELOPMENT GOALS

- Propose activities for inquiry and exploration that strengthen the awareness of students and their responsibility for a better planet.
- Play the videos that show the students what the actual situation of the planet is and what the relevance of the SDGs is.

TEACHING PLAN

DEVELOPMENT

Each student or group of students will need a digital device such as a computer, tablet or smartphone to answer the questions. They can enter the application with a code and enter their nicknames with which they wish to play.

They can then start the course. The questions will appear one by one, and subsequently the possibilities for response, associated with a particular color.

Each student or group will choose a color that they think is the right answer with their device. Once everybody has answered or when the time has ended, they are told whether the answer is right or wrong and a ranking of positions with names of participants will be projected on the wall. The application summarizes the right answers for the ranking, but also the speed of the response.

2nd-year primary-school student: "I liked it a lot, it was great fun, it was like being in a TV competition".

The positions can be modified with each question, until arriving at the end of the course in which a podium for the three winning positions is displayed.

Evaluation rubrics

The rubrics are documents in which the specific characteristics of a product, project or task are described at various levels of effort. In this way, they provide information on what is expected from the work of the student, which will make a more objective valuation possible, will facilitate feedback and will strengthen self-evaluation.

NOTE: It is essential that the students rely on them from the start, so that its use is to be effective. In that way they can know what their strengths are and which aspects they can improve.

From this perspective, they constitute an instrument that facilitates the progressive evaluation of the teaching-learning process, because it provides detailed information on each criterion, indicating the degree to which it has been achieved. All these features make it both an evaluation and a learning tool, simultaneously.

With regard to their characteristics, it is important that they establish a quality-of-compliance grading of the standards, which have to be related with curricular content, and have to be coherent with the educational objectives and with the level of student development.

In what follows, some examples are proposed to complete self-evaluations, co-evaluations, evaluations of group members, and evaluations of both the learning process, and oral presentations.

SELF-EVALUATION

DATE STUDENT

Evaluate your work drawing drops of water under each cloud.

Always

Sometimes

Often

Hardy ever

Total / 20

I participate in the tasks by contributing ideas and listening to suggestions, respesting the opinions of other group members.

I make an affort to cooperate with my team helping my classmates when they need help.

I speak in an educated respectful manner without raising my voice.

I take advantage of the time and I organize myself so that the work is deliveres on time.

When there is a problema, I propose alternatives and lend attention to other opinions to take the final decisión jointly.

GROUP CO-EVALUATION

DATE

MEMBERS

GROUP

The team paints the drop of wáter to evaluate the work jointly.

1 Hardy ever
2 Sometimes
3 Often
4 Always

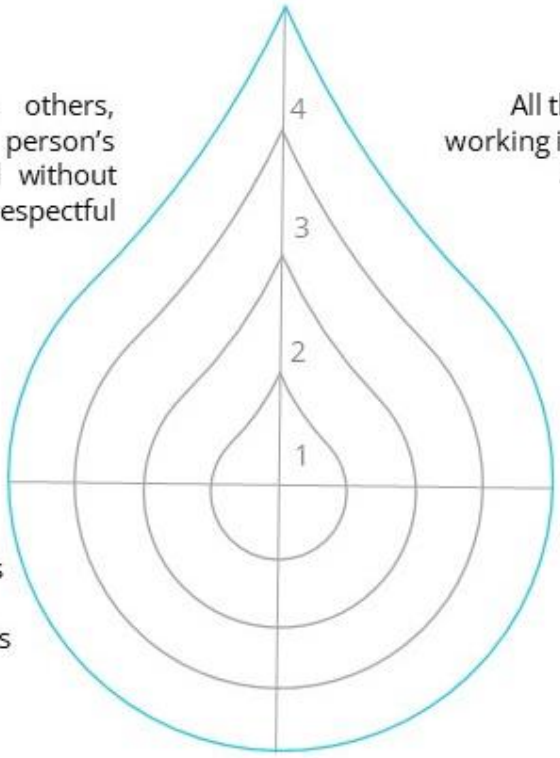
TOTAL / 16

ATTITUDE

We listen to the others, respecting each person's turn to speak and without showing disrespectful attitudes.

COOPERATION

All the group collaborated, working in a cooperative way to achieve the objetictive.



PARTICIPATION

The whole group has participated in the activities, giving ideas and duggestions to improve the work.

CONFLICT RESOLUTION

Whenever there have been problems, we have solved them among us all, talking and jointly finding a solution.

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EVALUATION OF THE ORAL PRESENTATION

DATE GROUP

The team paints the drop of wáter to jointly evaluate the work.

1	2	3	4	Always
1	2	3	4	Sometimes
1	2	3	4	Often
1	2	3	4	Hardy ever

Total / 16

He/she contributes ideas, listens to suggestions and respects the ideas of the other group members.	1 2 3 4
When there is a problem, he/she proposes alternatives and pay attention to other opinions to jointly take the final decisión.	1 2 3 4
He/she makes an effort to work in a team helpping other classmates when necessary.	1 2 3 4
He/she manages the time well and is organized so that the work is delivered in time.	1 2 3 4

Total / 16

He/she contributes ideas, listens to suggestions and respects the ideas of the other group members.	1 2 3 4
When there is a problem, he/she proposes alternatives and pay attention to other opinions to jointly take the final decisión.	1 2 3 4
He/she makes an effort to work in a team helpping other classmates when necessary.	1 2 3 4
He/she manages the time well and is organized so that the work is delivered in time.	1 2 3 4

Total / 16

He/she contributes ideas, listens to suggestions and respects the ideas of the other group members.	1	2	3	4
When there is a problem, he/she proposes alternatives and pay attention to other opinions to jointly take the final decisión.	1	2	3	4
He/she makes an effort to work in a team helpping other classmates when necessary.	1	2	3	4
He/she manages the time well and is organized so that the work is delivered in time.	1	2	3	4

Total / 16

He/she contributes ideas, listens to suggestions and respects the ideas of the other group members.	1	2	3	4
When there is a problem, he/she proposes alternatives and pay attention to other opinions to jointly take the final decisión.	1	2	3	4
He/she makes an effort to work in a team helpping other classmates when necessary.	1	2	3	4
He/she manages the time well and is organized so that the work is delivered in time.	1	2	3	4

Total / 16

He/she contributes ideas, listens to suggestions and respects the ideas of the other group members.	1	2	3	4
When there is a problem, he/she proposes alternatives and pay attention to other opinions to jointly take the final decisión.	1	2	3	4
He/she makes an effort to work in a team helpping other classmates when necessary.	1	2	3	4
He/she manages the time well and is organized so that the work is delivered in time.	1	2	3	4

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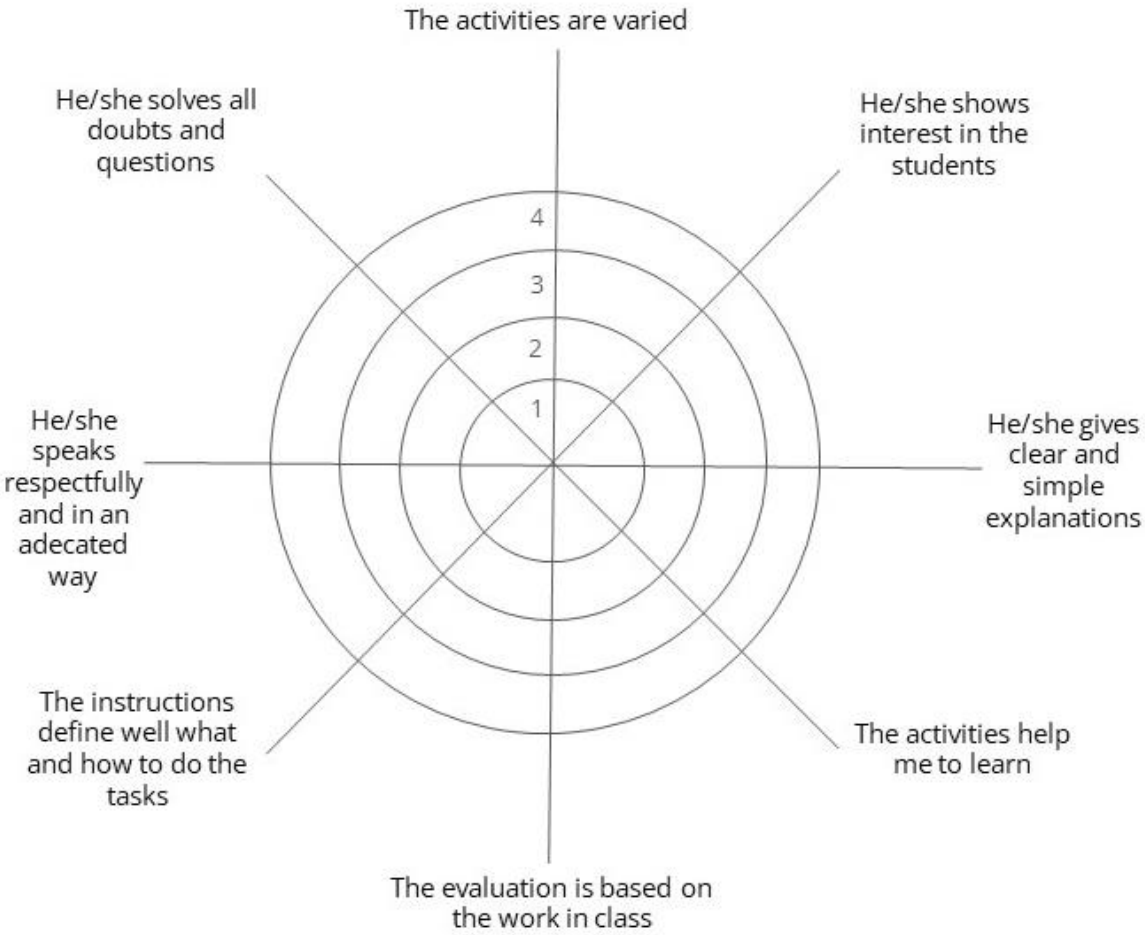
EVALUATION OF THE TEACHING PROCESS

DATE

Evaluate the learning process painting a drop of wáter on the corresponding line.

1 Hardy ever
2 Sometimes
3 Often
4 Always

TOTAL / 32

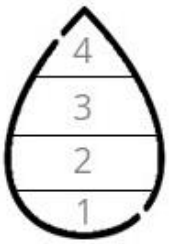


EVALUATION OF THE ORAL PRESENTATION

DATE

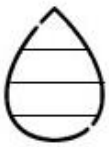
GROUP

The team paints the drop of wáter to jointly evaluate the work

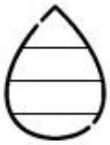


Always
Often
Sometimes
Hardy ever

TOTAL / 24

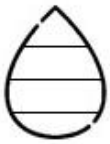


All group members participate in the presentation.

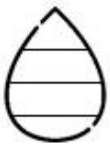


The speak slowly, clearly and loudly enough.

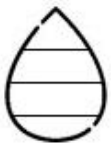
Ther use aceptable postures and gestures, and they are acting normally.



They demonstrate understanding of the topic and the process followed.



They use the specific vocabulary learnt during the activities.



They have learnt to respond to the questions that have been raised.

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SeLFiE

STEAM educational approach and foreign language learning in Europe

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