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Changing Climate, Changing Minds: Lesson Plans for a Greener Future

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TNS LOVE & SIMPLICITY

ÖZTAŞ ANADOLU LİSESİ DALAMAN 1974

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IES CERRO de los INFANTES

Lesson Plans from MALTA

Theresa Nuzzo School is a primary Church School. It caters for children ages 3 - 12 years of age. It is a mixed-ability school.
There are twenty teachers including kindergarten assistants and Learning support assistants.
The subjects taught are English, Maltese, Mathematics, Social Studies, Art, Physical Education , Music and Drama.
It builds its principles on the values of the Mother Foundress of the school - especially catering for a holistic education. The school itself is situated in a disadvantaged area in which a high percentage of refugees live. In spite of this, in our school we have a very small percentage of refugees as the children attending our school are chosen by a ballot. The school promotes an inclusive ethos and seeks to integrate children with special needs.

Lesson Plan 1: Climate Change

Learning Objectives

By the end of the lesson, students will:

- Understand the basic concept of climate change
- Learn about Greta Thunberg as a young changemaker
- Think of simple ways they can help the environment
- Practice teamwork and public speaking skills

Lesson Activities

1. Warm-Up Brainstorm (10 mins)

- The lesson starts with a class discussion on the question:

  "What do you think climate change means?"

- The teacher writes students' ideas on the board.

2. PowerPoint Presentation (10 mins)

- The teacher shows a PowerPoint explaining:
  - What climate change is
  - Why it's happening
  - How it affects people, animals, and the Earth

3. Greta Thunberg Introduction (10 mins)

- The class learns about Greta Thunberg, a young girl who speaks up about climate change.
- The teacher shows a Power Point Presentation about her and discusses with the students.

4. Group Activity: Change Makers (15 mins)

- Students break into small groups.
- Each group talks about 5 ways they can help the Earth (e.g. planting trees, turning off lights, recycling).
- They write or draw their ideas on a worksheet printed on recycled paper.

5. Sharing Time (15 mins)

- Each group shares their ideas with the class.

5 Ways I Can Help Our Earth

Lesson Plan 2: Planting a Plant from Cuttings with Knots and Rooting

Powder Objective:

Students will learn how to propagate a plant from cuttings, including how to identify and use knots (nodes) on the plant and apply rooting powder to help the cutting develop roots. By the end of the lesson, students will have hands-on experience in plant propagation.

Materials Needed:

- Healthy plant to take cuttings from (e.g., pothos, coleus, or ivy)
- Scissors or pruning shears
- A stick to do a hole to infiltrate the plant in the soil
- Rooting hormone powder (available at garden stores)
- Small pots with soil
- Paper towels (for cleaning scissors)
- Water for misting

Introduction (10-15 minutes)

1. **Introduction to Plant Growth:**
    - Discuss the basics of plant growth: "How do plants grow? What do plants need?"
    - Introduce the concept of **propagation**: “Propagation is how we make new plants from an existing one. Today, we will learn how to use plant cuttings to grow a new plant.”
2. **Explaining Nodes (Knots) on Plants:**
    - Show the students a healthy plant (like a pothos or ivy). Point out the **nodes** (the “knots” on the stem where leaves and roots can grow).
    - Explain that when cutting a plant, it's important to include a node because that’s where new roots will grow.
    - Discuss how cuttings can be placed in water or soil, but we’ll add **rooting powder** to help the roots grow faster and stronger.
    - Show Video: https://www.youtube.com/watch?v=_taBmwyRSyc&t=310s

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Demonstration (15-20 minutes)

1. **How to Take a Cutting with a Node:**
    - Show the students how to take a cutting:
        - Using scissors or pruning shears, cut a piece of stem around 4-6 inches long, making sure it includes at least one node.
        - Explain that the node is where roots will grow, and the cutting must have this part for successful rooting.

2. **Applying Rooting Powder:**
    - Explain that **rooting powder** (also known as rooting hormone) helps encourage the cutting to develop roots quickly.
    - Demonstrate how to use the rooting powder:
        - Gently dip the cut end of the stem into the powder, covering the exposed part where roots will form. Tap off any excess powder.
    - Discuss how this powder contains hormones that stimulate root growth and make the process faster.
3. **Planting the Cutting:**
    - **Soil Method**:
        - Plant the cutting into a small pot filled with soil. Make a small hole in the soil with a stick or pencil and gently insert the cutting. Lightly press the soil around the cutting..
4. **Caring for the Cutting:**
    - Place the pot or water container in a warm, bright spot, but out of direct sunlight.
    - Mist the cutting with a spray bottle regularly to keep the air moist. If the cutting is in water, remind students to change the water often to keep it clean.

Activity (15-20 minutes)

1. **Student Participation:**
    - Provide each student with a healthy plant to take a cutting from.
    - Have them carefully cut their plant piece just below a node, making sure to remove excess leaves from the bottom part of the cutting.
    - Let them dip their cutting in rooting powder and plant it in soil, or place it in a small container with water.

Wrap-Up (5-10 minutes)

1. **Group Reflection:**
    - Ask the students:
        - "Why is it important to have a node on the cutting?"
        - "What do you think will happen to the cutting in the next week or so?"
    - Discuss how long it might take for roots to develop, and that patience is part of the process.
2. **Next Steps:**
    - Remind the students that their cutting might take a few weeks to grow roots. Encourage them to continue observing and caring for their plants at home.
    - Let them know that once the roots are visible (for water method) or they notice new growth (for soil method), they can carefully transplant their plant to a larger pot.

Lesson Plan 3 : Planting Seeds in an Empty Milk Carton

Learning intention:

- To teach children about recycling and the importance of nature.
- To enhance eye-to-hand coordination and sensory experience.

Materials Needed:

- Tuff tray
- Compost
- Seeds
- Empty milk carton
- Scoops

Development of lesson:

Introduction (5 minutes):

- Welcome the children and gather them in a circle.
- Discuss the importance of recycling and how we can use materials like milk cartons to grow plants.
- Show them the materials needed for the activity.

Hands-on Activity (20 minutes):

Preparation

- Fill the tuff tray with compost and place it in a central location where all children can reach.
- Cut the top off the empty milk carton to create an open container.
- Demonstrate how to fill the milk carton with compost using the scoops.

Planting

- Let each child take turns filling their milk carton with compost.
- Provide seeds to the children and guide them on how to plant the seeds in the compost.
- Encourage children to gently press the seeds into the soil using their fingers.

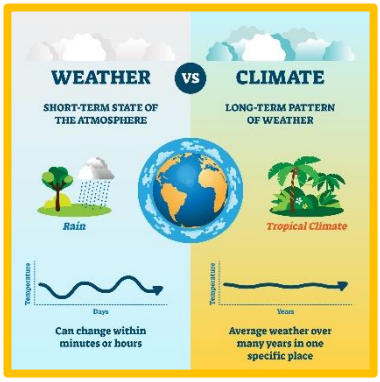
Watering

- Demonstrate how to water the seeds carefully using either a small watering can or a spray bottle.
- Allow each child to water their planted seeds.

Observation and Discussion:

- Place the planted milk cartons in a designated area where they can receive sunlight.
- Encourage the children to observe their plants daily and discuss the growth process.
- Explain the importance of taking care of plants and how they need sunlight, water, and love to grow.

Lesson Plan 4



Weather vs Climate

Aim: To be able to describe the difference between weather and climate.

Lesson Objectives: To be able to to describe the difference between weather and climate and know what type of climate we have in Malta.

- To name at least three climate zones.
- To name at least one country in each climate zone.

Assumed Prior Knowledge: To be aware of the different types of weather that we experience in Malta.

- To be aware that different countries experience different weather.
- To be able to name some countries that have different weather to Malta.

Resources: NASA Climate Change YouTube video – What's the difference between weather and climate? https://www.youtube.com/watch?v=vH298zSCQzY

- Weather Vs Climate Cards.
- Different Climate Zones colouring in exercise.
- Classwork: Fill in the blanks exercise.
- Name three animals that you might find in each climate zone.

Assessment: Weather Vs Climate Cards.

- Different Climate Zones colouring in exercise.
- Classwork: Fill in the blanks exercise.
- Name three animals that you might find in each climate zone.

Lesson Outcomes: To be able to define both weather and climate.

- To be able to name at least three different climate zones.
- To name some examples of countries in each climate zone.

Differentiation: Group work

- Class discussion
- Individual work

Skills For Life: Working as part of a team. • Listening and following instructions.

Notes for each slide

Slide 1 – Weather vs Climate

• Slide containing the aims and objectives of the lesson.

Slide 2 - Climate vs weather…what's the difference?

• This slide aims to generate thoughts and discussions amongst the class around what they think both weather and climate are.

• As a teacher, you could ask the pupils to discuss in pairs and write down thoughts in their project books or they could do this individually.

• Then, have a class discussion where pupils tell the rest of the class what they think weather and climate are.

Slide 3 - Climate vs weather…what's the difference?

• The NASA video explains the difference between weather and climate in the first one minute. After that, it touches on climate change which can be shown to the class if the teacher wishes.

Slide 4 - Climate vs weather…what's the difference?

• Following the video, the teacher can talk through the definitions and ask pupils to copy the definitions into their project books.

Slide 5 - Climate vs weather…what's the difference?

• This is the first in class exercise of the lesson and can be done in pairs or individually. The pupils will need a pair of scissors each and a glue stick to complete the exercise.

• Instructions: The pupils should cut out the climate cards and spread them out on the table. Pupils should find two cards, one which defines weather and the other, climate, and stick these under the headings on the worksheet provided. Then, ask the pupils to pick up and read the remaining cards and decide whether they are statements which better describe weather or climate and separate them into two piles. Finally, as a class, run through the answers and then ask the pupils to stick the cards in the correct columns and stick the worksheet in their project book.

Slides 6 – 10 – Types of Climate

• These slides name the Earth's five climate zones with a brief description of the weather patterns and examples of countries within each zone. Pupils should copy this information into their project book to help with future worksheets and homework exercises.

Slide 14 – The Effects of Climate Change

• Optional discussion - before revealing the information on this slide, ask pupils to discuss what they think extreme weather is and whether they know any examples of it. This can be done individually, in pairs or as a class.

• This slide introduces extreme weather, which will be explained more in the next lesson of the series. Teacher to talk through this slide with the class and ask the pupils to note down the examples of extreme weather.

Slide 15 – H.W. or Classwork

• The H.W. or classwork for this lesson is a "fill in the blanks" worksheet around everything that has been covered in the PowerPoint lesson. The pupils should use their workbooks to help them fill in the answers if they need it.

Worksheet: Weather vs Climate

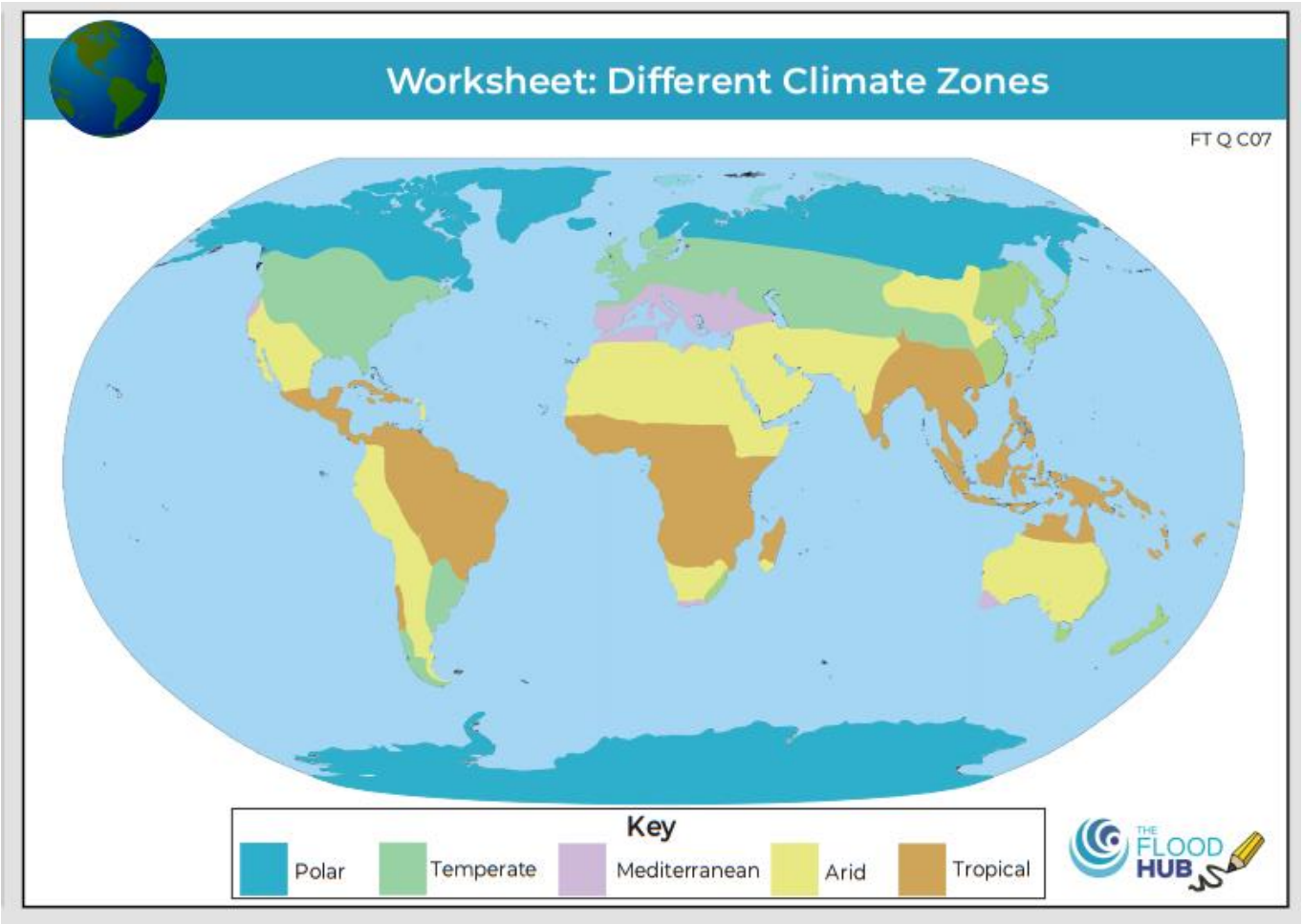
Spread the cards out on the table. Firstly, find two cards, one which defines weather and the other, climate. Then, pick up and read the remaining cards and decide whether they are statements which better describe the weather or climate. Finally, stick the cards in the box below and stick in your project book.

Teacher's copy

Weather	Climate
What's happening outside right now. It is temporary and only lasts a few days.	A description of the weather conditions in an area over the last 30 years.
There was a heatwave for five days in Greece last summer.	Spain has warm, dry summers and cool, mild winters
There was heavy rain yesterday afternoon.	The Amazon is hot but often rains all year round.
The frost last night caused the pavements to be icy and slippery.	Malta has four seasons all year round.
The weather forecast shows snow on Tuesday but rain on Wednesday.	Antartica is cold all year round.
It is cloudy today.	It is cold during the winter in Turkey.

Student's copy

Weather	Climate
What's happening outside right now. It is temporary and only lasts a few days.	A description of the weather conditions in an area over the last 30 years.



FT Q C07

Match-up Worksheet: Different Climate Zones

Draw a line to match up each climate zone with the correct description.

Polar	Warm all year round and very wet.
Temperate	Warm, dry summers and cool, mild winters
Desert/Arid	Have four main seasons - spring, summer, autumn and winter.
Tropical	Cold all year round with lots of snow and ice.
Mediterranean	Very hot and rarely rains.

THE FLOOD HUB

Polar	Warm all year round and very wet.
Temperate	Warm, dry summers and cool, mild winters
Desert/Arid	Have four main seasons - spring, summer, autumn and winter.
Tropical	Cold all year round with lots of snow and ice.
Mediterranean	Very hot and rarely rains.

FT Q C07

Fill in the Blanks Worksheet: Different Climate Zones

Fill in the blanks in the sentences below using the words listed at the bottom.

Examples of weather include rain, wind, sunshine, thunderstorms and snow. The weather is described as what is happening outside right now. It is temporary and only lasts a few days. However, climate is a description of the weather conditions in an area over the last 30 years.

Polar climates are cold all year round with lots of snow and ice. Antarctica and the Arctic have this type of climate.

Temperate climates have four main seasons – spring, summer, autumn and winter. The UK has this type of climate.

Desert/Arid climates are very, very hot as it rarely rains. There are lots of hot desert climates across North Africa, e.g. the Sahara Desert.

Tropical climates are hot all year round but are very wet as it rains lot. The Amazon rainforest in Central America is an example of an area with a tropical climate.

Mediterranean climates have warm, dry summers and cool, mild winters. An example of an area with a Mediterranean Climate is Southern Spain.

Amazon	Now	Warm
Arctic	Sahara	Wet
Autumn	Snow	Wind
Climate	Southern Spain	Winter
Cold	Summer	
Cool	Sunshine	
Four	Temporary	
Hot	Thunderstorms	

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Lesson Plan 5: What makes the sea level rise?

Introduction

Tell the children that today we are going to learn about sea level rise and how climate change is affecting this.

1) Question: Do you know what makes the sea rise?
   Give some time for the children to express themselves.

2) Go through the PowerPoint.

3) Experiment.

Things needed:

- A medium-sized plastic food storage container.
- Playdough (enough to fill 1/3 of the container).
- Ice-cubes.
- Water, and
- Marker.

4) Show video: Climate Change – the Environment for Kids – Smile and Learn.

Conclusion

Children draw a picture about what they learned.

Video Link

https://www.youtube.com/watch?v=IJoAcD0oUww

Lesson Plans from GREECE

GYMNASIUM KERAMOTIS is well-equipped. There are 11 classrooms , 2 science laboratories, a library, a computer room, a canteen and a gym. English and German are taught as foreign languages. The main aims of the school are : To develop the natural curiosity that children exhibit about themselves and their world, and use their curiosity to foster positive attitudes to learning; to provide equal opportunity for all, to extend individual talents and interest; to develop children as autonomous learners; to develop respect and care for themselves, their environment and the wider environment of the world; to develop children's imagination and creativity by offering a wide range of experiences; to understand the importance of health, hygiene and safety; to involve children in regular exercise; to develop cooperation. Our kids are lovely, creative, well-behaved and curious about the world. They take part in sports competitions, art and song contests winning medals and prizes.

Lesson Plan 1	
Subject	**Social Studies – Home Economics – Greek Language – English Language**
Topic	Understanding Pre-cycling
Sub-topic	Reducing Waste to Achieve Zero Waste
Teaching and Learning aids	Students' books, in-class game, poster creator app.
Rationale	Introduce the concept of pre-cycling and explain its significance in waste reduction. Students will be able to develop an awareness of resource and material exploitation, generate innovative ideas to reduce waste, and work towards achieving zero waste.
Specific Outcome	Importance of pre-cycling in reducing waste Practical ideas to reduce household waste through pre-cycling Creativity in developing innovative solutions for waste reduction Awareness of environmental issues and sustainability practices Creative thinking and innovative problem-solving in waste management
Assessment	Students will be assessed on their ability to present a practical idea to reduce household waste in a creative and innovative manner, showcasing an understanding of pre-cycling and its importance in waste reduction.

Lesson Process		
Stage	**Teaching and Learning Activity**	**Learner's activity/Learning Points**
Introduction (5 min)	Engage students by asking: "Have you ever thought about the impact of the items you use daily on the environment? How can we be more mindful of our resource consumption?"	Students deliberate and give answers to the teacher and rest of class.
Development, Step 1 (15 min)	Discuss the concept of pre-cycling and provide examples of how it differs from recycling. Address the misconception that pre-cycling is the same as recycling by highlighting the proactive nature of pre-cycling in avoiding waste generation.	Students work in groups and do research on the notions of "recycling" and "precycling". They take down notes and share them with class.

Step 2 (10 min)	Guide students in brainstorming practical ideas to reduce household waste through pre-cycling. Scaffold questioning by starting with basic examples of pre-cycling and progressing to more challenging scenarios. Monitor student performance by circulating the classroom and providing feedback on their ideas.	Students work in groups and take down notes on ideas. They find ways of proactively doing pre-cycling practices in order to avoid waste generation (zero waste policy).
Step 3 (5 min)	Reflect on the importance of pre-cycling in driving sustainable practices and reducing waste.	Students discuss in class and stress the importance of Pre-Cycling for households.
Step 4 (5 min)	Assign students the task of creating a poster or presentation showcasing a practical idea to reduce household waste using pre-cycling. Students should include an explanation of how their idea contributes to achieving zero waste and why pre-cycling is crucial in waste reduction.	Students listen to the task and form groups to work from home through telecollaboration. During the next lesson, they will share their ideas with the class and summarize the key points discussed during the lesson.
Conclusion (5 min)	Game/Formative assessment: Teacher gives an in-class game for implementation, through which students try identifying items that could be pre-cycled instead of being thrown away.	Students identify the items and gain points, simultaneously gaining knowledge.

Lesson Plan 2	
Subject	**Art** and **Technology**
Topic	Reduce, Reuse, Recycle: A Path to Zero Waste
Sub-topic	Reusing Waste Materials for Creativity in Art and Technology
Teaching and Learning aids	Students' books, recyclable material (old garments, plastic bottles, paper etc.), flashcards of sustainable art.
Rationale	In this lesson, learners are expected to develop a consciousness regarding the very issue of resource and material exploitation, and then come up with innovative ideas to reduce waste, eventually achieving zero waste. Students will be able to repurpose waste materials to create art pieces and technological inventions while demonstrating the importance of resource protection.
Specific Outcome	Importance of zero waste and resource protection Creative ways to reuse waste materials in art and technology (eg. making artistic clothing from thrown rugs) Problem-solving and critical thinking skills in repurposing waste Environmental impact of reusing waste materials Students will demonstrate environmental awareness and respect for resources by reusing waste materials in art and technology projects. Students will apply creativity and critical thinking skills to solve real-world problems related to sustainability and resource management
Assessment	Students will be assessed based on their ability to repurpose waste materials into an art piece or a technological prototype, showcasing their creativity and understanding of resource protection.

Lesson Process		
Stage	**Teaching and Learning Activity**	**Learner's activity/Learning Points**
Introduction (5 min)	Introduction of the concept of zero waste and the importance of resource protection Question: "How can we use old garments, bottle caps, and school books to create something new and useful?"	Students give ideas in class on what may be done with old things.

Development, Step 1(10 min)	Give old garments, bottles, caps, lids, books etc to students. Discuss the key points on the importance of zero waste and creativity in reusing waste materials Engage students in a brainstorming session on potential projects using old garments, bottle caps, and school books Misconception: Students may think waste materials are useless and should be thrown away, rather than repurposed.	Students work in groups and try to think of appropriate use of old material. A good suggestion would be to work towards a more artistic presentation and depiction of buildings of the local community, creation of replicas of national art pieces etc. Students deliberate and take notes, make designs etc.
Step 2 (15 min)	Provide examples of art pieces and technological inventions made from reused waste materials Guide students in brainstorming and planning their own projects using waste materials Monitor student progress through one-on-one check-ins and group discussions.	Students listen to teacher and also share their own ideas with the rest of the class. Students will work in groups to create their art piece or technological prototype using the waste materials provided. This work will also continue as team work after school.
Step 3 (10 min)	Thorough explanation of the assignment: Tell students to create a visual representation of the finished project along with a short explanation of the materials used and the message behind their creation.	Students listen, take notes and discuss of the next steps in groups. Students will present their prototype design drafts to the class and reflect on the process of repurposing waste materials.
Conclusion (5 min)	To enhance students' future artistic creation, show a few flashcards of famous artists or inventors who incorporate sustainability and reuse practices in their work.	Students look at the artists and artwork and get inspired.

Lesson Plan 3	
Subject	**Music** and **Mathematics**
Topic	Exploring the Harmony of Music and Mathematics Through Bartering
Sub-topic	Learning how to save money and resources through bartering processes
Teaching and Learning aids	Students' books, song about bartering benefits, mathematics sheets, known music tune to write a song on, video.
Rationale	Students will be able to recognize the importance of bartering as a method of saving resources and understand the mathematical concepts involved in the bartering process.
Specific Outcome	Importance of bartering in saving resources Benefits of bartering over purchasing items Mathematical calculations involved in a barter exchange Recognize the value of alternative methods of trade such as bartering in economic systems Apply mathematical concepts to real-world scenarios, including bartering exchanges
Assessment	Students will be assessed on their ability to identify at least three benefits of bartering compared to purchasing items and demonstrate their understanding of the mathematical calculations involved in a barter exchange through a practical activity.

Lesson Process		
Stage	**Teaching and Learning Activity**	**Learner's activity/Learning Points**
Introduction (5 min)	Engage students by playing a catchy song promoting the concept of bartering. Ask students why they think bartering was an important practice in ancient civilizations. Discuss the key points of bartering and its relevance in today's society.	Students listen to the song for a minute and then try to understand the benefits of bartering all the way back from ancient times. (Common misconception: Bartering is only done in underdeveloped societies)
Development, Step 1(8 min)	Provide scenarios for students to practice calculating the value of items in a barter exchange. Start with simple examples and gradually increase the complexity.	Students work individually and solve equations that involve bartering exchanges. They then work in pairs and check the answers. Following, they work in groups of four and see if

	Monitor student performance by observing their calculations and offering support where needed.	their answers agree (Think-Pair-Share technique).
Step 2 (14 min)	Task half students with creating a bartering scenario and calculating the equivalent value of items exchanged. Encourage rest half students to find real-life examples of bartering and write a song (lyrics) based on a familiar song.	Students work in groups of four. Some groups create an equation which involves bartering. Some groups create a song (write lyrics on a known tune) about bartering.
Step 3 (8 min)	Have students read their Mathematics scenarios and sing the songs. Then, in class, summarize the benefits of bartering compared to buying items in a traditional store.	Students will present their scenarios to the class and explain their calculations. They will also sing their songs. A follow-up discussion will implement knowledge.
Conclusion (5 min)	Reflect on how math was used in the barter exchange activity. Show examples of successful bartering transactions in small video as a close-up. https://www.youtube.com/watch?v=nnM3Hduimq0	Students watch a one-minute video and conclude on benefits of bartering. Students may record the song at home and upload the mathematics drills on the school webpage.

Example of exercise (Equations in Bartering Exchanges):

In a bartering system, goods or services are exchanged directly without the use of money. For example, a farmer may trade 10 bushels of apples for 5 bags of flour from a baker. These types of exchanges can be expressed using mathematical equations. Let's explore some examples of how equations can be used to represent bartering exchanges.

Fill in the Blank: Fill in the blank with the correct words: (Word Bank: goods, ten, mathematical, five, two)
In a bartering system, __ or services are exchanged directly without the use of money.
A farmer may trade __ bushels of apples for 5 bags of flour from a baker.
These types of exchanges can be expressed using __ equations.

The equation representing the farmer's trade would be: 10 bushels of apples = __ bags of flour.
If a carpenter trades 3 chairs for 2 tables, the equation would be: 3 chairs = __ tables.

Answer Key:
In a bartering system, goods or services are exchanged directly without the use of money.
A farmer may trade 10 bushels of apples for 5 bags of flour from a baker.
These types of exchanges can be expressed using mathematical equations.
The equation representing the farmer's trade would be: 10 bushels of apples = 5 bags of flour.
If a carpenter trades 3 chairs for 2 tables, the equation would be: 3 chairs = 2 tables.

Example of song for bartering:

Bargaining for a Better World
(Verse 1)
I used to buy everything I'd need,
But then I learned a better deed.
Bartering saves money and lives,
Helping us all thrive and survive.
(Chorus)
Bartering, oh how it shines!
Saving resources, a treasure so fine.
Trade and swap, learn the math,
A better way to walk life's path.
(Verse 2)
Saving resources, a crucial part,
It's good for the soul and the heart.
Bartering over purchases grand,
Makes the world a better land.
(Chorus)
Bartering, oh how it shines!
Saving resources, a treasure so fine.
Trade and swap, learn the math,
A better way to walk life's path.
(Bridge)
Say goodbye to excess spending,
Bartering is life-extending.
Calculate the trade just right,
Making the future so bright.
(Chorus)
Bartering, oh how it shines!
Saving resources, a treasure so fine.
Trade and swap, learn the math,
A better way to walk life's path.
(Outro)
So come along and join the fun,
Bartering under the shining sun.
Saving money, resources too,
A brighter world for me and you.

Lesson Plan 4	
Subject	**Geology** and **Art**
Topic	Exploring the Relationship Between Geology and Art concerning protection of Earth practices.
Sub-topic	See how trash and rubbish has influenced our Earth (soil, terrace, environment) and work towards a Zero Waste society.
Teaching and Learning aids	Students' books, videos, sketch books, art kit.
Rationale	Students will be able to analyze how geological formations have influenced various art forms throughout history and understand how important sustainability is.
Specific Outcome	Understand the impact of geological formations on art. Identify specific examples of art inspired by geology. Analyze the connection between geological features and artistic expression. Plan and conduct an investigation of the properties of water (polluted or non-polluted) and its effects on Earth materials and surface processes.
Assessment	Students will create a visual presentation showcasing the connection between a specific geological feature (being influenced by pollution) and a piece of art, explaining how the geological feature inspired the artwork.

Lesson Process		
Stage	**Teaching and Learning Activity**	**Learner's activity/Learning Points**
Introduction (5 min)	Show images of famous artworks inspired by nature and ask students to identify any geological elements present, especially influenced by pollution.	Students look at the images. Discussion follows on what needs to be changed and how we may turn ugliness into beauty.
Development, Step 1(10 min)	Watch two videos for inspiration (one each group) Video: Transforming Ocean Trash into Art https://www.youtube.com/watch?v=wDrKlByGEsA Discuss the geological features that influenced these artworks.	Students are divided in two groups. Each group watches a separate video. Students take notes. They explore ways to use material found buried in Earth or at the sea beds, material thrown in

	Video: Tilos – the first Zero Waste Greek island https://www.youtube.com/watch?v=5nD3x-avCP4 Discuss how a whole island used trash in an artistic way and works towards a zero-waste policy.	landfills etc. so as for them not to stay there and pollute the atmosphere.
Step 2 (20 min)	Have students look at a picture or realia of a natural geological feature (former trash or influenced by pollution) and create a piece of Art.	In five groups, students will choose a geological feature and create a piece of art inspired by it. They must be able to explain the connection between the two, so they also take notes.
Step 3 (5 min)	Ask students to present their work. Monitor student understanding of each piece of work by asking targeted questions during group discussions.	Students present their work to the class and explain the connection between the geological feature and the piece of art.
Conclusion (5 min)	Ask students to reflect on one new thing they learned about the influence of geology on art today and the need for sustainability and saving of our planet.	Students will be assessed on their ability to articulate the influence of geology on artistic expression. There is discussion on ways to prevent pollution and destruction of the Earth in the future.

Lesson Plan 5	
Subject	**Science, Physics, Home Economics, Greek Language**
Topic	Understanding Sustainable Development Goals and Precycling Practices in Science and Chemistry
Sub-topic	17 Sustainable Development Goals
Teaching and Learning aids	Students' books, Genial.ly site created e-book by Greek students describing 17 goals
Rationale	Students will be able to explain the concept of 17 sustainable development goals, understand the importance of protecting the environment, and apply precycling practices in Chemistry.
Specific Outcome	Introduction to 17 sustainable development goals Importance of protecting the environment in Chemistry Implementation of precycling practices to reduce waste Evaluate or refine a technological solution that reduces impacts of human activities on natural systems. Analyze ideas and perspectives on the environment and sustainability from various sources.
Assessment	Assessment: Students will create an e-poster showcasing the 17 sustainable development goals, identify ways to protect the environment, and propose precycling practices to reduce waste. (Work of Greek students shown here: https://view.genial.ly/65f878b0a181d30014340a13/guide-bravo2024-sdgs-guide)

Lesson Process		
Stage	**Teaching and Learning Activity**	**Learner's activity/Learning Points**
Introduction (5 min)	Students will watch a short video highlighting environmental issues around the world. Engage students by asking: "Why is it important for us to protect the environment? How can we contribute to a sustainable future?"	Students watch video and participate in discussion.
Development, Step 1 (8 min)	Discuss the 17 sustainable development goals and their significance. Explain the link between the sciences and environmental protection.	Students listen to teacher and then work in groups. They take notes of examples of precycling practices.

	(Common misconception: Recycling is enough to reduce environmental impact.) Have students work in groups and provide examples of precycling practices in daily life. Scaffold questioning from easy ("What is a sustainable development goal?") to hard ("How can we implement precycling in a chemical laboratory?"). Monitor student performance by circulating the room and providing guidance as needed.	
Step 2 (22 min)	Divide the class in 5 groups and give each group some Sustainable Development Goals to elaborate on. Provide material on each one of the goals and have students underline the main points. Help students create a guide on the 17 goals. This will also continue as homework and students will eventually upload their work on Genial.ly Have a few groups design precycling plans.	Students study the provided material and work on the 17 goals. They will also start creating drafts for a step-by-step guide on how to implement the precycling practice they proposed. Some students will design a plan for a precycling initiative in their school or community.
Step 3 (5 min)	Students will share their drafts and their precycling plans. Students are told that their work will continue for homework, will be uploaded on an app and be disseminated to the local community.	Students take notes and listen to peer feedback so as to tele-collaborate from home with their group.
Conclusion (5 min)	Elaborate more on the 17 goals and the need for a well-written platform where all the information will be gathered.	Students ask questions on project and prepare for the project which will be worked on from home.

Lesson Plans from TURKEY

Dalaman Oztas Anadolu is a small comprehensive institution. It is situated in the southwest part of Turkey located on the coast of the Mediterranean Sea. Our school is located in the city of Dalaman. Through different cultural manifestations we try to make our students know better the mixed-cultural inheritance. We collaborate with city theatre, tourist office, ethnological center and other institutions. They often have opportunities to visit fairs of modern literature, digital technology, science and mathematics and historically important localities.

Daily Lesson Plan 1

SUBJECT: SCIENCE

LESSON TOPIC: HUMAN AND NATURE

LEARNING objectives

- Students realize that they are a part of the environment they live in

MATERIALS needed

TOOLS AND MATERIALS USED: .
Written Sources
Smart board, EBA, Resource books

HOOK/ intro

LEARNING-TEACHING METHODS AND TECHNIQUES
1. Explanation, 2. Induction
3. Deduction, 4. Group discussion
5.Question and Answer, 6.Group Work

LESSON structure

THE WORLD ENVIRONMENT AND LIVING THINGS
No living thing can live alone. Humans and other living things use everything that makes up the environment together. However, unlike other living things, humans control the living and non-living entities of the environment. Therefore, humans are the ones who affect nature the most among living things.
The fact that we are a part of the environment we live in is an important concept for humans and a basic concept for understanding environmental responsibilities. Some important information on this subject:
a) Being a Part of Ecosystems: Humans are a part of various ecosystems on earth. These ecosystems include forests, lakes, rivers, oceans, deserts and more. b) Nutrition and Water Supply: We depend on the resources provided by the environment to sustain our lives. Our food, water and other basic needs come from nature. Living things are part of the food chain.
c) Breathing: We breathe in and out every moment, and this is one of the most basic indicators that we are a part of our environment. The air we breathe is full of oxygen produced by plants. d) Environmental Interactions: Natural factors such as climate, geography, vegetation and animals affect our daily lives. e) Environmental Pollution: People have the potential to pollute the environment. Factors such as industrial activities, waste management problems and air, water and soil pollution can negatively affect the health of nature and the environment we live in. f) Sustainability: People should contribute to the sustainability of the environment they live in. Sustainability includes preserving natural resources for future generations and fulfilling environmental responsibilities.

LESSON closure

*Ask them to observe human-nature interactions in their environment and prepare a report. In this report, they may be asked to explain with examples how humans affect the environment and how nature affects humans.
* The course will be evaluated by considering students' observation skills, participation and activity during discussion.
* Let's fill in the blanks
*Let's match For measurement and evaluation, projects, concept maps, diagnostic branched tree, structured grid, six hat technique, puzzle, multiple choice, open-ended, true-false, matching, fill in the blanks, two-stage test and other different questions and techniques will be used in appropriate places.

Daily Lesson Plan 2

SUBJECT: SCIENCE

LESSON TOPIC: ME AND MY ENVIRONMENT

LEARNING objectives

- Concepts: School and living environment, environmental cleanliness, nature, forest, park, garden, buildings, national parks, natural monuments, etc.
- Learning Outcome: F.3.6.2.4. Designs an artificial environment.

MATERIALS needed

TOOLS AND MATERIALS USED: . Written Sources
1. Our Science Book
2. Encyclopedias
3. Current publications
4. Story, story books

HOOK/ intro

LEARNING TEACHING METHODS AND TECHNIQUES
1. Explanation, 2. Induction
3. Deduction, 4. Group discussion
5. Travel observation, 6. Demonstration
7. Question and answer, 8. Case study
9. Brainstorming, 10. Role play
11. Group work, 12. Games
13. Role play

LESSON structure

- INTRODUCTION:

Continues with students asking whether human hands or nature have more contribution to the environment we live in.

- DEVELOPMENT:

Asks students for answers to their questions. If you had it all in your hands, what kind of environment would you design and asks them to draw and animate it. Asks them to observe the environment.

LESSON closure

- CONCLUSION:

We get information about the environments from everyone and conclude which one is more important.

LESSON PLAN 3

Textbook: Snapshot Intermediate
Unit: Struggle for Survival (Unit 16)
Lesson: The Impact of Deforestation
Time: 40 min
Skills: Reading, Listening, Speaking, Writing
Lesson aims:
- To raise awareness about the causes and effects of deforestation;
- To encourage students to think critically about solutions to deforestation;
- To help students understand and analyze texts related to deforestation;
- To improve students' speaking and writing skills on environmental topics.

Objectives:
- SWBAT identify and classify the causes of deforestation;
- SWBAT recognize and use key vocabulary related to deforestation;
- SWBAT discuss the consequences of deforestation and propose possible solutions;
- SWBAT form arguments and express their opinions on the issue;
- SWBAT use learned vocabulary in sentences of their own.

Assumptions:
- Ss must have basic knowledge of environmental problems;
- Ss must be interested in global environmental issues.

Anticipated problems and possible solutions:
- If Ss do not understand the oral instructions or tasks, they will be explained using visual aids and simplified language.

Materials: Textbook, Handouts, Pictures, Flashcards, Blackboard.
Methods: Brainstorming, mind mapping, conversation, reading, explanation, elicitation, description.
Interactions: Whole Class, Individual Work, Pair Work, Group Work.

LESSON PLAN 4

Textbook: Snapshot Intermediate
Unit: Struggle for survival (Unit 16)
Lesson: Waste Sorting and Recycling
Time: 40 min
Skills: Reading, Listening, Speaking, Writing

Lesson aims:
- To raise awareness of the importance of waste sorting and recycling.
- To teach students how to classify different types of waste (plastic, paper, glass, organic, etc.).
- To encourage students to take responsibility for reducing waste and protecting the environment.
- To improve students' speaking and writing skills through discussions and exercises related to waste sorting.

Objectives:
- SWBAT identify and classify different types of waste.
- SWBAT recognize and use key vocabulary related to waste sorting and recycling.
- SWBAT express their opinions on the importance of recycling and argue their point of view.
- SWBAT practice forming sentences using newly learned vocabulary.
- SWBAT describe proper waste disposal methods and suggest ways to reduce waste.

Assumptions:
- Students are familiar with basic environmental issues.
- Students have some prior knowledge of recycling and waste management.

Anticipated problems and possible solutions:
If students do not understand oral instructions, visual aids (pictures, diagrams) will be used.

Materials: Textbook, Handouts, Pictures, Flashcards, Blackboard, Recycling Bins (if available).
Methods: Brainstorming, categorization, discussion, reading, explanation, description, role-playing.
Interactions: Whole Class, Individual Work, Pair Work, Group Work.

LESSON PLAN 5a

Textbook: (Insert textbook name here)
Unit: Struggle for Survival (Unit 16)
Lesson: Recycling and Protecting the Environment
Time: 40 min
Skills: Reading, Listening, Speaking, Writing
Lesson Aims:
- To highlight the importance of recycling and its impact on the environment.
- To encourage students to take action and adopt recycling habits.
- To develop students' vocabulary related to recycling and waste management.
- To improve students' reading and listening comprehension skills.
- To help students express their opinions on recycling both verbally and in writing.

Objectives:
- SWBAT identify and classify different types of recyclable materials.
- SWBAT recognize and use key vocabulary related to recycling in context.
- SWBAT exchange opinions on the importance of recycling and support their ideas with examples.
- SWBAT create sentences using new vocabulary.
- SWBAT describe practical ways to recycle in daily life.

Assumptions:
- Students have basic knowledge of environmental issues.
- Students will be eager to participate in discussions.

Anticipated Problems and Possible Solutions:
- If students struggle with certain vocabulary or concepts, visual aids (such as recycling symbols and posters) will be used to support understanding.

Materials: Textbook, handouts, pictures, flashcards, recycling symbols, blackboard.
Methods: Brainstorming, word webs, discussion, reading, listening, explanation, description.
Interactions: Whole-class discussion, individual work, pair work, group work.

LESSON PLAN 5b

Textbook: Snapshot Intermediate
Unit: Struggle for survival (Unit 16)
Lesson: Protecting the natural environment (*Earth Day*)
Time: 40 min
Skills: Reading, Listening, Speaking, Writing

Lesson aims:
- to highlight the importance of enviromental protection and raise awareness of the many ways people can help save our planet;
- to encourage Ss to take action in response to environmal degradation;
- to encourage Ss to perceive the overall meaning of the text and develop knowledge in relation to it;
- to develop Ss' speaking and writing competences.

Objectives:
- SWBAT identify asnd classify global enviromental problems;
- SWBAT identify learned words and phrases in authentic texts on the topic of enviromental protection;
- SWBAT exchange opinions on the topic, argue their point of view and give examples to support their ideas;
- SWBAT practise vocabulary related to the topic in sentences of their own;
- SWBAT describe ways to help save theplanet5.

Assumptions:
- Ss must be familiar with enviromental issues;
- Ss must be eager to participate.

Accipated problems and possible solutions;
- If Ss do not understand the oral commands or the tasks, they will be translated into Romanian.

Materials: Textbook,Handouts,Pictures, Flashcards, Blackboard.
Methods: brainstorming word webs, conversation, reading, explanation, elicitation, description
Interactions: Whole class, Individual Work, Pair Work, Group Work.

Lesson Plans from SPAIN

I.E.S. Cerro de los Infantes was established in 1983 and is located in Pinos Puente, 18 kilometers from the city of Granada in the Autonomous Region of Andalusia. Our school is located in front of a marginal neighborhood of the town. The number of our students is around 700. We have 74 teachers and 5 people working as caregivers in directorial duties and services.
Our main goal is to provide all our students with a quality public education in line with the curriculum. This goal has special tangibility in our most vulnerable population, because we want to make an improvement in their personal, social and cultural conditions and build a bridge to get out of the situation of social exclusion.Our education is holistic, comprehensive and inclusive, and we strive to integrate and adapt the European Programme so that it is useful to every student for everyday life.

ACTIVITY

Diagnostic activities and evaluation of the state of our rivers.

Carrying out outings to the rivers along different river sections previously chosen. With the help of didactic material, the problems of each river course and its environmental interest will be brought closer to the participants. Previous activities will be carried out in the classroom to motivate and plan the activity to be developed in the river.

Objectives: On the one hand, to assess the previous ideas that different people have about the ecological state of the river, to collect experiences of contact with it, analysis, concerns... to contrast with what was found during the visit and to be able to guide the subsequent awareness-raising work.

On the other hand, to apply diagnostic techniques of water quality and other aspects through tools and cards enabling the collection of data and their subsequent analysis and evaluation.

Finally, to develop creativity through photographic reports that illustrate the work carried out and allow to know in broad outline the characteristics of the studied section, the conflictive points, the best preserved, the most degraded, the most degraded

best preserved, the most degraded, etc. and to make them known to the rest of the educational center.

During the trip to the section's route, a diagnosis and evaluation will be carried out from several points of view. In the first place, we intend to sample certain water quality parameters: Ph; dissolved oxygen; temperature;

Turbidity. In addition, the sampling will be extended by measuring nitrates and nitrites.

A diagnosis of the hydromorphological indicators will then be made, taking into account the most elementary parameters and indicators of the flow, the riverbed and the riverbank by means of a field card.

Another aspect of the diagnosis is the observation of the fauna and flora and to know which species are typical of the river and which are invasive, in order to subsequently carry out an awareness-raising activity in the school on human practices that influence their presence.

After the field trip and with the results obtained and the photos taken in the field, “Reports of river sections” describing the ecological state of the section studied are planned.

REAL EXPERIENCE

In our school we have developed this activity with a group of 1st ESO. In these samplings scientific rigor is present, as always, but it is not the priority. However, the students went from not wanting to go near the river to queuing up to put on their boots, and some reluctant students also ended up catching and identifying macroinvertebrates. The red crabs continue to live here very well, we took two of similar size to the other time or a little bigger.

Recall that the possible values for the ecological status of a river are as follows: Very good 🔵, Good 🟢, Moderate 🟡, Poor 🟠 and Bad 🔴.

In the river analyzed we have seen this time nitrogen values slightly above the acceptable limit, which is 0.4 for ammonium, and oxygen this time was better; the river was running with less water, but less turbid. Here what was measured, with its classification:

pH: 8 ➞ Good 🟢

Dissolved oxygen: 6 mg/l ➞ Good 🟢

Ammonium (NH4): 0.5 mg/l ➞ Moderate 🟡

Ammonia (NH3): 0.5 mg/l ➞ Moderate 🟡

And the macroinvertebrates we found gave us a score of *5*, which also corresponds to Moderate 🟡 (the previous time we got a score of 6, moderate likewise).

We always stay with the worst score (the principle of the European Directive is “One out, all out”). So our river would be in yellow *Moderate* 🟡, a category that without being very bad Does not reach good status. This is consistent, with minor differences, with what we observed in our previous sampling.

Lesson Plan 1: Impact action
Activity to raise awareness, care and protection of the natural environment of our town.

Objectives:

A) That students have knowledge of the importance of water.
B) To make students aware of their biological and environmental heritage.
C) That our students understand that environmental heritage is as important as cultural or architectural heritage.
D) To raise awareness of the importance of caring for the natural environment.
E) Raising awareness of the production of waste.
F) Acquisition of concepts such as sustainability.

- Competences:

The aim is to develop environmental competence which is the set of knowledge, abilities, skills and attitudes, useful to interact with the environment, in an ethical, responsible and sustainable way, in order to avoid or diminish the negative effects produced by inadequate practices caused by human activity and to promote the benefits that professional activity can generate in the environmental field, taking into account its economic and social implications.

- Activity:

Walk to reduce the carbon footprint to the riverbed of the Cubillas River as it passes through the municipality (20 min).

Once at the river, there will be a practical presentation on everything the students know about rivers and have acquired in previous years and during this year's Biology course (15 min.).

An expert will present the current state of the river and talk about the species (both animal and plant) of the Mediterranean riparian forest (15 min.).

The current state of the riverbed in the section where we are going to intervene will be analysed (10 min.).

Activity to reflect on and raise awareness of the importance of preserving freshwater for the survival of human beings and the maintenance of nature as a way of saving the planet (20 min.).

Cleaning of the riverbed and reforestation with native plants (40 min.).

Return to School (20 min.).

Lesson Plan 2: Recycling Used Cooking Oil

The environmental impact of used cooking oil and the importance of recycling it.

Lesson overview

Lesson overview:

In this lesson, students will explore the harmful effects of disposing of used cooking oil improperly, especially on water systems and marine life.

They will learn about how oil pollution affects the environment and public health. The class will then explore the importance of recycling used oil

and will take part in a hands-on workshop to create a useful product (such as homemade soap) from recycled cooking oil.

Lesson objectives

Lesson objectives:

By the end of the lesson students will be able to:

- Understand how used cooking oil contaminates the environment
- Describe the consequences of oil pollution on water and ecosystems
- Identify responsible ways to manage and recycle used oil
- Participate in a practical workshop to reuse cooking oil at home

Resources

Resources:

- Video on oil pollution (e.g., https://www.youtube.com/watch?v=yEcwj6Yp5YQ or similar)

- Rough paper for group notes

- Observation sheet on oil use and waste

- Glass jars or plastic bottles with lids

- Used cooking oil (filtered), essential oils, caustic soda (handled by the teacher), gloves, water

- PPT presentation

- Labels and markers

- Poster materials (cardboard, coloured pens)

Procedure

Procedure:

1. Introduction (10 minutes)

- Show a short video about the environmental damage caused by pouring used oil down the drain.

- Ask: Have you or someone at home ever poured used oil into the sink? What do you think happens to it afterwards?

- Introduce key facts: 1 litre of oil can contaminate up to 1,000 litres of water.

2. Teacher's explanation (10 minutes)

- Explain the chain of pollution: from the kitchen drain to rivers, lakes, and oceans.

- Emphasise that used oil forms a layer that blocks oxygen and sunlight, harming aquatic life.

3. Group activity: Case study and observation sheet (15 minutes)

- Provide a fictional case: "A town with frequent sewer blockages and fish die-offs in a nearby river."
- In groups, students identify the source of the problem and propose environmentally friendly solutions.
- Write ideas on rough paper and share with the class.

4. Taller práctico: Homemade recycled-oil soap (30-40 minutes)

- Explain the basic chemistry behind soap-making (saponification).
- Teacher prepares the caustic soda mixture (students must not handle it directly).
- In groups, students combine filtered oil, the prepared mix, water and optional essential oils.
- Pour into molds or containers. Let it cure (leave to dry and harden for days).
- Label each group's creation and store safely.

5. Wrap-up and reflection (10 minutes)

- Ask: What did you learn today about oil waste?
- Students write one thing they will share at home to help reduce pollution.
- Optional: prepare posters or flyers to raise awareness in school or community.

Conclusion

Conclusion:

Used cooking oil is not just kitchen waste - it becomes an environmental hazard if disposed of incorrectly. Recycling it can prevent serious harm and even produce useful, eco-friendly products. Together, we can protect our water, our wildlife, and our future.

1. Activity: Scientific Exploration of the Cubillas River

- **Target Age Group:** 2nd year of Secondary Education (13–14 years old).
- **Location:** Cubillas River, Pinos Puente, Granada.
- **Schedule:** Full school day (approximately 5 hours in the field + travel time)

2. Activity Description

This activity allows students in 2nd year of Secondary Education to explore and understand the ecosystem of the Cubillas River through practical scientific methods. Students will be organized into rotating groups to participate in three specific workshops focused on studying different aspects of the river environment.

3. General and Specific Objectives

- Foster scientific curiosity and interest.
- Promote environmental awareness.
- Develop observation, analysis, and data recording skills.
- Encourage teamwork and cooperative learning.
- The main objective of these proposals is to improve students' scientific literacy, encompassing three fundamental areas: sustainability, research, and experimental science. The aims are:
    - Increase scientific, technological, and innovative culture in Spanish society, especially among young people.
    - Promote active public participation in scientific outreach activities and knowledge generation through citizen science projects.
    - Highlight the social and economic value of science and technology.
    - Improve the scientific training students may need for future scientific-technological studies or professional activities.
    - Encourage creativity, rational thinking, and a critical spirit in young people, enabling them to develop skills and values aligned with a knowledge-based economy, building a society capable of making evidence-based decisions.
    - Promote scientific literacy among school-age and non-university youth and spark their interest in scientific-technological careers through direct contact with the scientific method and hands-on research.

4. Key Competences

The main competences linked to these didactic proposals, in accordance with **Royal Decree 1105/2014, of December 26**, which establishes the basic curriculum for **Compulsory Secondary Education and Baccalaureate**, are:

- Linguistic communication
- Basic competences in science and technology
- Digital competence
- Learning to learn
- Social and civic competences
- Cultural awareness and expression

5. Subjects Involved and Content Blocks

A) The subjects involved will be:

- Biology
- Geology
- Chemistry
- Computer Science

B) The content blocks involved will be:

- **Block 1. Skills, abilities, and strategies. Scientific methodology.**
  The scientific method. Basic characteristics. Experimentation in Biology and Geology: gathering and selecting information from natural environment samples. Laboratory instruments and materials. Rules for use and safety.
- **Block 2. The Earth in the Universe. The hydrosphere.**
  Water on Earth. Freshwater and saltwater: their importance for living beings. Pollution of freshwater and saltwater. The biosphere. Characteristics that made Earth a habitable planet.
- **Block 3. Biodiversity on planet Earth.**
  Classification systems of living beings. Concept of species. Binomial nomenclature. Invertebrates: Poriferans, Cnidarians, Annelids, Mollusks, Echinoderms, and Arthropods. Anatomical and physiological characteristics. Vertebrates: Fish, Amphibians, Reptiles, Birds, and Mammals. Anatomical and physiological characteristics. Adaptations of plants and animals to their environments.
- **Block 4. Research project.**
  Development and presentation of research on Biology or Geology content covered throughout the course. Introduction to scientific activity. Use of various sources of information. Use of ICT to search and select information and present conclusions. Individual and group work.

6.- WORK PROPOSALS: Fluvial ecology and the scientific method in the field

This day consists of a visual inspection of a stretch of the river, data collection by students, sampling of benthic macroinvertebrates for analysis, collection of plant samples for classification, and finally gathering information on the riverbed condition and water quality.

The main objective is to understand the natural environment and to highlight the richness of these spaces and the importance of their conservation and protection. The activity also aims to showcase techniques for studying and analyzing fluvial ecosystems.

6.1. – Presentation:

At the beginning of the practical workshops, the following contents will be explained as an introduction to the activity:

- a) How a river is defined and how a fluvial system is zoned.
- b) Presentation of the environmental values and the importance of nature conservation. Guidelines for environmentally respectful behavior.
- c) Precautionary measures and recommendations to be followed during the activity will also be presented.

6.2. – Safety Measures:

- Always go to the river accompanied, never alone.
- Be cautious with animals or stinging/irritating plants. If you are unsure about them, do not touch them.
- Pay special attention when crossing fast-flowing rivers or those deeper than ankle height: it can be very dangerous.
- As a precaution, do not drink river water. It is probably not potable.
- Use rubber gloves if you suspect the water might be contaminated.
- During or after the inspection, do not eat without washing your hands first.
- If you have any wounds, cover them properly with waterproof material.
- Avoid walking along unstable riverbanks, as they can be dangerous.
- If crossing private property is necessary, ask the owners for permission.
- Pay attention to weather forecasts.

6.3. – Distribution of Materials and Explanation of Methodology:

Next, materials will be handed out and a detailed explanation will be given of the data collection sheet, the macroinvertebrate sampling protocol, the field notebook for recording information on vegetation and riparian forest, and the process for collecting information on the riverbed health and water quality.

- Detailed explanation of Sheet 1

- Detailed explanation of Sheet 2
- Detailed explanation of Sheet 3

Students will then be divided into **three groups**, assigning different roles to each member to promote **cooperative learning**. Additionally, one student will be chosen as the **school representative** responsible for entering the collected data into the data collection sheet.

7.– Specific Workshops

Workshop 1: Classification of Benthic Macroinvertebrates

- **Workshop Description:**
  This workshop allows students to become "field scientists" for a day by participating in a real ecological research activity. It focuses on the collection, observation, and identification of benthic macroinvertebrates—visible invertebrate animals that live on the bottom of rivers (such as insect larvae, crustaceans, worms, etc.). These organisms are excellent bioindicators: their presence or absence provides clues about the health of the fluvial ecosystem.
- **Specific Objectives:**
  ◦ Identify and classify aquatic macroinvertebrates.
  ◦ Relate their presence to the ecological quality of the river.
- **Materials Needed:**
  ◦ High river boots
  ◦ Capture nets
  ◦ White trays
  ◦ Binocular magnifiers
  ◦ Tweezers and Petri dishes
  ◦ Identification and record sheets (Annex I)
- **Workshop Methodology:**
  ◦ Introduction to the concept of bioindicators
  ◦ Explanation of what macroinvertebrates are and why they are useful for assessing water quality
  ◦ Demonstration of how different species tolerate varying levels of pollution
  ◦ Example: The presence of mayflies or caddisflies usually indicates clean water, whereas tubificid worms or certain dipteran larvae (e.g., chironomids) can live in polluted water.
- **Sample Collection:**
  ◦ Students will be taught how to use bottom nets to capture macroinvertebrates in slow-flowing areas of the river.
  ◦ Wearing high boots, students will collect substrate samples (leaves, stones, sand), gently shaking them in white trays filled with water.
- **Classification and Identification:**
  I. Binocular magnifiers, tweezers, and Petri dishes will be used to observe morphological features (body shape, number of legs, gills, etc.).

II. Using the identification sheets (Annex I), students will determine the group each organism belongs to.
III. Each group will record their findings in a table and discuss what the results suggest about the water quality.

- **Final Reflection:**
  I. Each group will formulate a small hypothesis on the river's condition based on their sample.
  II. All groups will share their results to establish a global assessment of the ecosystem.

Workshop 2: Physico-Chemical Water Analysis

- **Workshop Description:**
  In this workshop, students will become water quality analysts, using simple but real field laboratory techniques. Through various physico-chemical tests, students will obtain objective information about the state of the Cubillas River water. Interpreting this data will help determine whether the water shows signs of pollution and how it might affect the living organisms in the fluvial ecosystem.

Workshop Methodology

◦ **Introduction to Physico-Chemical Parameters**

- A brief explanation will be given about the indicators to be measured:
  - **pH**: indicates whether the water is acidic, neutral, or basic.
  - **Ammonia (NH_3)**: may signal organic pollution (animal or industrial waste).
  - **Sulfates and Sulfites**: sulfur-based compounds linked to industrial discharges or decomposition of organic matter.
- Ideal values for freshwater will be discussed, as well as the implications of deviations from those values.

◦ **Sample Collection**

- Water samples will be collected using sterile bottles, following basic hygiene protocols to prevent cross-contamination.
- Water temperature will be measured using thermometers, as it influences oxygen solubility and aquatic life.

• Field Analysis

- Test strips and portable chemical kits will be used to analyze the aforementioned parameters.
- Students will use a color chart or value table to interpret the results and record each one on the data sheets (Annex II).
- If time and resources permit, duplicate samples may be analyzed to check data reliability.

• Interpretation and Discussion

- Groups will discuss what their results indicate: Is the water clean? Is there pollution? What actions could humans take to improve water quality?
- A joint session will be held to compare data from all groups and develop a general diagnosis of the river's physico-chemical condition.

• Specific Educational Objectives

- Become familiar with basic scientific tools for water analysis.
- Understand how physico-chemical factors affect living organisms.
- Apply the scientific method through observation, analysis, and hypothesis formulation.
- Develop skills in recording, interpreting, and communicating scientific data.
- Raise awareness of the impact of human activities on aquatic ecosystems.

• Scientific and Environmental Relevance

Physico-chemical water analysis is a cornerstone in the study of ecosystems. Through this workshop, students learn how water chemistry determines life conditions, and how small changes can have major ecological consequences. Moreover, they understand that rigorously measured data can be a powerful tool for environmental advocacy and for promoting responsible actions.

Workshop 3: Botanical Inventory and Field Journal

• General Description of the Workshop

This workshop transforms students into botanical explorers, tasked with discovering, observing, and recording the flora of the riparian ecosystem. Through direct observation and fieldwork, students will identify the most representative plant species of the riparian forest around the Cubillas River and create a personal botanical journal, serving as both a scientific record and an artistic testimony of their experience.

• Specific Objectives

- Identify typical plant species of the riparian forest.
- Create a detailed botanical field journal.

• Required Materials

- Botanical guides
- Paper bags for leaf collection
- GPS devices or compasses
- Field notebooks (Annex III)
- Pencils and drawing materials

• Workshop Methodology

◦ **Ecosystem Contextualization**

- A brief introduction to what a riparian forest is, its ecological functions, and its importance in conserving the river ecosystem.
- Examples of typical plants in this habitat will be presented: willows, alders, ashes, reeds, canes, etc.

◦ **Fieldwork: Identification and Collection**

- In small groups, students will use illustrated botanical guides to locate and name the observed species.
- Leaves of selected plants (never entire specimens) will be collected and placed in paper bags for drying and later analysis.
- Location data will be recorded using GPS or a compass: orientation, position relative to the river, soil type, sunlight exposure, etc.

• Field Journal Development

Each student will complete their personal field notebook (Annex III), including:

- Common and scientific name of the plant
- Detailed drawing, photo, and/or leaf impression
- Observed characteristics (shape, color, arrangement)
- Habitat where it was found
- Personal comments or reflections

The use of drawing pencils or artistic materials is encouraged to improve attention to detail and motivation.

Sharing and Closure

- Some of the identified species will be shared and discussed, emphasizing the role of riparian vegetation in stabilizing riverbanks, controlling erosion, and enhancing biodiversity.
- Optionally, groups may compare findings and create a collective inventory of species discovered during the session.

Specific Educational Objectives

- Observe and identify native flora of the riparian ecosystem.
- Learn how to record and classify species using field techniques.
- Develop skills in scientific illustration and botanical description.
- Encourage respect for nature and responsible sample collection.

- Stimulate focus, attention to detail, and personal expression through the field notebook.

Scientific and Environmental Relevance

Riparian vegetation is one of the most important ecological indicators of a healthy river ecosystem. Through this activity, students not only gain botanical knowledge, but also develop deep ecological awareness, understanding the vital role of plants in natural balance. Additionally, the field notebook becomes a powerful tool that connects science, art, and environmental education.

Tabla de Recogida de Datos – Taller 2: Análisis Físico-Químico del Agua

Nº Muestra	Temperatura (°C)	pH	Amoniaco (NH_3/NH_4^+) [mg/L]	Sulfatos (SO_4^{2-}) [mg/L]	Sulfitos (SO_3^{2-}) [mg/L]	Turbidez (NTU)	Color / Olor	Observaciones
1								
2								
3								
4								
5								
6								
7								
8								
9								
10								
11								
12								

Indicaciones para el uso:

- **Temperatura:** registrar con termómetro antes de tomar la muestra.
- **pH:** utilizar tiras reactivas o medidor digital.
- **Amoniaco, sulfatos y sulfitos:** utilizar los reactivos o kits de análisis indicados.
- **Turbidez:** si se dispone de medidor, anotar en NTU; si no, descripción visual.
- **Color / Olor:** observación cualitativa (ej. “transparente / sin olor”, “marrón / olor a podrido”).
- **Observaciones:** cualquier aspecto relevante del entorno, del muestreo o resultados.

Lesson Plan 5: Sea Level Rise and Its Environmental Impact

The Learning Intentions

The Learning Intentions:

- To explore historical data on sea level measurements through online research

- To understand the increase in sea levels over time

- To calculate the approximate rise in sea level from past records to the present day

- To reflect on the environmental and societal impact of sea level rise through group discussion and presentation

Materials Needed

Materials Needed:

- Computers with internet access (one per pair or group)

- Research log sheet/table (prepared by the teacher)

- Calculator (optional)

- A projector or whiteboard for group presentations

Target Group and Age

Target Group and Age:

- Students in 1º ESO (12-13 years old)

- Small groups of 3-4 students

Lesson Development (Total: 50 minutes):

1. Introduction (5 minutes)

- Brief explanation of the term "sea level" and why its rise is a concern.

- Show a short image or graph of sea level trends.

2. Guided Internet Research (15 minutes)

- Students use their computers to search for historical sea level data.

- Teacher provides suggested sources (e.g., NOAA, NASA, IPCC).

- Students complete a log sheet recording sea levels from selected years (e.g., 1880, 1920, 1950, 1980, 2000, 2020, present year).

3. Calculation and Comparison (10 minutes)

- Each group calculates the total increase in sea level between the earliest and latest data points.

- Groups write down their result and discuss whether the change is significant.

4. Group Work: Environmental Impact (15 minutes)

- Students reflect on how rising sea levels affect nature and humans (floods, coastal erosion, displacement, etc.).

- Each group prepares a short summary (poster, slide or oral report) about the dangers of sea level rise.

5. Sharing and Wrap-Up (5 minutes)

- Groups briefly present one key idea or consequence of sea level rise.

- Teacher reinforces the importance of awareness and action on climate change.

Additional Resources

Additional Resources:

- NASA Climate Change: https://climate.nasa.gov/vital-signs/sea-level/

- NOAA Sea Level Trends: https://tidesandcurrents.noaa.gov/sltrends/

- IPCC Reports: https://www.ipcc.ch/

- Educational video: "Sea Level Rise Explained" (YouTube, TED-Ed)

- Printable sea level log table (teacher-prepared)

Sea Level Log Table

Year	Sea Level (mm)	Source / Notes
1880		
1920		
1950		
1980		
2000		
2020		
Current Year		