



What is STEAM?

STEAM is an acronym that stands for Science, Technology, Engineering, Arts and Maths. It is based on Inquiry-Based Learning, the Communicative Approach and CLIL. STEAM encourages experiential and holistic learning and it focuses on 21st-century skills. STEAM-based learning allows for learner-centred and student-led lessons where the teacher has the role of an explorer among the learners.

What are the aims of STEAM in the English classroom?

The use of STEAM in the English classroom aims to:

- encourage the exploration of the world, and help students gain knowledge about real-life situations.
- reinforce independence and autonomy, and make learners responsible for their own learning process.
- develop communication skills by using the English language, and support interaction skills between learners.
- engage and motivate students in their own learning process.

What are the benefits of STEAM in the English classroom?

- Learners gain knowledge about the world around them.
- They collaborate with their peers in order to complete the STEAM challenges.
- They use the English language as the medium of communication and they accomplish their tasks by gaining new learning outcomes.
- They develop important 21st-century skills (Communication, Collaboration, Creativity, Critical Thinking and Problem-Solving).
- They become curious, and they are eager to learn more and continue their learning process.
- They are actively engaged in the learning process.
- They feel secure throughout the learning process and they are able to develop and share ideas with their peers.
- They become autonomous and independent, an extremely important asset for the language-learning process.

Science

Science is commonly used to learn about and explain the natural world through experiments, but it is not only about that. It provides students with a different way of thinking and allows them to predict, observe and draw conclusions from their findings. By encouraging students to ask questions, solve problems and explain ideas, they develop scientific inquiry. Young learners are very interested in experimenting, testing and trying new things so through science, they become more motivated and eager to learn.

Technology

Technology is not only used to develop software and apps or to design electronic devices. It refers to a wide range of tools that have got a practical application. In the English language classroom, we use technology to help young learners understand the order and the process behind designing or building something that works.

Engineering

Engineering is a part of STEAM that combines elements of Arts and Maths. It is not only about creating crafts though. Students build projects by calculating, using various materials or searching for appropriate materials. This way, they dive into the process of creating specific mechanisms or equipment. Then, students have to test their designs and reflect on ways to improve them.

Arts

Arts is the most creative part of STEAM and the reason why STEM has been transformed into STEAM. The Arts section reinforces engagement and inspiration, and it promotes chances for innovation in the classroom. Arts includes drawing and painting, but it could also include drama, poetry, theatre, photography, videography, dancing and music. When children have the chance to produce art, they are able to express themselves, think creatively and use their imagination. The process starts with the inspiration stage where students observe and study pieces of art. Then, they create a draft of their pieces of art, which is a great way for students to understand the importance of drafting and redrafting – a useful technique for their future steps in STEAM and learning in general.

Maths

Maths is usually combined with Science and/or Engineering, and plays an important role in developing students' way of thinking by helping them develop their problem-solving and critical-thinking skills. Maths is implemented as a learning process during which students calculate, investigate graphics or experiment with concepts of geometry.

The Steps

A iWonder: During this initial stage, students answer simple questions to raise their interest in the STEAM activity and activate any previous empirical or academic knowledge of the topic.

B iImagine: In the second stage, learners predict or imagine what is going to happen. This stage promotes students' critical thinking and creativity, and motivates them for what follows.

C iExplore: In this stage, students follow the steps to carry out their experiment or create something. While the teacher is always there to monitor the activity and provide help, it is important for students to do their project/experiment by themselves or in pairs/groups. This way, students develop their critical thinking, collaboration and communication skills.

D iObserve: The observation stage is very important since students have to think critically and understand what they have explored. Students collaborate, discuss and share their thoughts on what they see/observe.

E iCreate: During the creative stage, students present the results of their project/experiment and their observations in the form of a drawing, poster, table, chart, presentation, etc. This allows students to gain a deeper understanding of the STEAM activity and also to improve their presentation skills as well as their overall self-confidence.

F iEvaluate: In this step, learners reflect on the process of the STEAM activity and the knowledge they gained from it, and identify strengths and weaknesses.

The Role of the Teacher

Teachers do not need to be STEAM experts or researchers to teach English through STEAM, as this is an approach to language learning in which students and teachers work together. Teachers need to be enthusiastic and excited for what is coming and eager to learn more about the STEAM mindset. It is a process that allows teachers to encourage curiosity and inquiry. Teachers monitor the activities and give feedback to students when necessary. They also motivate students to complete their STEAM challenge and encourage them to develop their social and thinking skills, thus developing their self-esteem.

STEAM Corner

It is a good idea to create a STEAM corner at the beginning of the school year. This is a corner of the classroom where students can find their tools and their materials, and display their creations. Teachers will also be able to use students' creations for future lessons or even as props for higher/lower levels. A STEAM corner will also encourage students' curiosity and organisational skills, since they will be able to find everything that is needed for their challenges there.

Some Tips

- Organise the materials before each lesson so as to have everything ready for the next STEAM activity.
- Set time limits during the stages of the challenges in order for students to carry them out more easily and effectively.
- If a STEAM activity doesn't work, there is no need to feel stressed. What matters most is the process, not necessarily the end result. Find alternative ways to explain the conclusion to your students, and explore together what went wrong and what should be done differently next time.
- Give feedback to students when necessary and provide them with help whenever they need it.
- Follow the instructions about pair work/groupwork to ensure communication between students.



Science 1 – Natural Disasters

Materials:

For this experiment, you will need:

- an empty glass jar with a lid
- water
- washing-up liquid
- glitter

Procedure:

- Explain the aim of the lesson to the Ss.
- Go through the new vocabulary and explain/elicit the meanings of the words.
- Allow Ss some time to think about and answer the questions in the *iWonder* section. (Key to Ex. 2: 1 tornado, 2 tsunامي, 3 flood, 4 earthquake)
- Show the materials in the *Imagine* section to the Ss and elicit how they can use them for the experiment. Give Ss some time to work together and answer the question. Monitor the pairs as they are working together.
- You can ask Ss to repeat the materials to practise the new vocabulary.
- Ask a student to read the *Did You Know?* boxes. Elicit if Ss knew these facts
- Ask a student to read the steps of the experiment in the *iExplore* section. Explain/Provide further information if necessary.
- Allow Ss time to do the experiment. Help and support throughout the process.
- Allow Ss time to work in pairs, talk about and write down their observations in the *iObserve* section.
- In the *iCreate* section, Ss work with a partner and think about what people should and shouldn't do to stay safe during a tornado. (Key to Ex. 7: A ✓, B ✓, C ✓, D ✗, E ✓, F ✓, G ✗, H ✗, I ✓)
- Then, allow Ss time to prepare a poster about how people can stay safe during a tornado. Alternatively, Ss can work on this at home and present their posters to the class in the next lesson.
- After finishing all the steps, Ss answer the questions in the *iEvaluate* section and complete the Evaluation Form at the back of their books.
- Encourage a class discussion about the STEAM activity.
- As an extension, ask Ss to research online, collect information about the Fujita Scale and prepare a presentation.

Science 2 – Hot-Air Balloons

Materials:

For this experiment, you will need:

- a very thin plastic bag
- string
- scissors
- a small paper cup
- a hairdryer
- a stopwatch

Procedure:

- Explain the aim of the lesson to the Ss.
- Go through the new vocabulary and explain/elicit the meanings of the words.
- Allow Ss some time to think about and answer the questions in the *iWonder* section.
- Show the materials in the *Imagine* section to the Ss and elicit how they can use them for their experiment. Give Ss some time to work together and answer the question. Monitor the pairs as they are working together.
- You can ask Ss to repeat the materials to practise the new vocabulary.
- Ask a student to read the *Did You Know?* boxes. Elicit if Ss knew these facts.
- Ask a student to read the steps of the experiment in the *iExplore* section. Explain/Provide further information if necessary.
- Allow Ss time to complete the experiment. Help and support throughout the process.
- Allow Ss time to work in pairs, talk about and write down their observations in the *iObserve* section.
- In the *iCreate* section, Ss test their hot-air balloons in various conditions and record their findings. Then, Ss present their hot-air balloons to the class.
- After finishing all the steps, Ss mark the statements in the *iEvaluate* section as *T* (True) or *F* (False) to check their understanding, and complete the Evaluation Form at the back of their books.
- Encourage a class discussion about the STEAM activity.
- As an extension, Ss can work in groups, research online and collect information about the history of hot-air balloons. You can then ask the groups to present the history of hot-air balloons in parts, one after the other.

Science 3 – What is Evaporation?

Materials:

For this experiment, you will need:

- 2 plastic or glass bowls
- some water
- a marker
- food colouring (any colour you like)

Procedure:

- Explain the aim of the lesson to the Ss.
- Go through the new vocabulary and explain/ elicit the meanings of the words.
- Allow Ss some time to think about and answer the questions in the *iWonder* section. (Key to Ex. 3: A, B, C, D and F are examples of evaporation)
- Show the materials in the *imagine* section to the Ss and elicit how they can use them for the experiment. Give Ss some time to work together and answer the question. Monitor the pairs as they are working together.
- You can ask Ss to repeat the materials to practise the new vocabulary.
- Ask a student to read the *Did You Know?* box. Elicit if Ss knew this.
- Ask a student to read the steps of the experiment in the *iExplore* section. Explain/Provide further information if necessary.
- Allow Ss time to do the experiment. Help and support throughout the process.
- Allow Ss time to work in pairs, talk about and write down their observations in the *iObserve* section.
- In the *iCreate* section, Ss record a video of their experiment and then present it to the class.
- After finishing all the steps, Ss answer the questions in the *iEvaluate* section and complete the Evaluation Form at the back of their books.
- Encourage a class discussion about the STEAM activity.
- As an extension, Ss can choose one of the suggestions given to repeat their experiment in different conditions and record their observations.

Science 4 – Crystals

Materials:

For this experiment, you will need:

- table salt
- some boiling water
- a glass jar
- a pencil or a wooden skewer
- a piece of string
- a spoon
- some food colouring (if you want)
- a magnifying glass
- a smartphone

Procedure:

- Explain the aim of the lesson to the Ss.
- Go through the new vocabulary and explain/ elicit the meanings of the words.
- Allow Ss some time to think about and answer the questions in the *iWonder* section. (Key to Ex. 1: A, B, D, E and F are crystals)
- Show the materials in the *imagine* section to the Ss and elicit how they can use them to create crystals. Give Ss some time to work together and answer the question. Monitor the pairs as they are working together.
- You can ask Ss to repeat the materials to practise the new vocabulary.
- Ask a student to read the *Did You Know?* box. Elicit if Ss knew this.
- Ask a student to read the steps of the experiment in the *iExplore* section. Explain/Provide further information if necessary.
- Allow Ss time to do the experiment. Help and support throughout the process.
- Allow Ss time to work in pairs, talk about and write down their observations in the *iObserve* section.
- In the *iCreate* section, Ss take photos of their experiment on different days to record how crystals are formed and write a short sentence to describe what happens in each photo. Invite some students to present their photos to the class.
- After finishing all the steps, Ss answer the question in the *iEvaluate* section and complete the Evaluation Form at the back of their books.
- Encourage a class discussion about the STEAM activity.



Science 5 – A Lava Lamp

Materials:

For this experiment, you will need:

- a glass jar with a lid
- a cup of vegetable oil
- ¼ cup of vinegar
- food colouring (any colour you like)
- a tablespoon of baking soda
- water
- a spoon
- a paper cup
- a torch

Procedure:

- Explain the aim of the lesson to the Ss.
- Go through the new vocabulary and explain/ elicit the meanings of the words.
- Allow Ss some time to do the experiment, observe, think about and answer the questions in the *iWonder* section.
- Show the materials in the *imagine* section to the Ss and elicit how they can use them to make a lava lamp. Give Ss some time to work together and answer the question. Monitor the pairs as they are working together.
- You can ask Ss to repeat the materials to practise the new vocabulary.
- Ask a student to read the *Did You Know?* box. Elicit if Ss knew these facts.
- Ask a student to read the steps of the experiment in the *iExplore* section. Explain/Provide further information if necessary.
- Allow Ss time to complete the experiment. Help and support throughout the process.
- Allow Ss time to work in pairs, talk about, write down their observations and draw the steps of the experiment in the *iObserve* section.
- In the *iCreate* section, Ss record a video of their experiment and present it to the class.
- After finishing all the steps, Ss complete the sentences in the *iEvaluate* section. (**Key to Ex. 8:** 1 liquids, 2 bubbles, 3 sinks, 4 floats, 5 denser, 6 less dense) Then, they complete the Evaluation Form at the back of their books.
- Encourage a class discussion about the STEAM activity.

Technology 1 – Electricity

Materials:

For this project, you will need:

- a pencil (HB or softer, you can also use 4B or 6B)
- an A4 piece of paper
- a battery (9V)
- an LED
- sticky tape

Procedure:

- Explain the aim of the lesson to the Ss.
- Go through the new vocabulary and explain/ elicit the meanings of the words.
- Allow Ss some time to think about and answer the questions in the *iWonder* section. (**Suggested Answers to Ex. 4:** Electricity – TV, toaster, hairdryer, washing machine, etc, Battery – torch, alarm clock, watch, calculator, etc, Electricity/Battery – computer, video game console, smartphone, lamp, etc) (**Key to Ex. 5:** iron, copper and graphite are good conductors of electricity)
- Show the materials in the *imagine* section to the Ss and elicit how they can use them to create a simple electrical circuit. Give Ss some time to work together and answer the question. Monitor the pairs as they are working together.
- You can ask Ss to repeat the materials to practise the new vocabulary.
- Then, allow some more time for Ss to draw a sketch of their circuit in the box provided. Alternatively, Ss can draw in their notebooks.
- Ask a student to read the *Did You Know?* box. Elicit if Ss knew these facts.
- Ask a student to read the steps of the project in the *iExplore* section. Explain/Provide further information if necessary.
- Allow Ss time to complete the project. Help and support throughout the process.
- Allow Ss time to work in pairs, talk about and write down their observations in the *iObserve* section.
- In the *iCreate* section, Ss create different electrical circuits following the suggestions given and keep a record of their successful attempts.
- Invite several Ss to present their electrical circuits to the class.
- After finishing all the steps, Ss complete the sentences in the *iEvaluate* Section and then, complete the Evaluation Form at the back of their books.
- Encourage a class discussion about the STEAM activity.

Technology 2 – A Potato Battery

Materials:

For this experiment, you will need:

- 3 or 4 fresh potatoes
- 6-8 zinc-coated nails
- 6-8 wires with crocodile clips at both ends
- 6-8 copper coins
- an LED

Procedure:

- Explain the aim of the lesson to the Ss.
- Go through the new vocabulary and explain/elicite the meanings of the words.
- Allow Ss some time to think about and answer the questions in the *iWonder* section. (**Key to Ex. 4:** A is a series circuit and B is a parallel circuit)
- Show the materials in the *Imagine* section to the Ss and elicit how they can use them to make a series circuit. Give Ss some time to work together and answer the question. Monitor the pairs as they are working together.
- You can ask Ss to repeat the materials to practise the new vocabulary.
- Then, allow some more time for Ss to draw their series circuit in the box provided. Alternatively, Ss can draw in their notebooks.
- Invite several Ss from around the class to predict what will happen when they connect all the materials.
- Ask a student to read the *Did You Know?* box. Elicit if Ss knew this.
- Ask a student to read the steps of the experiment in the *iExplore* section. Explain/Provide further information if necessary.
- Allow Ss time to carry out the experiment. Help and support throughout the process.
- Allow Ss time to work in pairs, talk about and write down their observations in the *iObserve* section.
- In the *iCreate* section, Ss create a poster to explain how they created their series circuit and how it works. They can also record the whole process on video: they can present the materials they used, the steps they followed and their observations.
- After finishing all the steps, Ss answer the question in the *iEvaluate* section and complete the Evaluation Form at the back of their books.
- Encourage a class discussion about the STEAM activity.
- As an extension, Ss can try two variations of the same experiment and record their observations and conclusions.

Technology 3 – Magnets

Materials:

For this project, you will need:

- a large iron nail
- electrical tape
- an AA battery
- a wire cutter
- some metal paper clips
- insulated (=with plastic cover) copper wire (about 1 m long)
- protective gloves

Procedure:

- Explain the aim of the lesson to the Ss.
- Go through the new vocabulary and explain/elicite the meanings of the words.
- Allow Ss some time to think about and answer the questions in the *iWonder* section. (**Key to Ex. 2:** most magnets are made of iron, nickel or cobalt. **Key to Ex. 4:** 1 attract, 2 repel, 3 repel, 4 attract)
- Show the materials in the *Imagine* section to the Ss and elicit how they can use them to make an electromagnet. Give Ss some time to work together and answer the question. Monitor the pairs as they are working together.
- You can ask Ss to repeat the materials to practise the new vocabulary.
- Then, allow some more time for Ss to draw an electromagnet in the box provided. Alternatively, Ss can draw in their notebooks.
- Ask a student to read the *Did You Know?* box. Elicit if Ss knew these facts.
- Ask a student to read the steps of the project in the *iExplore* section. Explain/Provide further information if necessary.
- Allow Ss time to complete the project. Help and support throughout the process.
- Allow Ss time to work in pairs, talk about and write down their observations in the *iObserve* section.
- In the *iCreate* section, Ss present their electromagnets to the class focusing on the points given.
- After finishing all the steps, Ss mark the statements in the *iEvaluate* section as *T* (True) or *F* (False) to check their understanding. (**Key to Ex. 11:** 1F, 2T, 3F, 4T, 5F) Then, they complete the Evaluation Form at the back of their books.
- Encourage a class discussion about the STEAM activity.
- As an extension, Ss can choose one of the following: they can research online, collect information about Michael Faraday, prepare a poster about him and his work on electromagnetism and present it to the class or, they can research online, collect information, photos and videos about maglev trains and present them to the class.



Technology 4 – Green Packaging

Materials:

For this project, you will need any of the following:

- old books
- pieces of cardboard
- old jars
- egg cartons
- pieces of fabric
- toilet roll tubes
- a fabric bag
- pieces of coloured paper
- old newspapers

Procedure:

- Explain the aim of the lesson to the Ss.
- Go through the new vocabulary and explain/elicit the meanings of the words.
- Allow Ss some time to think about and answer the questions in the *iWonder* section. (**Key to Ex. 1:** all materials, except for polystyrene, can be considered green packaging as long as they can be reused, recycled or upcycled)
- Show the materials in the *imagine* section to the Ss and elicit which they can use to create green packaging. Give Ss some time to work together and answer the question. Monitor the pairs as they are working together.
- You can ask Ss to repeat the materials to practise the new vocabulary.
- Then, allow some more time for Ss to decide what type of packaging they would like to create and which materials they would like to use.
- Ss draw their idea for green packaging in the box provided. Alternatively, they can draw in their notebooks.
- Ask a student to read the steps of the project in the *iExplore* section. Explain/Provide further information if necessary.
- Allow Ss time to complete the project. Help and support throughout the process.
- Allow Ss time to work in pairs and then, talk about and write down their observations in the *iObserve* section.
- In the *iCreate* section, Ss present their green packaging to the class focusing on the points given.
- After finishing all the steps, Ss complete the sentence in the *iEvaluate* section and then, complete the Evaluation Form at the back of their books.
- Encourage a class discussion about the STEAM activity.

Technology 5 – Let's Take a Virtual Tour

Procedure:

- Explain the aim of the lesson to the Ss.
- Go through the new vocabulary and explain/elicit the meanings of the words.
- Allow Ss some time to think about and answer the questions in the *iWonder* section. (**Key to Ex. 5:** 1D, 2A, 3B, 4J, 5I, 6G, 7H, 8E, 9C, 10F)
- Ask a student to read the *Did You Know?* box. Elicit if Ss knew these facts.
- Ask a student to read the steps of the project in the *iExplore* section. Explain/Provide further information if necessary.
- Allow Ss time to complete the project. Help and support throughout the process.
- Alternatively, Ss can work on the project at home.
- Allow Ss time to talk about and write down their observations in the *iObserve* section.
- In the *iCreate* section, invite groups of Ss to give their presentations to the class. Encourage the other groups to listen carefully, take notes and then give their feedback.
- Ss can vote for their favourite virtual tours. You can also add any other categories you like so that all the groups win.
- After finishing all the steps, Ss answer the question in the *iEvaluate* section and complete the Evaluation Form at the back of their books.
- Encourage a class discussion about the STEAM activity.

Engineering 1 – The Layers of the Earth

Materials:

For this project, you will need:

- 4 Styrofoam™ balls (various sizes)
- a paper cutter
- paints and paintbrushes

Procedure:

- Explain the aim of the lesson to the Ss.
- Go through the new vocabulary and explain/elicite the meanings of the words.
- Allow Ss some time to think about and answer the questions in the *iWonder* section. (**Key to Ex. 2:** 1 crust, 2 mantle, 3 outer core, 4 inner core)
- Show the materials in the *Imagine* section to the Ss and elicit how they can use them to create a model of the layers of the Earth. Give Ss some time to work together and answer the question. Monitor the pairs as they are working together.
- You can ask Ss to repeat the materials to practise the new vocabulary.
- Then, allow some more time for Ss to draw a model of the Earth and its layers in the box provided. Alternatively, Ss can draw in their notebooks.
- Ask a student to read the *Did You Know?* box. Elicit if Ss knew these facts.
- Ask a student to read the steps of the project in the *iExplore* section. Explain/Provide further information if necessary.
- Allow Ss time to complete the project. Help and support throughout the process.
- Allow Ss time to work in pairs and then, talk about and write down their observations in the *iObserve* section.
- In the *iCreate* section, Ss research online and collect information about the average temperature and the average thickness of each layer of the Earth.

Layer of the Earth	Average temperature	Average thickness
inner core	about 5,200° C	about 1,200 km
outer core	4,500° to 5,500° C	about 2,200 km
mantle	about 1,000°C near the crust to 3,700° C near the core	about 2,900 km
crust	average 15° C on the surface of the Earth to 600° C near the mantle	about 15 to 20 km

- Then, invite several Ss to present their models to the rest of the class and give information about each layer.
- After finishing all the steps, Ss complete the sentences in the *iEvaluate* section and then, complete the Evaluation Form at the back of their books.
- Encourage a class discussion about the STEAM activity.

Engineering 2 – Earthquakes

Materials:

For this project, you will need:

- a pan
- cardboard paper
- some marshmallows
- some jelly
- some toothpicks

Procedure:

- Explain the aim of the lesson to the Ss.
- Go through the new vocabulary and explain/elicite the meanings of the words.
- Allow Ss some time to think about and answer the questions in the *iWonder* section.
- Allow Ss time to read the descriptions of the possible damage earthquakes cause to buildings and then, draw a sketch for each piece of information in the boxes provided. Alternatively, Ss can draw in their notebooks.
- Show the materials in the *Imagine* section to the Ss and elicit how they can use them to create an earthquake-resistant building. Give Ss some time to work together and answer the question. Monitor the pairs as they are working together.
- You can ask Ss to repeat the materials to practise the new vocabulary.
- Then, allow some more time for Ss to draw a model of an earthquake-resistant building in the box provided. Alternatively, Ss can draw in their notebooks.
- Ask a student to read the *Did You Know?* box. Elicit if Ss knew these facts.
- Ask a student to read the steps of the project in the *iExplore* section. Explain/Provide further information if necessary.
- Allow Ss time to complete the project. Help and support throughout the process.
- Allow Ss time to work in pairs, test their models and then, talk about and write down their observations in the *iObserve* section.
- In the *iCreate* section, Ss present their earthquake-resistant buildings to the class including the information in the rubric.
- After finishing all the steps, Ss answer the question in the *iEvaluate* section and complete the Evaluation Form at the back of their books.
- Encourage a class discussion about the STEAM activity.
- As an extension, Ss can choose one of the ideas in the *iExtend* section. They can either research online to collect information about a famous earthquake-resistant building or collect information about the area where they live in, whether there are a lot of earthquakes there and why.



Engineering 3 – A Rube Goldberg Machine

Materials:

For this project, you will need:

- some dominoes
- toilet roll tubes
- some books
- wooden sticks
- a drawing pin
- some marbles
- a balloon
- a mug
- glue

Procedure:

- Explain the aim of the lesson to the Ss.
- Go through the new vocabulary and explain/ elicit the meanings of the words.
- Allow Ss some time to think about and answer the questions in the *iWonder* section.
- Make sure you allow time for Ss to research online to find photos and videos of Rube Goldberg machines so that they can understand more about them.
- Show the materials in the *imagine* section to the Ss and elicit how they can use them to create a Rube Goldberg machine. Give Ss some time to work together and answer the question. Monitor the pairs as they are working together.
- You can ask Ss to repeat the materials to practise the new vocabulary.
- Then, allow some more time for Ss to draw a Rube Goldberg machine in the box provided. Alternatively, Ss can draw in their notebooks.
- Ask a student to read the *Did You Know?* box. Elicit if Ss knew these facts.
- Ask a student to read the steps of the project in the *iExplore* section. Explain/Provide further information if necessary.
- Allow Ss time to complete the Rube Goldberg machine. Help and support throughout the process.
- Allow Ss time to work in pairs, test their machines and then, talk about and write down their observations in the *iObserve* section.
- In the *iCreate* section, Ss record a video of their Rube Goldberg machine in action, explaining what happens in each step. It's a good idea for Ss to record a slow-motion video so that they can show each step of the machine more clearly. You can use a smartphone to record the video. Most smartphones include a 'slow motion' option.
- After finishing all the steps, Ss write their opinion about Rube Goldeberg machines in the *iEvaluate* section and complete the Evaluation Form at the back of their books.
- Encourage a class discussion about the STEAM activity.

Engineering 4 – Over the Bridge

Materials:

For this project, you will need:

- wooden cubes
- paints and paintbrushes
- small stones or pebbles
- pieces of thick cardboard
- a ruler
- string
- glue
- wooden sticks

Procedure:

- Explain the aim of the lesson to the Ss.
- Go through the new vocabulary and explain/ elicit the meanings of the words.
- Allow Ss some time to think about and answer the questions in the *iWonder* section. (Key to Ex. 3: 1D, 2C, 3B, 4A, 5E)
- Show the materials in the *imagine* section to the Ss and elicit how they can use them to create a bridge. Give Ss some time to work together and answer the question. Monitor the pairs as they are working together.
- You can ask Ss to repeat the materials to practise the new vocabulary.
- Allow Ss time to brainstorm for ideas in their groups before they start designing their own bridge. Ss draw their models in the box provided. Alternatively, they can draw in their notebooks.
- Ask a student to read the *Did You Know?* box. Elicit if Ss knew this.
- In the *iExplore* section, Ss work in groups. Each group creates its own bridge. A student in each group reads the steps of the project. Explain/Provide further information if necessary.
- Allow Ss time to complete the project. Help and support throughout the process.
- Allow Ss time to talk about and write down their observations in the *iObserve* section.
- In the *iCreate* section, each group records a short video tutorial to show the steps they followed to build the model of their bridge.
- Ss can vote for the best bridge for each category. You can also add any other categories you like so that all the groups win.
- After finishing all the steps, Ss answer the questions in the *iEvaluate* section and complete the Evaluation Form at the back of their books.
- Encourage a class discussion about the STEAM activity.

Engineering 5 – Movable Bridges

Materials:

For this project, you will need:

- 10 wooden cubes
- wooden skewers
- 6 wooden cubes with holes
- 2 10ml-syringes (without the needles)
- some strong glue
- a bowl of water
- a small tube that can fit on the syringe
- 2 cable ties
- craft sticks

Procedure:

- Explain the aim of the lesson to the Ss.
- Go through the new vocabulary and explain/elicite the meanings of the words.
- Allow Ss some time to think about and answer the questions in the *iWonder* section.
- Show the materials in the *imagine* section to the Ss and elicit how they can use them to make a movable bridge. Give Ss some time to work together and answer the question. Monitor the pairs as they are working together.
- You can ask Ss to repeat the materials to practise the new vocabulary.
- Then, allow some more time for Ss to draw a sketch of their movable bridge in the box provided. Alternatively, Ss can draw in their notebooks.
- Ask a student to read the *Did You Know?* box. Elicit if Ss knew these facts.
- Ask a student to read the steps of the project in the *iExplore* section. Explain/Provide further information if necessary.
- Allow Ss time to complete the project. Help and support throughout the process.
- Allow Ss time to work in their groups, test their movable bridges and record their observations in the *iObserve* section.
- In the *iCreate* section, Ss give presentations about the movable bridge they have created. The steps provided can help the Ss organise their presentations. Alternatively, you can allow Ss time to prepare their presentations at home. Invite several students to present their movable bridges in the next lesson.
- After finishing all the steps, Ss answer the questions in the *iEvaluate* section and complete the Evaluation Form at the back of their books.
- Encourage a class discussion about the STEAM activity.

Arts 1 – Reimagining Famous Portraits

Procedure:

- Explain the aim of the lesson to the Ss.
- Go through the new vocabulary and explain/elicite the meanings of the words.
- Allow Ss some time to think about and answer the questions in the *iWonder* section. (Key to Ex. 2: 1Bd, 2De, 3Ca, 4Ab, 5Ec)
- Show the images in the *imagine* section to the Ss and elicit how they compare to portraits 1 and 2 from Ex. 2. Monitor the pairs as they are working together.
- Then, allow some time for Ss to think about why and how artists change famous portraits.
- Ask a student to read the *Did You Know?* box. Elicit if Ss knew this.
- Ask a student to read the steps of the project in the *iExplore* section. Explain/Provide further information if necessary.
- Allow Ss time to complete the project. Help and support throughout the process.
- Allow Ss time to work in pairs, talk about and write down their observations in the *iObserve* section.
- In the *iCreate* section, Ss present their reimagined portrait to the class following the ideas given. Alternatively, Ss can work on this at home and present their portraits in the next lesson.
- After finishing all the steps, Ss answer the question in the *iEvaluate* section and complete the Evaluation Form at the back of their books.
- Encourage a class discussion about the STEAM activity.



Arts 2 – Abstract Art

Materials:

For this project, you will need:

- drawing paper
- a pencil or black marker

and any of the following:

- coloured pencils
- coloured markers
- wax crayons
- finger paints
- coloured chalk
- paints and paintbrushes

Procedure:

- Explain the aim of the lesson to the Ss.
- Go through the new vocabulary and explain/ elicit the meaning of the phrase.
- Allow Ss some time to think about and answer the questions in the *iWonder* section.
- Show the materials in the *Imagine* section to the Ss and elicit which they would like to use to create an abstract painting. Give Ss some time to think about and answer the question.
- You can ask Ss to repeat the materials to practise the new vocabulary.
- Ask a student to read the *Did You Know?* box. Elicit if Ss knew these facts.
- Ask a student to read the steps of the project in the *iExplore* section. Explain/Provide further information if necessary.
- Allow Ss time to complete the project. Help and support throughout the process.
- Then, allow Ss time to work in pairs, observe their partner's painting, talk about and write down their observations in the *iObserve* section.
- In the *iCreate* section, Ss present their abstract paintings to the class including the points given.
- After finishing all the steps, Ss tick the correct answers in the *iEvaluate* section to check what they have learnt about abstract art and complete the Evaluation Form at the back of their books.
- Encourage a class discussion about the STEAM activity.
- As an extension, Ss can research online to collect information about a famous abstract painter and present them to the class. Then, they can organise an abstract art exhibition at school to celebrate World Art Day and present abstract paintings from famous artists as well as their own abstract paintings.

Arts 3 – The Colour Wheel

Procedure:

- Explain the aim of the lesson to the Ss.
- Go through the new vocabulary and explain/ elicit the meanings of the words.
- Allow Ss some time to think about and answer the questions in the *iWonder* section. (**Key to Ex. 4:** primary colours: yellow and blue, secondary colour: green, tertiary colours: red-orange, blue-purple).
- Go through the colour schemes in the *Imagine* section with the Ss and explain each one. Then, give Ss some time to work together and answer the question in Ex. 6 (**Key:** 1 complementary scheme, 2 analogous scheme, 3 monochromatic scheme)
- Ask a student to read the *Did You Know?* box. Elicit if Ss knew these facts.
- Ask a student to read the steps of the project in the *iExplore* section. Explain/Provide further information if necessary.
- Allow Ss time to create their paintings. Help and support if necessary.
- Allow Ss time to work in pairs, talk about and write down their observations in the *iObserve* section.
- In the *iCreate* section, allow Ss time to prepare labels for their paintings. Then, put all paintings on the walls of the classroom and turn the classroom into an art gallery.
- After finishing all the steps, Ss answer the question in the *iEvaluate* section and complete the Evaluation Form at the back of their books.
- Encourage a class discussion about the STEAM activity.

Arts 4 – Patterns in Painting

Materials:

For this project, you will need:

- a pencil or black marker
- drawing paper and a ruler, or graph paper

and any of the following:

- paints and paintbrushes
- coloured markers
- wax crayons
- coloured pencils

Procedure:

- Explain the aim of the lesson to the Ss.
- Go through the new vocabulary and explain/ elicit the meanings of the words.
- Allow Ss some time to think about and answer the questions in the *iWonder* section. (**Key to Ex. 2:** 1 layers of a tree trunk, 2 a rose, 3 skin of a leopard, 4 scales of a fish, 5 honeycomb, 6 pine cone)
- Allow extra time for Ss to research online and find a pattern that appears in their country's art, and then draw it in the box provided. Alternatively, Ss can draw in their notebooks.
- Show the materials in the *Imagine* section to the Ss and elicit which of these Ss would like to use to create their paintings with patterns. Give Ss some time to think about and answer the question.
- You can ask Ss to repeat the materials to practise the new vocabulary.
- Ask a student to read the *Did You Know?* box. Elicit if Ss knew this and whether they can identify the pattern on the vase.
- Ask a student to read the steps of the project in the *iExplore* section. Explain/Provide further information if necessary.
- Allow Ss time to complete their paintings. Help and support throughout the process.
- Then, allow Ss time to work in pairs, observe their paintings, talk about and write down their observations in the *iObserve* section.
- In the *iCreate* section, Ss record a short video to present their paintings to the class including the points given.
- After finishing all the steps, Ss answer the question in the *iEvaluate* section and complete the Evaluation Form at the back of their books.
- Encourage a class discussion about the STEAM activity.
- As an extension, Ss can research online to collect information about a famous painter who used/uses patterns in their work, prepare a digital presentation about them and give the presentation to the class.

Arts 5 – Paint a Poem

Procedure:

- Explain the aim of the lesson to the Ss.
- Go through the new vocabulary and explain/ elicit the meanings of the words.
- Allow Ss some time to think about and answer the questions in the *iWonder* section.
- In the *Imagine* section, explain to the Ss what rhyme is and allow them time to complete the task. (**Key:** 1d, 2f, 3a, 4b, 5c, 6e/words that rhyme in 'The Swing': swing-thing, blue-do, wall-all, wide-countryside, green-again, brown-down)
- Ask a student to read the steps of the project in the *iExplore* section. Explain/Provide further information if necessary.
- Allow pairs of Ss time to write a poem. Then, each student paints an image that captures the idea of the poem. Advise Ss not to show their paintings to each other so as to avoid being influenced by their partners' paintings. Help and support if necessary.
- Allow Ss time to work in pairs, talk about their poem and paintings, and write down their observations in the *iObserve* section.
- In the *iCreate* section, Ss present their poems and paintings to the rest of the class, focusing on the points given.
- After finishing all the steps, Ss answer the questions in the *iEvaluate* section and complete the Evaluation Form at the back of their books.
- Encourage a class discussion about the STEAM activity.
- As an extension, allow Ss time to have a free discussion about what Leonardo da Vinci said regarding the connection between painting and poetry.



Maths 1 – Geometrical Buildings

Materials:

For this project, you will need:

- coloured cardboard
- sticky tape
- scissors
- paints and paintbrushes
- a compass
- a ruler

Procedure:

- Explain the aim of the lesson to the Ss.
- Go through the new vocabulary and explain/ elicit the meaning of the word.
- Allow Ss time to think about and answer the questions in the *iWonder* section. You can ask Ss to repeat the names of the types of 3D shapes to practise the new vocabulary. (**Key to Ex. 3:** 1 square-based pyramid, 2 cylinder, 3 cone, 4 sphere, 5 cube, 6 cuboid)
- In the *imagine* section, explain to the Ss that most 3D shapes, like cubes and pyramids, can be unfolded along their edges to create a flat 2D shape. This unfolded 2D shape is called the net of the 3D shape. Ts may choose to explain this in the Ss' L1 if necessary. Allow Ss time to study the designs and match them to their 3D shape. (**Key to Ex. 4:** 1C, 2D, 3F, 4B, 5E, 6A)
- Show the materials in the *imagine* section to the Ss and elicit how they can use them to build models of geometrical buildings. Give Ss some time to work together and answer the question. Monitor the pairs as they are working together.
- You can ask Ss to repeat the materials to practise the new vocabulary.
- Then, allow some more time for Ss to draw a sketch of a geometrical building in the box provided. Alternatively, Ss can draw in their notebooks.
- Ask a student to read the *Did You Know?* box. Elicit if Ss knew this.
- Ask a student to read the steps of the project in the *iExplore* section. Explain/Provide further information if necessary.
- Allow Ss time to create their geometrical buildings. Help and support if necessary.
- Allow Ss time to work in pairs, talk about and write down their observations in the *iObserve* section.
- In the *iCreate* section, allow Ss time to talk about their different buildings and explain why they chose the specific shapes using the vocabulary provided.
- After finishing all the steps, Ss answer the questions in the *iEvaluate* section and complete the Evaluation Form at the back of their books.
- Encourage a class conversation about the STEAM activity.

Maths 2 – Time Zones

Procedure:

- Explain the aim of the lesson to the Ss.
- Allow Ss time to think about and answer the questions in the *iWonder* section.
- Go through the *Did you know?* box and explain to Ss what UTC means and how we use it to find the time in various places around the world. Then, allow Ss time to do Ex. 4. First, Ss need to see what time it is in Reykjavik, Iceland and then add or subtract to find what time it is in these cities around the world. (**Key to Ex. 5:** for the first four places Ss need to subtract (S) and for the rest they need to add (A).
- In the *iExplore* section, allow Ss to work in pairs, use the information they have learnt so far and do calculations to solve these problems.

(Key to Ex. 7:

- 1 Sydney, Australia is 10 hours ahead of London, UK, so if it's 3:30 pm in London, it's 1:30 after midnight in Sydney. So it's not a good idea for Lucy to call her friend Arlo.
 - 2 New York City is 5 hours behind Dublin, Ireland, so if it's 6 pm in Dublin, it's 1 pm in New York City, and since it's a weekday, John should be at school. So, he can't watch the game.
 - 3 a) Frankfurt, Germany is 9 hours ahead of Los Angeles, USA. So, if it's 7 am in Frankfurt, it's 9 in the evening in Los Angeles (the previous night).
b) If Greta flies at 9 pm (Los Angeles time), she will arrive at 9 am the following day.
- Allow Ss time to work in pairs, talk about and write down their observations in the *iObserve* section. (Key: 1F, 2F, 3T, 4T).
 - In the *iCreate* section, Ss create three problems similar to the ones in the *iExplore* section. Then, they give them to other pairs to solve.
 - After finishing all the steps, Ss answer the questions in the *iEvaluate* section and complete the Evaluation Form at the back of their books.
 - Encourage a class conversation about the STEAM activity.

Maths 3 – Equality in Maths

Procedure:

- Explain the aim of the lesson to the Ss.
- Go through the new vocabulary and explain/elicite the meanings of the words.
- Allow Ss time to think about and answer the questions in the *iWonder* section. (Key to Ex. 3: 1 weight, 2 length/distance, 3 size, 4 time) (Key to Ex. 4: 1T, 2T, 3F, 4T, 5F, 6T)
- Show the cards in the *Imagine* section to the Ss and elicit what they need to do to match the cards. Remind Ss that they need to do the calculations inside the brackets first.
- Allow Ss time to do the calculations. Help and support throughout the process. (Key to Ex.6: 1B, 2C, 3A, 4E, 5D)
- Ask a student to read the *Did You Know?* box. Elicit if Ss knew this.
- Ask a student to read the steps of the project in the *iExplore* section. Explain/Provide further information if necessary.
- Allow Ss time to work in pairs, talk about and write down their observations in the *iObserve* section.
- In the *iCreate* section, allow Ss time to create and play a memory game by following the instructions.
- After finishing all the steps, Ss choose the correct word/phrase about them in the *iEvaluate* section and complete the Evaluation Form at the back of their books.
- Encourage a class conversation about the STEAM activity.

Maths 4 – Circles

Materials:

For this project, you will need:

- 8 small coins of the same size
- 8 big coins of the same size
- a compass
- a ruler

Procedure:

- Explain the aim of the lesson to the Ss.
- Go through the new vocabulary and explain/elicite the meanings of the phrases.
- Allow Ss time to think about and answer the questions in the *iWonder* section. (Key to Ex. 3: 1 ripples in water, 2 full moon, 3 orange, 4 bird's nest, 5 trunk of a tree). You can ask Ss to repeat the words/phrases in Ex. 3 to practise the new vocabulary.
- Allow Ss some time to study the diagrams and do the task in Ex. 4 (Key: 1C, 2A, 3D, 4B)
- Show the materials in the *Imagine* section to the Ss and elicit how they can use them to find out some facts about circles. Give Ss some time to work together and answer the question. Monitor the pairs as they are working together.
- You can ask Ss to repeat the materials to practise the new vocabulary.
- Ask a student to read the *Did You Know?* box. Elicit if Ss knew this.
- Ask a student to read the steps of each test in the *iExplore* section. Explain/Provide further information if necessary.
- Allow Ss time to carry out the tests. Help and support if necessary.
- Allow Ss time to work in pairs, talk about and write down their observations in the *iObserve* section. (Key to Ex. 7: 1T, 2F [You can fit 6 circles around a circle if they all have the same radius.], 3T, 4F [The right angle of the triangle is the one opposite the diameter of the circle.])
- In the *iCreate* section, allow Ss time to create a poster with drawings of circles. Alternatively, Ss can work on this at home and present the posters to the class in the next lesson.
- After finishing all the steps, Ss complete the statements in the *iEvaluate* section and then complete the Evaluation Form at the back of their books.
- Encourage a class conversation about the STEAM activity.

Maths 5 – The Amazing Number Pi

Materials:

For this project, you will need:

- pieces of A4 paper
- three plastic or glass bowls
- scissors
- a ruler
- a calculator
- some string
- several round objects (a paper plate, a paper cup, a lid, a tin can, etc)
- a compass

Procedure:

- Explain the aim of the lesson to the Ss.
- Allow Ss time to think about and answer the questions in the *iWonder* section. (Key to Ex. 2: 1 circumference, 2 diameter, 3 radius)
- Show the materials in the *Imagine* section to the Ss and elicit how they can use them to explore pi. Give Ss some time to work together and answer the question. Monitor the pairs as they are working together.
- You can ask Ss to repeat the materials to practise the new vocabulary.
- Ask a student to read the *Did You Know?* box. Elicit if Ss knew these facts.
- Ask a student to read the steps of the two tests in the *iExplore* section. Explain/Provide further information if necessary.
- Allow Ss time to carry out the tests. Help and support if necessary.
- Allow Ss time to work in pairs, talk about and write down their observations in the *iObserve* section. (2. The number pi is 3.14. / 3. The circumference of a circle is $\pi \times$ diameter.)
- In the *iCreate* section, allow Ss time to create a video presentation to explain what pi is. Ss can also prepare a pi collage.
- After finishing all the steps, Ss choose the correct word in the *iEvaluate* section to check what they have learnt about pi. (Key to Ex. 8: 1 circles, 2 approximately, 3 the same, 4 Greek) Then, they complete the Evaluation Form at the back of their books.
- Encourage a class conversation about the STEAM activity.

Project 1 – Go Green

Aim

In order to fight climate change, cities all over the world are trying to become green. The aim of this project is to understand the importance of green cities, places where people save energy and protect the environment. In this project, we will learn about:

- green cities
- wind power and wind turbines
- how towns/cities can become greener
- the importance of making our everyday lives greener

Suggested timeline

Week 1: We learn about green cities.

Week 2: We learn about wind power and wind turbines.

Week 3: We do a survey about how towns/cities can become greener.

Week 4: We design a poster to inform people about the importance of green living.

TIPS:

- Before you start this long-term project, you can write the timeline on a piece of A4 paper and post it on the classroom wall. You can ask students to brainstorm on the titles of every week and think about what they'll do every week. This way, you can engage your students and make them feel curious and motivated about the project.
- The weekly timeline above is a suggestion only. Teachers can either complete all the tasks in one lesson, or divide them into smaller parts and complete them in more than one lesson.

Week 1: Green Cities

Materials:

For this project, you will need:

- green and blue crepe paper
- empty milk cartons
- empty tin cans
- paints and paintbrushes
- coloured paper
- glue
- scissors
- toilet roll tubes
- a large piece of cardboard (1 m x 1 m or 1 m x 1.5 m)
- various things from nature that you can find in your garden or local park (e.g. small rocks or grass)
- Plasticine™ or any other modelling material (various colours)

Procedure:

- Explain the aim of the lesson to the Ss.
- Allow Ss some time to think about and answer the questions in the *iWonder* section.
- Show the materials in the *Imagine* section to the Ss and elicit how they can use them to create a model of a green city. Give Ss some time to work together and answer the question. Monitor the pairs as they are working together.
- You can ask Ss to repeat the materials to practise the new vocabulary.
- Then, allow some more time for Ss to draw their ideas in the box provided. Alternatively, Ss can draw in their notebooks.
- Ask a student to read the *Did You Know?* box. Elicit if Ss knew this.
- Ask a student to read the steps of the project in the *iExplore* section. Explain/Provide further information if necessary.
- Allow Ss time to do the project. Help and support throughout the process.
- Allow Ss time to work in pairs, talk about and write down their observations in the *iObserve* section.
- In the *iCreate* section, Ss present their projects to the class in the form of a guided tour: they point out the different parts of their green cities and talk about their importance.
- After finishing all the steps, Ss answer the questions in the *iEvaluate* section.
- Encourage a class discussion about the STEAM activity.

Week 2: Wind Power

Materials:

For this project, you will need:

- a paper plate
- wooden skewers
- some paper clips
- a ruler
- a paper straw
- some string
- scissors
- Plasticine™
- a fan
- two paper cups
- some sticky tape
- a compass
- some small heavy objects (e.g. pebbles, small rocks, marbles)

Procedure:

- Explain the aim of the lesson to the Ss.
- Go through the new vocabulary and explain/elicite the meanings of the words.
- Allow Ss some time to think about and answer the questions in the *iWonder* section. (Key to Ex. 3: 1R, 2R, 3NR, 4R, 5NR, 6R)
- Show the materials in the *Imagine* section to the Ss and elicit how they can use them to create a model of a wind turbine. Give Ss time to work together and answer the question. Monitor the pairs as they are working together.
- You can ask Ss to repeat the materials to practise the new vocabulary.
- Then, allow some more time for Ss to draw their ideas in the box provided. Alternatively, Ss can draw in their notebooks.
- Ask a student to read the *Did You Know?* box. Elicit if Ss knew this and give them time to research online and find the answer to the question about their own country.
- Ask a student to read the steps of the project in the *iExplore* section. Explain/Provide further information if necessary.
- Allow Ss time to complete the project. Help and support throughout the process.
- Allow Ss time to work in pairs, test their wind turbines, talk about and write down their observations in the *iObserve* section.
- In the *iCreate* section, Ss prepare and give a short presentation to the class. Alternatively, Ss can work on this at home and give their presentations in the next lesson.
- After finishing all the steps, Ss answer the question in the *iEvaluate* section.
- Encourage a class discussion about the STEAM activity.
- As an extension, Ss can watch the film *The Boy Who Harnessed the Wind* and then have a class discussion about it.



Week 3: My Green Town/City

Procedure:

- Explain the aim of the lesson to the Ss.
- Go through the new vocabulary and explain/ elicit the meanings of the words.
- Allow Ss some time to think about and answer the questions in the *iWonder* section.
- Show the questionnaire in the *Imagine* section to the Ss and allow them time to complete it. Explain to the Ss that surveys are useful tools for collecting information from various people using relevant questions with the aim of understanding people's opinions on a subject.
- Allow Ss time to study the graph in Ex. 4 and discuss what it shows.
- Ask a student to read the steps of the project in the *iExplore* section. Explain/Provide further information if necessary.
- Allow Ss time to create their questionnaires and then give them to friends, family, teachers, etc to fill them in.
- Allow more time for Ss to create their graphs based on the information they have collected. Help and support throughout the process.
- Allow Ss time to work in pairs, talk about and write down their observations in the *iObserve* section.
- In the *iCreate* section, Ss prepare a short video to explain why and how they did the survey, and present the results of their survey.
- After finishing all the steps, Ss answer the question in the *iEvaluate* section.
- Encourage a class discussion about the STEAM activity.

Week 4: A Green Poster

Procedure:

- Explain the aim of the lesson to the Ss.
- Allow Ss some time to think about and answer the questions in the *iWonder* section.
- In the *Imagine* section, Ss work in pairs and research online to find more ideas about how people can live a greener life. They can either stick photos or draw their ideas in the boxes provided. Monitor the pairs as they are working together.
- Ask a student to read the steps of the project in the *iExplore* section. Explain/Provide further information if necessary.
- Allow Ss time to complete their posters. Ss can use the ideas given to help them. Help and support throughout the process.
- Allow Ss time to work in pairs, talk about and write down their observations in the *iObserve* section.
- In the *iCreate* section, Ss present their posters to their classmates. They also prepare a short video to inform people about the importance of green living.
- As a final step, Ss put everything they prepared during this long-term project together as part of a fair to celebrate World Environment Day.
- Ss answer the question in the *iEvaluate* section.
- Encourage a class discussion about the STEAM activity.
- Allow some classroom time to go through the questions in the *iExtend* section and have a class discussion to evaluate this long-term project.

Project 2 – The Gifts of Nature

Aim

Nature gives us food and water as well as goods that we use in our everyday lives. The aim of this project is to understand more about nature, learn about the wonderful gifts it offers us and how we can use them to create various objects. In this project, we learn about:

- ecosystems
- plants
- perfume distillation
- soap making

Suggested timeline

- Week 1:** We learn about ecosystems and create our own ecosystem in a jar.
- Week 2:** We explore different plants and create a herbarium.
- Week 3:** We learn about perfume distillation and make our own perfume with natural ingredients.
- Week 4:** We make soap with natural ingredients.

TIPS:

- Before you start this long-term project, you can write the timeline on a piece of A4 paper and post it on the classroom wall. You can ask students to brainstorm on the titles of every week and think about what they'll do every week. This way, you can engage your students and make them feel curious and motivated about the project.
- The weekly timeline above is a suggestion only. Teachers can either complete all the tasks in one lesson, or divide them into smaller parts and complete them in more than one lesson.

Week 1: The Ecosystems of the Earth

Materials:

For this project, you will need:

- a spray bottle with water
- some small rocks
- activated carbon (you can find this online)
- some grass (from your garden or the local park)
- some moss
- some soil
- a big jar with a lid
- small tropical plants (e.g. cacti)

Procedure:

- Explain the aim of the lesson to the Ss.
- Go through the new vocabulary and explain/ elicit the meanings of the words.
- Allow Ss some time to think about and answer the questions in the *iWonder* section. (Key to Ex. 2: 1T, 2T, 3T, 4A, 5T, 6A / Key to Ex. 5: air, water, soil, sun)
- Show the materials in the *iImagine* section to the Ss and elicit how we can use them to create an ecosystem in a jar. Give Ss some time to work together and answer the question. Monitor the pairs as they are working together.
- You can ask Ss to repeat the materials to practise the new vocabulary.
- Allow Ss time to draw a sketch of their ecosystems in the box provided. Alternatively, Ss can draw in their notebooks.
- Ask a student to read the *Did You Know?* box. Elicit if Ss knew these facts.
- Ask a student to read the steps of the project in the *iExplore* section. Explain/Provide further information if necessary.
- Allow Ss time to complete the project. Help and support throughout the process.
- Allow Ss time to work in pairs, talk about and write down their observations in the *iObserve* section.
- In the *iCreate* section, Ss create a time-lapse video to show how their ecosystem is growing. Ss can use a smartphone to create a time-lapse video. Ss can record their videos over the specific period of time and then, with the help of a video editing app, they can speed up the footage. When the Ss' videos are ready, invite several Ss to show their videos to the class.
- After finishing all the steps, Ss answer the questions in the *iEvaluate* section.
- Encourage a class discussion about the STEAM activity.



Week 2: Plants

Materials:

For this project, you will need:

- leaves and flowers
- a newspaper
- an A4 sketchpad
- some kitchen paper
- some sticky tape
- gloves (if you want)

Procedure:

- Explain the aim of the lesson to the Ss.
- Go through the new vocabulary and explain/ elicit the meanings of the words.
- Allow Ss some time to think about and answer the questions in the *iWonder* section.
- Show the materials in the *Imagine* section to the Ss and elicit how they can use them to create a herbarium. Give Ss some time to work together and answer the question. Monitor the pairs as they are working together.
- You can ask Ss to repeat the materials to practise the new vocabulary.
- Ask a student to read the *Did You Know?* box. Elicit if Ss knew these facts.
- Ask a student to read the steps of the project in the *iExplore* section. Explain/Provide further information if necessary.
- Allow Ss time to complete the project. Help and support throughout the process.
- Allow Ss time to work in pairs, talk about and write down their observations in the *iObserve* section.
- In the *iCreate* section, invite several Ss to present the herbarium they have created to the class.
- Ss can also vote for the best herbarium for each category. You can also add any other categories you like so that all the groups win.
- After finishing all the steps, Ss answer the questions in the *iEvaluate* section.
- Encourage a class discussion about the STEAM activity.

Week 3: Perfume Distillation

Materials:

For this project, you will need:

- a pot with a glass lid
- a colander
- ice cubes
- any flowers that smell nice
- various spices
- a rolling pin
- a glass bowl
- some lemon zest
- some kitchen paper
- various herbs
- a small bottle (e.g. an empty perfume bottle)

Procedure:

- Explain the aim of the lesson to the Ss.
- Go through the new vocabulary and explain/ elicit the meanings of the words.
- Allow Ss some time for them to think about and answer the questions in the *iWonder* section.
- Give Ss time to study the diagram in the *Imagine* section carefully and label the steps. (**Key to Ex. 4:** 1 heating, 2 cooling, 3 collection)
- Then, show the materials in the *Imagine* section to the Ss and elicit how they can use them to create their own perfumes. Give Ss time to work together and answer the question. Monitor the pairs as they are working together.
- You can ask Ss to repeat the materials to practise the new vocabulary.
- Ask a student to read the *Did You Know?* boxes. Elicit if Ss knew these facts.
- Ask a student to read the steps of the project in the *iExplore* section. Explain/Provide further information if necessary.
- Allow Ss time to complete the project. Help and support throughout the process.
- Allow Ss time to work in pairs, talk about and write down their observations in the *iObserve* section.
- In the *iCreate* section, Ss draw sketches to complete the diagram that shows the process they followed to create a perfume with natural ingredients.
- Then, Ss can put their perfume in a small bottle, create a label for it and give it to someone as a gift.
- After finishing all the steps, Ss answer the questions in the *iEvaluate* section.
- Encourage a class discussion about the STEAM activity.

Week 4: Soap Making

Materials:

For this project, you will need:

- a spray bottle with surgical spirit
- a microwave-safe bowl
- a wooden stick
- a silicone mould tray
- small plastic animals (if you want)
- glycerin soap base
- flowers or herbs (if you want)
- dyes for soap making
- a microwave oven
- essential oils from the previous week's project

Procedure:

- Explain the aim of the lesson to the Ss.
- Go through the new vocabulary and explain/ elicit the meanings of the words.
- Allow Ss some time to think about and answer the questions in the *iWonder* section.
- Show the materials in the *imagine* section to the Ss and elicit how they can use them to make their own soaps. Give Ss some time to work together and answer the question. Monitor the pairs as they are working together.
- You can ask Ss to repeat the materials to practise the new vocabulary.
- Ask a student to read the *Did You Know?* box. Elicit if Ss knew this.
- Ask a student to read the steps of the project in the *iExplore* section. Explain/Provide further information if necessary.
- Allow Ss time to complete the project. Help and support throughout the process.
- Allow Ss time to work in pairs, talk about and write down their observations in the *iObserve* section.
- In the *iCreate* section, Ss present the soap they made to the class and talk about the steps they followed, the ingredients they used and why they chose these specific ones.
- After finishing all the steps, Ss answer the questions in the *iEvaluate* section.
- Encourage a class discussion about the STEAM activity.
- Allow some classroom time to go through the questions in the *iExtend* section and have a class discussion to evaluate this long-term project.