

OUTSTE(A)M Learning Scenario:

The Wonderful World of Water

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6-9 year old pupils



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The Wonderful World of Water

Summary

Pupils explore the water cycle, the properties and uses of water, and its different states (solid, liquid, and gas) along with their transitions. They also discover the constant motion of water and the importance of preserving this invaluable resource. Pupils get to explore solutions for water pollution, participate in a field trip to a local lake to observe and analyse water quality and engage in water filtration experiments. Pupils will also understand the properties of water on earth as well as in space, why water is essential for life and why everyone should act to conserve water.

Keywords

Water, Properties, Cycle, Conservation, Space

Aim

Pupils will understand the water cycle, water's states and properties, its importance to life on Earth, and how to conserve it responsibly.

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Overview

Subjects	Science, Geography, Arts, Mathematics, Physical Education (PE), Environmental Education, Technology
Topics	The journey of Water through the world
Age of pupils	6-9 years old
Preparation time	4 hours in total (20 minutes per activity)
Teaching time	~8 hours

Teaching materials

Online materials and resources

Activity 2 “A drop around the world”

- Read aloud story about the water cycle, e.g. link: <https://youtu.be/Elq52NBZ-cM>
- Read aloud story “A drop around the world”, link: <https://www.youtube.com/watch?v=ba9Jot0wix0>
- Read aloud story ‘A little raindrop’, link: <https://www.youtube.com/watch?v=ba9Jot0wix0>
- Interactive Water Cycle Diagram for Kids, e.g. link: <https://water.usgs.gov/edu/watercycle-kids-beg.html>

Activity 3 “Outdoor dance” (alternative activity)

- Song about the water cycle and water states, e.g. link: https://youtu.be/-CoeJnjZtXg?si=a7_19A8kpfPQ8Kfa

Activity 4 “Water cycle song and Posters”

- Video on water cycle for visual introduction, e.g. link: <https://youtu.be/KM-59ljA4Bs?si=PVmcJFMrOUX2Oq9i>

Activity 5 “Rain Explorers”

- The OUTSTE(A)M Game “Rain Explorers”: [http://files.eun.org/scientix/OUTSTE\(A\)M-Rain-Explorers.pdf](http://files.eun.org/scientix/OUTSTE(A)M-Rain-Explorers.pdf)

Activity 6 “Meet a Meteorologist”

- Video interview with a STE(A)M specialist in the field of meteorology: <http://files.eun.org/scientix/Michelle-Dillon-Metereologist.mp4>

Activity 7 “Let’s save Droppe”

- Video about water pollution, e.g. link: <https://youtu.be/A3rLfrUzY4?si=yCDcL17q7ujnlaTk>
- The OUTSTE(A)M Game “AREcoRescue”: [http://files.eun.org/scientix/OUTSTE\(A\)M-AREcoRescue.pdf](http://files.eun.org/scientix/OUTSTE(A)M-AREcoRescue.pdf)
- Online collaborative platforms (e.g. [Padlet](#), [MS Word](#))

Activity 9 “Analysing water samples”

- Video about water's behaviour in space, e.g. link: <https://www.youtube.com/watch?v=7IDRRklol8Q>

Activity 12 “Water on Earth vs Water in Space”

- Video about water's behaviour in space, e.g. link: https://youtu.be/H_qPWZbxFl8?si=v7EsB_bXzTpo6owf
- Video about water's properties in space, e.g. link: https://youtu.be/4A_dMWsw2oA
- Project Zero's Thinking Routine Toolbox: <https://pz.harvard.edu/thinking-routines>

Physical materials

Activity 1 "Letter from 'Droppe' the water drop"

- Letter from Droppe the Water Drop, large sheets of paper, markers, pens, and pencils.

Activity 2 "A drop around the world"

- Book: 'A drop around the world' by Barbara Shaw McKinney (or another book about the same topic), paper poster, whiteboard, world map or a globe, laminated water drop, snowflakes, gas, clouds.
- Book: 'The little raindrop' by Melanie Joyce for younger pupils.

Activity 3 "Outdoor dance"

- Signs or posters with the words "Boiling," "Ice," and "Snow", spray bottle with water or a projector (optional for the alternative activity).

Activity 4 "Water cycle song and Posters"

- Projector for the water cycle poster, whiteboard, white construction paper, labels and definition paper, markers, crayons/colored pencils, scissors, glue... (creating posters).

Activity 8 "Walk to the lake" and Activity 9 "Analysing water samples"

- Permission slips (if required), empty tubes for water sample, gloves and trash bags (for safety and cleanup), clear plastic cups or jars, coffee filters or paper towels, sand, gravel, activated charcoal (optional), funnels, spoons, magnifying glasses (optional).

Activity 10 "Water evaporation"

- 1 litter of water, measuring cups/cylinder, notebook or paper for recording observations, pen or pencil.

Activity 11 "Scavenger hunt"

	- Clue cards, clipboards, pencils or pens, notebooks. Activity 12 “Water on Earth vs Water in Space” - Clear plastic cups, water, food coloring (optional), pipettes or droppers, large shallow containers, towels for cleanup, a projector or screen for showing videos.
Guiding comments	- The Learning Scenario is intended to serve as a guide and framework for your own planning. Based on your context and the interests and needs of your children, you may choose to adjust this Learning Scenario accordingly. You are free to extend, repeat, adapt, rearrange some activities or spend more time in them as you see fit (License CC BY 4.0). - This Learning Scenario was designed to accommodate a range of support needs. However, independent learning should be prioritised wherever possible, allowing pupils to explore and learn on their own before offering additional support. The core activities in this Learning Scenario are Activity 1 “Letter from Droppe, the water drop”, Activity 2 “A drop around the world”, Activity 7 “Let’s save Droppe”, Activity 8 “Walk to the Lake” and Activity 9 “Analyzing water samples”. All other activities are complementary and lead to better retention of the objectives. The materials and resources mentioned above are suggestions. You may choose to use different ones based on yours and your pupils’ needs or use them in different activities than the ones they are introduced in. Part of the story used in this Learning Scenario refers to Droppe the water drop, a fictional character that is asking pupils’ help since the water of a lake is polluted and this creates a lot of problems to the animals living there. Given your pupils’ sensitivity to distressing themes, you may want to adjust the story.

Aim of the lesson

- **Developing a comprehensive understanding** of the water cycle, its stages, and its global journey through engaging activities such as reading, discussing, creating diagrams and experiments.
- **Deepening their knowledge** of the different water states (solid, liquid, gas) and their transitions through interactive movement games and hands-on experiments.

- **Exploring and understanding the impact of water pollution** through brainstorming strategies for cleaning polluted lakes, analysing water samples to understand pollution levels, and creating filtration systems.
- **Reinforcing their understanding of the water cycle**, water filtration, and the impact of pollution through a scavenger hunt game.

Lesson Plan

Name of activity	Procedure	Duration	STEM Criteria Code
Activity 1 “Letter from ‘Droppe’ the water drop” Language (Letter/Story) Science (Water/ Water pollution), Environmental Education (reasons for water pollution)	Pupils learning journey starts with a letter from Droppe, a water drop who lives in a lake near the school premises. This short letter/story sets the stage for all activities. Additionally, this letter makes pupils' knowledge more tangible and help them connect it to real-life. Prior to the lesson, write on a piece of paper the following letter and put it inside a bottle. <i>Hi,</i> <i>My name is Droppe, I am a little water drop living in Lake Brunnsviken. Our beautiful lake is in trouble. Pollution is making our water dirty, and many of my friends, the fish and other water creatures, are having a lot of problems because of this. We need your help to clean the lake and make it safe again.</i> <i>Can you help us, please? Together, we can make our lake a clean and happy place for all the creatures that live here.</i> <i>Thank you,</i> <i>Droppe the Water Drop</i> Gather pupils around, show them the bottle and say you found this on your way to school while walking by Brunnsviken lake (this is a lake near our school; you may change to any water body near your own area). It looks like there's a letter inside. Let's see what it says". After you read the letter, try engaging pupils by saying “Droppe needs our help! But to know how to properly help Droppe, our new water drop friend, we need to learn more about water. What do you	20'	A1, A3, F5

	think we can do to help? How do you think the problem started in the first place?”. Let students brainstorm and as they share their ideas collect them in a A3 paper poster/white board as you will use them in future activities. Do not spend too much time in these questions as they will be analysed in detail in a future activity. Adaptation: - To address more pupils and connect to various learning styles you may choose to turn this letter into a short story or provide pictures instead. This will also help pupils with additional support needs (language acquisition, instructional language is a second language etc.). - Finally, to add another layer to this activity you may choose to stage the story by taking your pupils on an excursion close to a water body. As pupils enjoy some outdoor learning, you can pretend that you found the bottle with the letter there.		
Activity 2 “A drop around the world” Language, Science and Geometry (Water cycle, Diagram, Story)	To begin this activity, draw a diagram showing the different stages of the water cycle on a big paper poster (A3 or bigger) before pupils enter the classroom. This poster can be used throughout the Learning Scenario as a reference. Pupils can also use this poster as a place to store their reflections and resources they get along the activities that follow. Alternatively show them an online diagram. When pupils see the diagram, motivate them to guess what it is about and share their reflections with the class. As another prompt, show them the cover of the book “A Drop Around the World” and ask them to “think-pair-share” what this book can be about and what its connection to the diagram may be. After pupils provide their ideas and reflections, invite them to discover what the diagram is about by reading and discussing the book “A Drop Around the World” by Barbara Shaw McKinney. As you do so, stop to discuss key points and ask questions about the water cycle stages that are depicted in each part of the story. These questions	30'	A3, B1, B3, F5

	can help pupils break down the concepts that are targeted in this activity. Alternatively, finish reading the book and go back to guide pupils identify and learn more about each concept and stage. In both cases, make sure to use a globe to illustrate water's global movement and certain guiding questions (see Annex 2). This will help pupils learn the water cycle's different stages easier. Adaptation: - If the book is not an accessible resource, you may use an online video instead for a read aloud version of the story. Additionally, you may choose to use puppets and other dolls to enact different scenes from the book. This will make great connection to Art Education (Drama) and provide a deeper meaning to pupils with additional support needs. - If your pupils are quite young you may choose to use this book as an alternative "The little raindrop" by Melanie Joyce. Here's the video to the read aloud story.		
Activity 3 "Outdoor dance" Science (Water cycle), Arts (Drama), Physical Education (game)	Get your pupils in an outdoor learning environment. Show them signs presenting the water's different states (see Annex 3). Tell pupils that they will have to agree upon and designate certain movements to each sign. Upon the presentation of each sign, they will have to imitate that movement. For example, for the state of gas/steam pupils may choose to move quickly and energetically (as if they are boiling and bubbles are forming); For solid (ice) pupils could stop moving, as if they are frozen whereas; for liquid (water) pupils could float gently and move softly. When there is agreement regarding this game's movements, start with a whistle blow and then randomly hold up different signs. Moving on, and as pupils understand the game better, make it more fun by dividing them in smaller groups and giving points to the group that performs the movements the fastest (keep a tally on a whiteboard for each group). Adaptation:	30'	A1, A3, B1, B3, E3

	- If going to an outdoor, open space learning area is not possible, turn this into an indoor activity by playing a song about the water cycle and its stages. Use a projector and let the pupils dance and follow the steps. - If certain pupils have mobility difficulties, you may choose to adjust the game's movements accordingly and/or assign different roles to ensure inclusion. Note: It is important to let pupils understand that the movements are not representing exactly how the particles move but is rather a playful approach for them to explore the concepts discussed further.		
Activity 4 “Water cycle song and Posters” Science, Geography (water cycle), Arts (Art)	Start the lesson by showing pupils a short video on the water cycle to provide a visual introduction and then discuss with them key words that can be used to describe each stage. While pupils share their reflections, write them down on the whiteboard in order. Then, divide pupils in groups and explain that each group will be making their own water cycle posters. Also ask them to use in their posters the key words that they came up with regarding the water cycle's stages. Provide more directions about the posters and tell them that they should represent the continuous movement of water through its different states (liquid, gas, solid) and include arrows to indicate the water cycle's stages. When the posters are ready allow pupils to display them and tell them to perform a gallery walk to see their peers' work. When this is done tell pupils they can take their posters home. This will reinforce their learning as well as further discussions at home. Adaptation: Depending on your pupils age and the access to proper equipment you may choose for them to create their posters using slides or other word processing tools (i.e. Microsoft Word, PowerPoint). This will help pupils make further connections to technology and practice certain skills.	60'	A1, A2, A3, B1, B2, B3, E3, C1, C2, F2, G1

Activity 5 “Rain Explorers” Science, Environmental Education	Moving forward and to consolidate pupils' learning regarding the water cycle and mainly its interconnection to the weather, prompt them to play with the OUTSTE(A)M Game “Rain Explorers” (http://files.eun.org/scientix/OUTSTE(A)M-Rain-Explorers.pdf). Through this game pupils get to explore the natural environment after it has rained, collect elements related to water and the environment around as well as complete educational challenges about the water cycle to earn points and become the best “Rain Explorer” of the day. Adaptation: “Rain Explores” is meant to be used after a rainy day. If there are no rainy days in the weather forecast, you may choose to adapt it to use it regardless of the weather.	As needed	A1, A2, B1, B3
Activity 6 “Meet a Meteorologist” Social Studies (STE(A)M Careers)	Invite pupils to learn more about a Meteorologist by watching this video interview (http://files.eun.org/scientix/Michelle-Dillon-Metereologist.mp4). This video interview explains the tasks and responsibilities of this STE(A)M career and is meant to inspire further curiosity. After watching the video interview, lead a discussion based on what pupils have seen and their interests. Focus specifically on the career's contribution and relevance and make connections to activities of this Learning Scenario. Adaptation: This video interview is part of the OUTSTE(A)M Job Profile “Meteorologist”. Prepare pupils in advance by introducing key vocabulary, pausing the video to encourage discussion and address questions, providing a glossary of terms to refer to during the interview. Additionally, you might consider inviting a meteorologist into the classroom for an in-person career talk, presented in a more age-appropriate and engaging format.	30' or as needed	A2, B1, B2, B3, F4, E3
Activity 7 “Let's save Droppe”	After summarising their learning journey so far, tell pupils that they will now revisit their main mission which is to help Droppe and its friends in the polluted lake.	45'	A1, A3, B1, B2, B3, E3,

Science (Water pollution), Environmental Education (strategies to tackle pollution), Technology (collaborative work)	To start, invite pupils to watch a short video about water pollution. As their curiosity is sparked begin a discussion about what water pollution is and what causes it. When the discussion reaches the desired conclusions divide pupils into small groups and provide them with a large sheet of paper and markers. Instruct each group to brainstorm and discuss what they could do to clean the lake. Encourage them to think about aspects such as Removing trash and debris, Filtering or treating the water, Preventing future pollution etc. When pupils are ready, prompt them to write down their input into online collaborative platforms (Padlet, MS Word). As they present their ideas in groups, write down key points and suggestions on the whiteboard. When all findings are presented, begin a discussion so that pupils can compare the different ideas. Finally, inform pupils that they will visit Lake Brunnsviken as a class (this is a lake near our school) to observe the pollution firsthand and learn more about how we can keep our lakes and surroundings clean. Note: Given pupils young age teachers should pay attention and discuss pollution's impact (fish' health etc.) in an age-appropriate way to avoid distress.		C1, C2, G1
Activity 8 “Walk to the lake” Physical Education (walk to the lake), Chemistry (water sample collection), Environmental Education (tackle pollution)	By engaging in this activity pupils will observe the pollution in Lake Brunnsviken, discuss its impact and collect water samples for analysis, which will be performed in the next activity. The objective of the visit is and emphasize the importance of safety during the trip. Upon arrival at the lake, instruct pupils to carefully observe the water and the surrounding areas. When pupils are ready and eager to work, distribute gloves and trash bags and task them to collect any visible trash. Demonstrate how to collect a water sample safely and allow pupils to collect some themselves from different parts of the lake. If it is not safe for them to do so, collect the samples yourself while pupils	40' (depends on how far the water body is)	A2, B1, B3, F5

	observe you. In either case, make sure to label the samples with the location and date. Next, let pupils enjoy the surrounding nature of this outdoor learning environment and ask them to report to you any connection that becomes visible to them between what they have learned so far and what they see all around them. Upon return to school discuss briefly what was observed. Then explain that the next steps would be to analyse the collected water samples in the next lesson. Adaptation: As your pupils explore the nature around the lake and depending on their interests you may choose to use the OUTSTE(A)M Game "AREcoRescue" (http://files.eun.org/scientix/OUTSTE(A)M-AREcoRescue.pdf). The game invites pupils to go outdoors and explore and collect more information about different plant species using an application. Note: If there are no lakes near your school, you may choose any other water body and plan your day trip there instead.		
Activity 9 "Analysing water samples" (Inquiry based) Science (Filtration), Engineering (design filtration systems)	Review the visit to the water body that you have chosen and highlight the observations made about pollution. Also discuss the importance of solving this problem and how clean water benefits everyone on earth (healthy plants and animals → healthy humans). Make also connections to the activities in the beginning of this Lesson Plan and highlight how one polluted body can impact various ecosystems due to the water cycle's nature. Take pupils to the science lab in the school and work further with the collected samples of water (optional if there is a lab in the school). When pupils are ready, write the word filtration on the whiteboard and ask if anyone knows what it means. After pupils present their ideas, define filtration as "a process that removes impurities from water by passing it through materials that trap unwanted particles".	60'	A1, A2, A3, B1, B2, B3, C1, C2, G1

	Then, divide pupils in groups and explain that they will be given a set of materials to create a water filtration system to clean the water samples they have gathered in the previous activity. After showing all the materials available for filtration, ask pupils what they think might work best and why. Then show them this video for further ideas. Give each group a clear plastic cup or jar, a funnel and the water samples from the lake. Encourage them to brainstorm and plan their filtration system, deciding which materials to use and in what order. After pupils work on their designs, have them pour the collected water samples through their filtration systems. Ask them to observe the water that comes out and note any changes in clarity and cleanliness. Use the whiteboard to demonstrate how to record their observations in notebooks by focusing on the appearance of the filtered water compared to the unfiltered water (clear, dirty). Additionally, encourage pupils to use magnifying glasses to examine the filtered water closely. Finally, gather the class and discuss the results of the filtration experiment. Ask pupils what they have observed and whether the water looked cleaner after filtration. Make sure to discuss the effectiveness of the different materials used in the filtration system too. Finish the discussion by reviewing the ways to tackle water pollution that pupils gathered during Activity 7. Adaptation: If you are running out of time, your pupils are rather young, or you are lacking the proper equipment you can lead this activity yourself and create only one filter as a class.		
Activity 10 “Water evaporation” Science (water evaporation), Maths (collecting data)	Pour exactly one litre of water into a measuring cylinder and place it near the classroom's window for a week. Help pupils form a hypothesis regarding what will happen to the water over the week and write them down in a worksheet. Pupils can use the same worksheet to keep track of their observations of the water evaporation (see Annex 4). To stimulate pupils' responses and give them enough	40' spread over a week	A1, A3, B1, B2, B3, C1, C2, G1

	time write on the whiteboard "I think the water will...". Encourage pupils to measure the water level every day and record how much water remains in the cylinder. After one week of observations, ask the pupils to check if their hypothesis was correct. When pupils are ready to formulate conclusions facilitate a discussion by asking "What do you think affects the evaporation of water? Did the same amount of water evaporate each day?" etc.		
Activity 11 "Scavenger hunt" (Summative assessment)	To test pupils' understanding of the water cycle, water filtration, and the impact of pollution, prompt pupils to participate in an outdoor scavenger hunt. For this scavenger hunt, prepare the clue cards and tasks in advance (see also Annex 5) and place/hang them at various locations in an outdoor learning environment such as the playground/schoolyard. Pupils work in groups and are tasked to go around the school premises by following the clues. By completing the tasks linked to each clue pupils will be able to revise their knowledge, benefit from peer learning. You will also identify possible gaps in their learning.	40'	A1, A3, B1, B2, B3, C1, C2, F5
Activity 12 "Water on Earth vs Water in Space" Science (water properties)	Pupils in this activity take a different angle to their learning by exploring water's properties in space and conducting experiments to visualise those properties. Start with a conversation about the properties of water on Earth by asking "What are some things you know about water (e.g., it flows, it's wet, it forms rivers and oceans)?" or "How do we use water in our daily lives?". Explain that in space, things can be... a bit different by showing a short video of astronauts on the ISS demonstrating how water behaves in space. Additionally, highlight how water forms spheres and floats due to microgravity. When pupils' curiosity is captured, tell them that they will now conduct an experiment. Have them pour water into clear plastic cups. Then guide them as they observe and discuss how water stays at the bottom due to gravity (optional: Add a few drops of food colouring to make the water more visible).	50 min	

	After that, have pupils pour water in a shallow container. Prompt them to form pipettes or droplets and observe how they behave differently on Earth than in space based on what they saw in the video. Next, have pupils compare their observations. Guide them by asking questions such as: "What differences did you notice?", "Why do you think water behaves differently in space?", "How does microgravity affect water on the ISS?". Additionally, prompt pupils to use thinking routines (I used to think..... now I think..... about properties of water) or the "Think-pair -share" routine (pupils first think then pair with a friend and then share their favourite observation or fact from the activity). After pupils share their reflections help them reinforce the idea that while water is essential both on Earth and in space, it behaves differently due to the different environments. Adaptation: Similarly to what you did with the OUTSTE(A)M Job Profile "Meteorologist", you may choose to show pupils this video interview. As pupils watch they get to know more things about the STE(A)M career of an astronaut. Additionally, given pupils exhibit the appropriate interest you may choose to let them play with the OUTSTE(A)M Game "Solar System" (http://files.eun.org/scientix/OUTSTE(A)M-Solar-System-Final.pdf), a dynamic group activity with roles based on celestial bodies.		
Provision for free play	Pupils will be allowed to use the resources, and any outcome created during the activities of this Lesson Plan, freely and independently. Various trips to areas where pupils can play near water bodies will also be organised. Pupils will also benefit from other scavenger hunts, like the one that they have already completed.	As needed	

Assessment

In this Learning Scenario, every activity has some sort of discussion that can serve as an opportunity for the teacher to conduct **Formative Assessment** and to check pupils' understanding.

- **A Drop Around the World:** to check pupils' reflections through the 'Think- Pair-Share' thinking routine.
- **Outdoor Dance:** to check pupils' movement during the game with state of water.
- **Water Cycle Song and Poster:** to check the progress regarding the posters and asks each group to explain the part of the water cycle they are currently working on.
- **Walk to the Lake:** During group discussions, ask pupils to share one idea they have for cleaning the lake. This helps assess their understanding of water pollution and its solutions.
- **Water Evaporation:** to check pupils' hypotheses about water evaporation and whether they are sound.
- **Water on Earth vs. Water in Space:** to check pupils as they share their reflections and as they discuss with peers.

Additionally, pupils are tasked to take photos throughout the activities with their tablets and record their learning outcomes (usually at the end of each activity). These photos are also used as prompts for pupils to reflect and explain what they have learned in various occasions.

Summative Assessment

Apart from the various opportunities to conduct Formative Assessments, this Learning Scenario also provides an engaging, play-based and interesting **Summative Assessment**. In particular, the scavenger hunts with its accompanying activities, serve as a great way to test pupils' knowledge.

Pupil Feedback

At the end of the Learning Scenario, ask pupils to use the photos they have been taking and indicate how they liked the activities. They can do this by modifying the photos by adding a ✓ or an X. Combining this with the feedback gained during the Formative Assessments the instruction can be adjusted accordingly.

Teachers' remarks

Pupils were able to benefit from connections to their daily lives thanks to the topic of water. The activities that required physical movement (game, scavenger hunt outdoors etc.) provided a dynamic learning environment for them. They also reached pupils with different learning styles.

The activity that invited pupils to focus on water's properties in space was a bit challenging for them. However, seeing the video was fascinating. Perhaps using more visuals related to space would enhance pupils' motivation and engagement even further.

Reflection on practice

STEM Strategy Criteria

This Learning Scenario contributes on a broader scale to the development of a STEM School strategy: <https://www.stemschoollabel.eu/criteria>.

A. Introduction

- ☒ [A1] Personalisation of learning
- ☒ [A2] Problem and project-based learning (PBL)
- ☒ [A3] Inquiry based Science Education (IBSE)

In this Learning Scenario, activities are tailored to pupils' interests and learning styles, with additional support provided to ensure inclusion. Pupils work collaboratively to explore solutions to lake pollution through hands-on experiments, developing inquiry and problem-solving skills. They investigate filtration methods by selecting suitable materials and make and test hypotheses related to water evaporation rates.

B. Curriculum implementation

- ☒ [B1] Emphasis on STEM topics and competencies
- ☒ [B2] Interdisciplinary instruction
- ☒ [B3] Contextualisation of STEM teaching

Although it may appear to be a science lesson, this learning scenario integrates multiple subjects, including language, geography, and art, adopting a holistic approach. The activities combine these subjects to reflect how skills and knowledge are applied together in real-life contexts, rather than teaching them separately.

C. Assessment

- ☒ [C1] Continuous assessment
- ☒ [C2] Personalised assessment

Formative assessment is carried out through observation of pupils' participation, engagement, and responses during activities and presentations. The teacher also reviews pupils' observations in Activity 9 ("Analysing water samples") and their use of these observations in Activity 10 ("Water evaporation") to develop and test hypotheses. Personalised assessment is supported through ongoing, individualised feedback throughout the activities.

D. Professionalisation of staff

- ☒ [D1] Highly qualified professionals
- ☐ [D2] Existence of supporting (pedagogical) staff
- ☒ [D3] Professional development

The teacher has experience using the STE(A)M approach, and the school supports staff professional development.

E. School leadership and culture

- ☐ [E1] School leadership
- ☒ [E2] High level of cooperation among staff
- ☒ [E3] Inclusive culture

Science and other subject teachers in higher grades were consulted to provide equipment and advice for the experiments, which proved essential for implementing the activities. The learning scenario also includes a variety of activities to cater for pupils with diverse learning styles and additional support needs.

F. Connections

- ☐ [F1] with industry
- ☒ [F2] with parents/guardians
- ☐ [F3] with other schools and/or educational platforms
- ☒ [F4] with universities and/or research centers

☒ [F5] with local communities

One of this Learning Scenario's central activities involved a walk to a local lake and a park. This was also the setting for several outdoor activities making connections to pupils' real-life. After the walk to the lake and seeing the pollution first-hand, pupils discussed at home with parents and shared their reflections. This allowed them to bring at their homes real-life examples about water consumption and water conservation and involved parents and guardians in their learning. Lastly, pupils made connections to the universities and research centres by engaging in the activities related to the OUTSTE(A)M Job Profile "Meteorologist".

G. School infrastructure

☒ [G1] Access to technology and equipment

☒ [G2] High quality instruction and classroom materials

The school's science labs, library and other special equipment (i.e. projectors) are accessible for staff to use. This made this Learning Scenario stand out and allowed pupils to change their learning environment frequently fostering the idea that learning is happening all over.

About OUTSTE(A)M

[OUTSTE\(A\)M](#) is a project funded by the European Union's (EU) Erasmus+ programme under the Grant Agreement (101133868), running from 1 January 2024 to 31 December 2026. Coordinated by European Partnership aisl (EUN), a network of 30+ education ministries, OUTSTE(A)M brings together four partners to develop a toolkit that will help teachers and educators promote high quality outdoor learning experiences using a STE(A)M approach.

About Scientix

[Scientix®](#) is the number one community for science education in Europe. It aims to promote and support a Europe-wide collaboration among STEM teachers, education researchers, policymakers and other educational stakeholders to inspire students to pursue careers in the field of Science, Technology, Engineering and Mathematics (STEM).

Annexes

Annex 1. Example of key vocabulary for pupils.

This is some indicative vocabulary that might be useful for pupils to get familiar with before or during the activities.

Aquatic environments: Places where water is the main feature, like oceans, rivers, lakes, ponds, and wetlands. This is where many animals and plants live.

Condensation: When water vapor cools down and turns back into liquid, forming clouds.

Ecosystem: A community of living things (like animals and plants) and non-living things (like water and rocks) that work together in one environment.

Evaporation: When the sun heats up water and turns it into vapor (gas) that rises into the air.

Filtration: A process that removes impurities from water by passing it through materials that trap unwanted particles.

Infiltration: When water soaks into the ground and becomes part of the groundwater.

Pollution: When harmful things like trash, chemicals, or smoke are added to the environment.

Precipitation: Water that falls from the sky, like rain, snow, sleet, or hail.

Runoff: Water that flows over the ground into rivers, lakes, or oceans after rain.

Transpiration: When plants release water vapor into the air from their leaves.

Water body: A large area of water like a river, lake, sea, or ocean.

Water conservation: Using water carefully so we don't waste it.

Water cycle: The process of how water moves around our planet. It evaporates, forms clouds, falls as rain or snow, and flows back into rivers and oceans.

Water pollution: When harmful substances like oil, plastic, or chemicals get into rivers, lakes, or oceans and make the water dirty or unsafe for people, animals, and plants.

Water states: The three forms that water can take. The states can be solid (ice), liquid (water), and gas (water vapor/steam).

Annex 2. Indicative questions to ask pupils during Activity 2 “A drop around the world”.

You can use these questions to facilitate meaningful reflections related to the story “Drop around the world” by Barbara McKinney. By using similar questions as the ones provided below, before and during the reading activity, you can ensure the active participation of pupils and their learning goals' achievements.

Before:

Show pupils pictures from the book and asks questions like:

What do you think about this drawing? What do you think the journey of a single drop of water looks like? Where might it go and what might it experience?

During:

What do you notice about the starting point of the water drop's journey?

What happens to the water drop when it evaporates? *(Explain the process of evaporation).*

How does the water vapor turn into a cloud? *(Discuss the condensation/formation of clouds).*

What forms can precipitation take, and where does it fall?

What happens to the water drop after it reaches the ground? *(Help pupils understand how water can be collected in rivers, lakes, and oceans).*

How does the water drop move through different ecosystems? *(Explain the water drop's journey through forests, deserts, and wetlands).*

What roles do plants and animals play in the water cycle? *(Talk about how they contribute to the movement of water).*

How do humans (pupils and their families) use water in their daily lives? *(humans impact).*

What impact do humans have on the water cycle? *(Discuss the positive and negative effects of human activities on water resources).*

How does the water drop complete its journey and start the cycle again? *(Focus on explaining the continuous nature of the water cycle and how the drop returns to its starting point).*

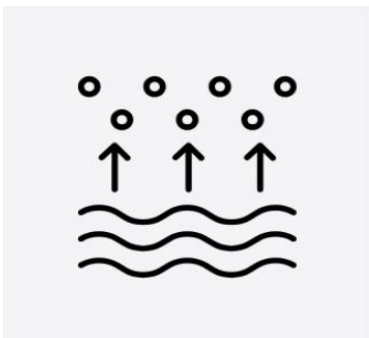
Annex 3. Pictures to laminate for Activity 3 “Outdoor dance”.



<https://thenounproject.com/search/icons/?q=water+drop>



<https://thenounproject.com/search/icons/?q=snow+flakes>



<https://thenounproject.com/search/icons/?q=evaporation>

Annex 4. Worksheet for pupils' hypotheses and observations for Activity 10 "Water Evaporation".

This worksheet was created by the author of this Learning Scenario using a word processing programme (i.e. MS Word).

Name:

Date:

Evaporation observations

My hypothesis: I think the water will...

Daily Observation:

Water level	Observation
Day 1	1000 ml
Day 2	
Day 3	
Day 4	
Day 5	

Conclusion: My hypothesis was.... (correct / incorrect) because...

Annex 5. Clue cards and tasks for pupils' summative assessment in Activity 11 "Scavenger hunt".

This scavenger hunt was created by the author of this Learning Scenario using a word processing programme (i.e. MS Word).

Clue 1: "Go outside and find a sunny spot next to a puddle or some water on the ground. What do you think happens to the water when the sun shines bright?"

Tasks linked to this clue:

- *Observe the water in the sunny spot.*
- *Explain how the sun's heat makes the water evaporate (turn into vapor) and how this vapor cools and forms clouds (condensation).*

Clue 2: "Look up at the sky and think about what sometimes falls from the clouds when they are turning dark. Can you also name different things that come down from the clouds when the weather changes?"

Tasks linked to this clue:

- *List different forms of precipitation, like rain, snow, sleet, and hail.*
- *Draw a picture of your favourite type of precipitation.*

Clue 3: "Find a place where clean water comes out, like a fountain or a tap. How do we make dirty water clean enough to drink?"

Tasks linked to this clue:

- *Describe how we can use things like sand and gravel to filter dirty water.*
- *Draw a simple picture showing the layers of sand and gravel cleaning the water.*

Clue 4: "Find a spot where you see trash or litter on the ground. How can this affect the water and the animals that live there?"

Tasks linked to this clue:

- *Discuss how pollution can harm water and animals.*
- *Draw a picture of what clean water looks like compared to polluted water.*

Clue 5: "Find a place that has access to water like a bathroom or a kitchen. Can you think of ways to use less water to preserve it?"

Tasks linked to this clue:

- *List three ways to save water.*
- *Draw a picture showing one way you can save water at home.*