

Didactic Scenario

1. Title

Discovering the Water Cycles and Crystal Life

2. Keywords

Water Cycle, Crystals, Hexagonal Structure, Physical Processes, Scientific Observation, Experimental Method

3. Basic information

STEAM Subject: SCIENCE

Typical interaction time with the instructional scenario in teaching hours for in-school work:
120 minutes

General description of the scenario:

<u>Phases</u>	<u>Stage</u>	<u>Time</u>
Introduction and Theory	Preparatory Stage	30 minutes
Experimental Activity	Implementation Stage	60 minutes
Discussion and Feedback	Evaluation Stage	30 minutes

Age group: 8-12 years old

Estimated difficulty level:

Very Easy	Easy	Moderate	Challenging	Very Challenging
	X			

Teaching resources

Materials:

- Sugar or Salt
- Water
- Containers or Pots
- Heat Source (eg, Lamp or Thermoset)
- Transparent Plastic Covers or Bags
- Spoons or Stirrers
- Activity Sheets or Questionnaires
- Computer or Projector (for presentation)

School infrastructure: Experiment Area: An area where students can carry out experiments safely, ideally with a bench or work table.

Additional material from external sources/online tools:

- YouTube: Videos explaining the crystallization process and water cycles (eg, "How Crystals Form" or "The Water Cycle Explained"). (Indicative <https://www.youtube.com/watch?v=vHApTRvbJCw>)
- Simulation Tools: PhET Interactive Simulations: Water cycle simulations that can be used for interactive learning.
- Online game: <https://www.educationsoutheastwater.com.au/resources/natural-water-cycle-game>

Differentiated instruction for students with different abilities and learning styles in the same class:

- Create groups of varying abilities so students can support each other. Students who understand concepts faster can help their classmates who need more support.
- It offered personalized support for students who have special needs or need extra help, such as extra time or help with organizing their homework.

Developed by: Development Center of Thessaly

4. Educational Problem

The scenario "Discovering Water Cycles and Crystal Life" solves the following educational problem:

Problematic Understanding of Scientific Concepts. Many students struggle to understand basic science concepts such as the water cycle and crystallization because of the abstract nature of these processes. The scenario uses hands-on activities and experiments to make these concepts more understandable and accessible, enhancing student engagement and applying

theoretical knowledge to real-world situations. Understanding Ecological Relationships. Promotes understanding of ecological relationships and biodiversity, enhancing students' knowledge of the role of insects in the ecosystem.

5. Learning Objective (-s)

1. Understanding Scientific Concepts. Students will understand the process of the water cycle and crystallization, recognizing their key stages and interactions.
2. Development of Observation Skills. Students will develop observation and recording skills through the experiments they will carry out, recording the results and comparing them with their theoretical knowledge.
3. Creating Scientific Models. Students will be able to create simple scientific models that illustrate the water cycle and the crystallization process.
4. Strengthening Critical Thinking. Students will develop critical thinking by evaluating the results of their experiments and discussing the effect of different factors on the crystallization process and the water cycle.
5. Application of Scientific Method. Students will apply the scientific method to conduct experiments, record data, and analyze results.
6. Enhancing Teamwork. Students will work in groups, enhancing their collaborative skills through working together and interacting with their peers.

6. Phases of the Scenario

Phase 1

Title: Introduction and Theory

Indoor	Outdoor	Mixed
		X

Phase duration in minutes: 30 minutes

Detailed description of the scenario phase: In the first phase, students are introduced to the basic concepts of the water cycle and crystallization. The teacher presents the basic principles with the help of visual materials such as diagrams and videos and explains the importance of these processes in nature. Students then prepare for the upcoming activities by organizing the

necessary materials and equipment. This phase also includes preparing the materials for the experiments and guiding the students to conduct them safely and effectively.

Activity Sheets: N/A

Phase 2

Title: Experimental Activity

Indoor	Outdoor	Mixed
		X

Phase duration in minutes: 60 minutes

Detailed description of the scenario phase: In the second phase, students perform experiments related to the water cycle and crystallization. With the help of the teacher, the students observe and record the results, noting the changes they observe. The activity involves making simple models and experiments, such as the evaporation of water and crystal formation, with the aim of better understanding the concepts through practical application.

Activity Sheets:

Activity Sheet: Performing Activities

Name: _____

Date: _____

Activity 1: Water Cycle

1. Preparation: Gather your materials: a glass of water, a clear bowl, and plastic wrap.
2. Experiment:
 - Pour water into the bowl and cover it with plastic wrap.
 - Place the bowl in a bright spot and observe.
3. Recording Observations:
 - What do you notice on the surface of the bowl after 15 minutes?
 - How do you think this relates to the water cycle?
4. Comments:
 - Describe what happened to the water and why.

Phase 3

Title: Discussion and Feedback

Indoor	Outdoor	Mixed
		X

Phase duration in minutes: 30 minutes

Detailed description of the scenario phase: In the third phase, students discuss the results of their experiments with the teacher and their classmates. The teacher guides the discussion to analyze and interpret their observations, connecting the results to the theoretical concepts of the water cycle and crystallization. This phase encourages students to express their thoughts, ask questions and receive feedback on their understanding. The purpose is to enhance understanding through interaction and review of learning outcomes.

Activity Sheets:

Activity Sheet: Discussion and Feedback

Name: _____

Date: _____

Discussion of Experiments

1. Conclusions of Experiments

- Water Cycle:
 - What did you notice on the surface of the bowl of water?
 - How does this relate to the water cycle?
- Crystal Formation:
 - What did you notice about the crystals that formed?
 - How does this relate to the crystallization process?

2. Questions for Thought:

- What are the possible causes for your observations?
- Were there any differences between expected and actual results?

3. Conclusions and Feedback:

- Note any new insights or ideas that emerged from the discussion.
- What difficulties did you encounter during the experiments and how did you overcome them?

4. Application of Knowledge:

- How can you use these results to explain similar processes in nature?
- Are there other questions you'd like to explore about the experiments?

7. Evaluation Methodology

Review the activity sheets students have completed for the phases of the experiment. Check the accuracy and completeness of their observations and their ability to connect results to theoretical concepts.

8. Additional Resources for the teacher

N/A