agrupamento de escolas henriques nogueira

## Lesson Plan

# EVERY DROP COUNTS

**Student information**

- Target Group Description: 4th Grade (9 to 10 years old)
- Awareness of environmental messages through stories or media (e.g., cartoons, songs).
- Able to observe, describe, and participate in group discussions. Exposure to basic science concepts.
- Developing problem-solving skills and more structured logical reasoning.
- Experience with reading comprehension, data collection (e.g., in tables), and simple graphing.
- Exposure to topics like sustainability, recycling, and ecosystems.
- Growing autonomy in carrying out tasks, expressing opinions, and reflecting on their own learning.

**Learning Experiences and Readiness**

- They have participated in previous classroom projects or themed weeks (e.g., Environment Day, Animals Week), providing a foundation for collaborative learning.
- Many students are motivated by hands-on activities, visual materials, digital subjects and storytelling, which align well with the project's design.

**STEAM Scenario + Final learning products**

- The project group was interested in investigating water waste when brushing teeth.
- Each student brought a 1.5 L plastic bottle (as in a faucet simulation), which was punctured and used by a colleague at the end of brushing their teeth to check water waste at the end of the day. The students in the cycle began by calculating the amount of water wasted in classes across the school. When calculating, they discussed the equivalence of water wasted per person with the unit of measurement "1.5 L bottle". They created statistics in graphs that visually demonstrated water waste.
- Physical demonstration corresponding to waste.

**INTENDED LEARNING OUTCOME**
**Acquisition of skills/abilities of:**

- Solving everyday problems Carrying out self-employment Collaborative work
- Environmental Awareness (of waste) Knowledge of SDG6
- Technical-scientific development Critical spirit
- Ability to reflect and analyze Aesthetic and artistic sensitivity

**Cognitive and Behavioral**

- Students will be able to analyze (cognitive behavior) the data collected on water waste during toothbrushing (Mathematics and Science content) within the context of their class and school (context).
- Students will be able to critically evaluate (cognitive behavior) the consequences of water waste for sustainability (Science/

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Citizenship content, linked to SDG 6) in the context of everyday life (context).
- Students will be able to create (cognitive behavior) graphical and artistic representations of the results obtained (Mathematics, Arts, and ICT content) to communicate to peers and the school community (context).
- Students will be able to plan and construct (cognitive/behavioral) visual structures with recycled materials (Engineering/Arts content) that symbolize water consumption and waste (context of the final exhibition).
- Students will be able to cooperate (behavioral) in carrying out interdisciplinary tasks (content of collaborative work, communication, and citizenship) in the context of a class project.

**Affective**
- They will develop environmental awareness and sustainability values connected to SDG 6 (Clean Water and Sanitation).
- They will adopt a critical and responsible attitude regarding daily water use.
- They will value creativity and artistic expression as a way of communicating environmental messages.

- **Mathematics – calculations, presentation of results, creation of graphs**
- **Arts – poster illustration, bottle structure, water cycle scene, display panels Science – Sustainability, water waste, planet**
- **Technologies – digital graphic representation**
- **Engineering – construction of the graphic structures, design and assembly of the structure with the bottles**

**SDG worked on: SDG 6 / SDG 4 / SDG 3 / SDG 13 / SDG 12**

**PEDAGOGICAL APPROACH AND LEARNING MODES**
- Learning based on problem solving, inquiry and collaborative learning.
- Project work.
- Group work, research, project Interactive and collaborative learning
- Problem-based learning
- Gamification

| **Learning activities** | **Teaching resources and materials** | **Assessment** |
|---|---|---|
| Indicate the learning activities students will engage in with clear instruction of the learning process<br><br>Exhibition with learning products | Indicate the needed resources (e.g., learning materials, digital and non- digital devices, software and apps, books, articles, human resources) and required learning environment (the physical space arrangement for the STEAM activities)<br>• School library<br>• Computer<br>• Tablet<br>• Interactive whiteboard<br>• Recycled and recyclable material | Indicate the assessment methods to understand learning process and identify learning outcomes<br><br>Assessment<br>• Headings<br>• Checklist |

| | |
|---|---|
| **1 - Introduction and Awareness**<br><br>**Lessons 1-2** | **Objectives:** Raise awareness about water waste; introduce the SDGs.<br><br>**Activities:**<br>• Discussion: "How much water do we waste while brushing our teeth?"<br>• Viewing of a video or infographic on SDG6<br>• Project explanation and group organization<br><br>**Subjects:** Science, Citizenship, ICT<br><br>**Skills developed:** Critical thinking, environmental awareness, oral communication, collaborative work |
| **2 - Investigation and Calculations**<br><br>**Lessons 3-5** | **Objectives:** Measure water waste; perform calculations and statistical representation<br><br>**Activities:**<br>• Simulation using pierced bottles (amount of water wasted)<br>• Recording of data by class<br>• Calculation of totals, averages, equivalents in L and 1.5L bottles<br><br>**Subjects:** Mathematics, Science<br><br>**Skills developed:** Problem-solving, technical and scientific development, independent work, critical analysis, digital competence |
| **3 - Visual Representation and Communication**<br><br>**Lessons 6-8** | **Objectives:** Create visual representations and communicate statistical data<br><br>**Activities:**<br>• Construction of manual and digital graphs<br>• Beginning of the physical structure with bottles<br>• Sketching posters and panels<br><br>**Subjects:** Mathematics, ICT, Arts<br><br>**Skills developed:** Visual communication, digital competence, aesthetic sensitivity, group work |
| **4 - Construction and Artistic Creation**<br><br>**Lessons 9-11** | **Objectives:** Materialize data and ideas in physical and artistic form<br><br>**Activities:**<br>• Assembly of visual structure (tower, cascade, water cycle)<br>• Creation of illustrations and messages<br><br>**Subjects:** Arts, Engineering, Science<br><br>**Skills developed:** Creativity, artistic expression, manual work, technical planning, collaboration |
| **5 - Presentation and Reflection**<br><br>**Lessons 12-13** | **Objectives:** Present results to the community and reflect on the experience<br><br>**Activities:**<br>• Final exhibition<br>• Group oral presentation<br>• Reflection circle and project evaluation<br><br>**Subjects:** Portuguese, Citizenship, All involved<br><br>**Skills developed:** Oral communication, critical thinking, reflection, analytical capacity, knowledge sharing |

**STEAM Plan Support Materials – “Every Drop Counts”**

**Initial Motivation Worksheet**
Student Worksheet – “How Much Water Do We Waste?”

Name:

Date:

Observe and answer:

1. Do you leave the tap running while brushing your teeth?

☐ Always ☐ Sometimes ☐ Never

2. How long do you think the water runs?

☐ Less than 1 minute

☐ 1 to 2 minutes

☐ More than 2 minutes

3. Why is it important to save water?

4. Write a sentence about water:

Drawing Activity:

Draw a correct action for saving water.

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**Experimental Worksheet – Water Waste Simulation**
Objective: Find out how much water is wasted while brushing teeth.

Materials:

- 1.5L plastic bottle

- Container

- Stopwatch

- Recording table

Procedure:

1. Make a small hole in the bottle.

2. Simulate toothbrushing time.

3. Collect the wasted water.

4. Record the results.

Data Recording Table:

| Group | Brushing Time | Amount of Water | Number of 1.5L Bottles |
|---|---|---|---|
| | | | |
| | | | |
| | | | |
| | | | |

Observations:

_____

_____

_____

_____

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**Mathematics Worksheet – Calculations and Statistics**
Student Worksheet – “Water Numbers”

1. A class wasted _____liters of water.

How many 1.5L bottles does this represent?

Calculation:

Answer:

2. If each student wastes ____liters of water per day, how many liters are wasted by a class of _____students?

Calculation:

Answer:

3. Use the collected data to create a graph.

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**Research Worksheet**
Student Worksheet – “Let’s Discover!”

Research and answer:

1. Where can we find water on Earth?

2. Why should we protect water?

3. What does SDG 6 mean?

4. Write 3 ways to save water:

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**Artistic Production Worksheet**
Student Worksheet – “Creating to Raise Awareness”

Poster Planning

Poster title:

Main message:

Colours we will use:

Recycled materials used:

Drawing Area:

Draw your poster idea.

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**Structure Construction Guide**
STEAM Construction – Tower / Drop / Waterfall

Materials:

- Recycled bottles
- Tape
- Scissors
- Cardboard
- Paint
- String

Steps:

1. Wash and dry the bottles.
2. Organize the bottles according to quantity.
3. Build the structure.
4. Decorate it with environmental messages.
5. Prepare the structure for the exhibition.

Safety Rules:

- Use scissors carefully.
- Work cooperatively.
- Respect your classmates' ideas.

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**Final Reflection Worksheet**
Student Worksheet – “What Did I Learn?”

1. What I liked most about the project was:

2. I learned that water:

3. From now on I will:

4. My group worked:

☐ Very well

☐ Well

☐ We need to improve

5. Draw the most important moment of the project.

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**Teacher Assessment Checklist**

| Criteria | Yes | No | Observations |
|---|---|---|---|
| Participates in activities | | | |
| Cooperates with the group | | | |
| Records data correctly | | | |
| Understands the environmental issue | | | |
| Creates graphs correctly | | | |
| Uses recycled materials | | | |
| Communicates ideas clearly | | | |
| Demonstrates creativity | | | |

**Assessment Rubric**

| Criteria | Excellent | Good | Satisfactory | Needs Improvement |
|---|---|---|---|---|
| Participation | Always participates | Frequently participates | Sometimes participates | Rarely participates |
| Teamwork | Cooperates very well | Cooperates | Cooperates a little | Does not cooperate |
| Scientific knowledge | Fully understands | Understands well | Partial understanding | Has difficulties |
| Creativity | Very creative | Creative | Little creativity | No creativity |
| Communication | Communicates clearly | Communicates well | Some difficulties | Does not communicate |

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**Poster Slogans**
- Every Drop Counts!

- Save Water, Save the Planet.

- Turn off the tap while brushing your teeth.

- Water: a precious resource.

- Small actions make a big difference.

**Digital Activity Suggestions**
- Create digital graphs using Excel or Canva

- Produce PowerPoint presentations

- Create QR codes with environmental messages

- Make quizzes about water

- Produce short awareness videos

**Project Closure**
Final Exhibition Suggestions:

- Display graphs and posters

- Present the constructed structure

- Invite families and other classes

- Create a “Water Commitment Wall”

Commitment:

“I promise to use water responsibly and help protect our planet.”

Signature: