



GEAR (Global and Environmental Awareness and Responsibility) – a Toolkit for Inclusive Environmental Education

Project Element: Water

Tool: Water cycle in a bag

Age: The whole school has been involved

Objectives:

- To make a small scale replica of the water cycle.
- To demonstrate that there are four main stages in the water cycle: condensation, evaporation, precipitation and collection.
- To increase children's discourse about the water cycle.
- To recognise that water is continually circulating

Basic transversal competences:

- **B.C. 03/06 Competence for science and technology:**
 - Using scientific and technological thinking in order to recreate the water cycle.
 - Use and application of knowledge and methodologies that explain the natural process. Note the different stages of cycle. These involve an understanding of the natural changes caused by the weather conditions.
- **B.C. 08 Competence for thinking, learning and communicating:** Asking questions, making hypothesis, experimenting, observing, sharing ideas making use of verbal and non-verbal codes.
- **B.C. 09 Competence for initiative, entrepreneurship and communication:** Taking initiative and managing initiative processes decisively and effectively, planning and carrying out small scale research projects.
- **B.C. 10 Competence for learning and living and communicating together:** taking part in interpersonal and group situations in a collaborative manner, recognising one's own and other's rights and duties, for the individual's and everybody's good.
- **B.C. 11 Competence to be yourself and communicate:** Self regulation of the learning process and of individual decisions, opinions and motivation to carry out duties and willpower.

FACTS

The earth has a limited amount of water. This water keeps going around and around in what we call the water cycle. When the sun heats the water in the lakes, streams, oceans, etc. some of it turns to a gas (water vapor). This is called **evaporation**. This invisible water vapor is light and rises into the air.

When the water vapor hits the cold air high up in the atmosphere it turns back to water droplets and collects in clouds. This is called **condensation**.

When too many water droplets form in a cloud, the cloud gets heavy and the water falls back to the earth in the form of rain, hail, sleet, or snow. This is called **precipitation**.

When the water falls back to the Earth, it may fall back in the streams, lakes, ocean, etc. or it may fall on the land. This is called **collection**. When it falls on the land, it either soaks into the earth for plants to drink or runs over the soil and back into the streams, lakes, oceans, etc. and the cycle begins all over again.

QUESTION: what are clouds made of?

We explain our children that clouds are made of a large collection of very tiny droplets of water or ice crystals. The droplets are so small and light that they can float in the air.

- **How can we make clouds in a bag?**

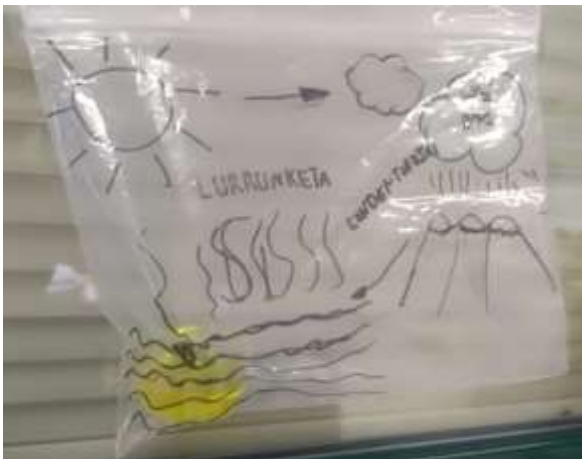
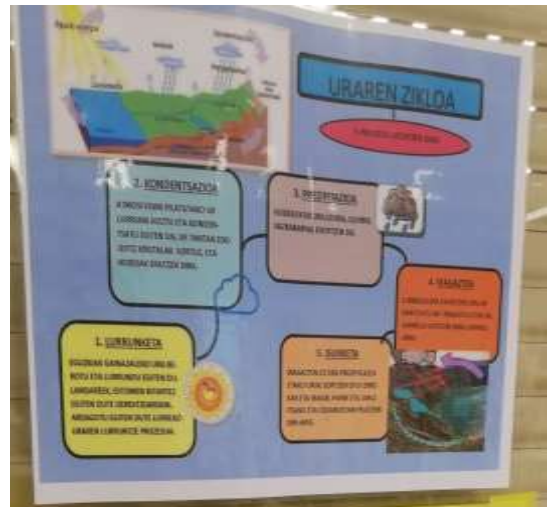
Materials:

- A zip lock plastic bag.
- A cup of water.
- Food coloring (optional)
- Tape

Procedure:

- Pour water into the plastic bag, add some drops of food coloring and seal it completely.
- Tape the bag to a window that receives some sunlight.
- Ask participants to predict what will happen and write their predictions: What do you think will happen?
- Keep the bag on the window for several hours /days and ask pupils if they can see any of the water cycle processes: Can you see any of the water cycle processes? (clouds are formed. When the clouds are full of water or saturated they release some of the water as rain)

- What processes do you know are occurring but we don't actually see happen? (The sun heats the water and water vapor rises)
- Make observations over the course of several days, record your observations and comment with your classmates.
- Where does the water go after it condenses on the plastic bag
- Why do you think this activity is called "Water cycle in a bag?"
- Draw the process using pictures and arrows: clouds, rain, sun.
- Label the process. Write the key words in the correct place: Evaporation, condensation, precipitation, collection.





OLDER PUPILS CARRIED OUT OTHER EXPERIMENTS ABOUT THE SAME TOPIC

5th graders prepared and explained these experiments to 2nd grade pupils.

MINI WATER CYCLE EXPERIMENT

Get₂ Know
H₂O

EXPERIMENT 1: Mini Water Cycle

Challenge: Create a small scale replica of the water cycle

WHAT YOU NEED:

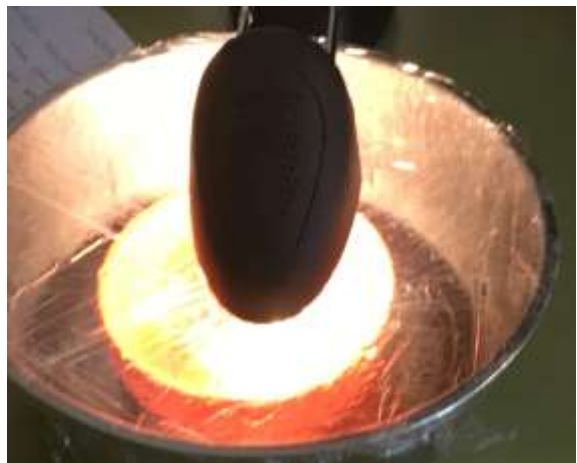
- Large, clear bowl
- Plastic wrap
- A weight (just heavy enough to keep the plastic wrap taut)
- Smaller container (a cut-down yogurt cup works well)
- Rubber band, piece of string, or packaging tape

STEP-BY-STEP:

- 1.** Place the small container in the middle of the large, clear bowl.
- 2.** Fill the bowl with a little water, being careful not to fill the small container inside.
- 3.** Cover the bowl with plastic wrap and fasten the plastic wrap around the rim of the bowl with your rubber band, string or packaging tape.
- 4.** Put a weight on top of the plastic wrap in the center of the bowl.
- 5.** Put your experiment on a windowsill or somewhere that the sun will hit it.

QUESTIONS:

- How long does it take for water to evaporate and condense on the plastic wrap?
- Where does the water go after it condenses on the plastic wrap?
- Would dark-colored water evaporate more quickly or more slowly than plain water? Why?
- Do you think air temperature or water temperature is more important to evaporation? Why?



RAIN MAKING EXPERIMENT

Supplies:

- A plate, ice, pan, water stove.

Boil a pan of water (*this is an ocean*). Fill a plate with ice cubes (*this is a cloud*).

Place the pie plate above the steam (*evaporation*). When the steam comes in contact with the cold plate, droplets of water form (*condensation*) and fall back into the pan – kind of like rain (*precipitation*)!

