

3.7 Water and energy

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Short description on the theme

Humans have used water power to supply energy for almost as long as we've used wind. Archaeologists have discovered descriptions of water wheels used for grinding grain that date back to more than 3 000 years ago.

Today, the energy of falling water is used mainly to drive electrical generators at hydroelectric dams. As long as snow and rainfall can fill the streams and rivers, moving water can be a renewable source of energy. All around planet earth, water is on the move. In rivers and creeks, water flows downhill under the force of gravity. It starts off as rain or snow falling on the highlands and mountains. Running water forms tiny rivulets and streams, which gather to form large rivers. Most rivers find their way to the edges of the continents, where they dump massive loads of fresh water and sediments into the oceans.

Evaporation from the surface of rivers, lakes, and oceans brings the water back into the atmosphere as invisible water vapour.

Under the right conditions, unseen water vapour condenses from the air to form clouds and possibly rain, snow, or hail. Seasonal rain and snowfalls bring fresh water back to the headwaters of streams, completing a very important ecological system called the »hydrologic cycle.«

By bringing fresh supplies of water to the highlands, the hydrologic cycle ensures that we always have energy available from flowing water.

Goals of this unit

- to explain the importance of water as a renewable energy source
- to discuss positive and negative aspects of the usage of water as a source for energy production

Objectives

- to learn about the production of electrical energy using the water cycle in nature
- to start to respect water as an essence of life on planet earth, and as an essential part of earth's life forms

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Education partner and target group, content and goal

2

Abstract of the examined themes and target group

3

Eight Concepts on water issues

3.1

Experience of water by working at learning stations

3.2

Water in our everyday life

3.3

Research on waterbodies, organisms and water quality

3.4

Water Art on paper

3.5

Water and climate change

3.6

Water and history

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Water and energy

3.8

Water games

4

Attachment

Basic conditions

Target group children and youth aged 10 – 14 and their parents
 Place class room in nature
 Materials needed plastic bottles, paper boats, scissors
 Methods Open discussion, Problem sol-ving
 Time frame 45 minutes

Explanation

5 minutes
 Explain to the group the goals and objectives of the exercise

15 minutes
 Start discussion about the ways in which human civilization uses water for electricity production.

Ask the question: How could energy production from water function, if there was either a lack of water, or no rain or snow at all in the mountains? Discuss what could cause this problem, and what effects this problem could have.

20 minutes
 Split the group into three smaller groups. Hand out the materials – the plastic bottles and pieces of paper. Give the groups 5 minutes to solve the problem, by giving these instructions: Make the paper boat and try to get it to move one metre, without using your hands. www.metacafe.com/watch/879140/how_to_make_a_paper_boat/
 One of the solutions is to create a channel with plastic bottles. Use the scissors to cut open the plastic bottles. Then you put the paper boat inside and fill the channel with water.

5 minutes
 Discuss with the group:
 1. How much water do they need to move the boat?
 2. What will happen if there is no water?
 3. Why is it important to use gravity to move the boat?
 4. Does a hydro-electric power plant pollute the environment?
 5. What is the difference between very big hydro-electric power plants and smaller ones?

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