Lesson 3

NATURAL PHENOMENA: RAIN, WIND, HAIL, STORM, TORNADO

Lesson objective: To acquaint pupils with various natural phenomena, types of precipitation and to explain the relationship between climate change and precipitation characteristics.

Terms: natural phenomena, precipitation, wind, rain, hail, hailstorm, tornado, storm, anemometer, weather vane, blotography.

Materials required for the Eco workshops:

1. Bowl or jar, hot water, ice cubes and plastic food wrap.

2. Paper cups, cardboard, pencil, pin, paper clip, scissors.

3. Sheet of paper, water, paint (watercolour or gouache), brush, cocktail straw, felt-tip or gel pen.

4. Transparent container, water, washing liquid.

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1. Information (Audio/text) 2 min.

Learning objective: To interest and acquaint pupils with the topic of the lesson (consequences related to climate change).

ACTIVITIES

Teacher: coordinates activity.
Pupils: watch video and listen to the information.

On the screen: video of the Earth revolving.

Due to climate change, the average temperature rises every year. That causes changes of natural phenomena: droughts alternate with heavy rains, unusual precipitations for the season are observed more and more often (hail in summer, rain in winter) etc.

Extreme meteorological phenomena increase because of climate change (tornado, record high and record low rainfall, droughts and even extreme cold). Due to global warming, common long term meteorological indicators such as temperature, sea level and precipitation are also changing.

2. Information (Audio/text) 2 min.

Learning objective: To recognise and identify types of precipitation and natural phenomena.

ACTIVITIES

Teacher: coordinates activity.
Pupils: watch the video and listen to the information.

On the screen: video showing different types of natural phenomena.

Natural phenomena include rain, hail, wind, storm and tornado.

Notes: _____

3. Information (Audio/text) 7 min.

Learning objective: To understand the principle of water circulation and its importance to nature.

ACTIVITIES

Teacher: coordinates activity.
Pupils: listen to the information and watch video about the water cycle.

On the screen: video about water cycle is displayed. The information about it is provided.

> As the sun warms, the water in oceans, seas, rivers and lakes evaporates. The cooled vapor turns into clouds. Water vapor accumulated in the clouds turns into rain. In winter, the droplets turn into small ice crystals - hail. Fallen precipitation is absorbed into the ground and returns to lakes, seas and oceans. Such a water journey is called a water cycle.

In nature, the water circulates in a closed circle. It means that once a water particle enters the circulation circle, it returns to the place from where it left.

4. Experiment 10 min.

Learning objective: To demonstrate the water cycle using the simplest tools.

ACTIVITIES

Teacher: coordinates activity.
Pupils: watch the video and work according to the given example.

On the screen: video and instructions for performing the experiment.

Add boiling water to a bowl or jar.
Cover it with a plastic food wrap.
Place several ice cubes on the top of it.
Wait and monitor for about 10 minutes.
Drops of water begin to accumulate on the inner side of the plastic food wrap and drip back into the container.

Materials recquired for the workshop: bowl or jar, boiling water, ice cubes and plastic food wrap.

5. Information (Audio/text) 5 min.

Learning objective: To acquaint pupils with types of precipitation.

ACTIVITIES

Teacher: coordinates activity.
Pupils: watch video about precipitation and listen to information about them.

On the screen: video of various kinds of precipitation.

Individual drops of water falling from the clouds to the surface of the Earth is called rain.
Precipitation, which is made up of irregularly shaped pieces of ice that fall during the warm season is called hail.
Air movement in relation to the Earth's surface is called wind.
Strong wind, usually together with rain and thunder is called storm.
A strong vortex with a vertical axis and a very high rotational speed is called tornado.

6. Interactive task 4 min.

Learning objective: To test pupils' knowledge about various types of precipitation.

ACTIVITIES

Teacher: coordinates activity.
Pupils: match pictures with the correct precipitation type.

On the screen: an interactive task is displayed.

Notes: _____

7. Interactive task — 5 min.

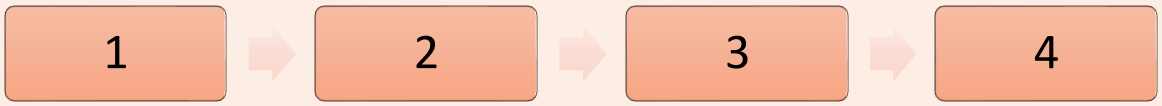
Learning objective: To develop creativity (depicting rain of different intensity with the sounds of fingers).

ACTIVITIES

Teacher: coordinates activity (presses the task buttons in sequence).
Pupils: represent rain of different intensity by tapping the table with their fingertips.

On the screen: 4 buttons with the names of the rain type are displayed:

1. light rain,
2. heavy rain,
3. thunderstorm,
4. pouring rain.



8. Workshop — 12 min.

Learning objective: To develop ability to investigate natural phenomena.
To build an anemometer (a device for measuring wind speed).
To develop collaborative skills while working in groups.

ACTIVITIES

Teacher: coordinates activity.
Pupils: watch the video, listen to the information about wind speed measurement, divide into groups of 2 - 3 pupils and construct the anemometer.

On the screen: video information about the construction and operation of the anemometer.

The wind is caused by the sun which heats the air differently in different parts of the world. The warmed air subsides, so it starts to rise and is replaced by cooler air. This kind of air movement is called wind. A light breeze barely moves the leaves and branches of the trees. Strong winds can break or even turn down trees.

Special devices called anemometers are used to measure wind speed. The speed and strength of the wind depends on how big the difference in atmospheric pressure between the areas is. The faster the wind, the greater the strenth affects the surrounding objects. Strong winds are described as tornadoes, storms, hurricanes.

Measure the wind speed with the constructed device - count how many times it rotates around the circle in 1 minute! Perform the wind speed measurement in different locations outside school!

9. Workshop — 12 min.

Learning objective:
To develop ability to investigate natural phenomena.
To build an anemometer (a device for measuring wind speed).
To develop collaborative skills while working in groups.

ACTIVITIES

Teacher: coordinates activity.
Pupils: watch the video, listen to the information about wind direction measurement, divide into groups of 2 - 3 pupils and construct the wind vane.

On the screen: video information about the construction and operation of the wind vane.

> The wind is characterised by two parameters - wind strength and wind direction. We have already found out that wind strength (speed) is measured with an anemometer. To determine the direction of the wind, we use another device - a wind vane. A freely rotating arrow on a vertical stick always points in the direction from which the wind is blowing.

Perform wind direction measurement in different locations outside school!
Place a wind vane into the ground, put a compass next to it, observe the movement of the wind vane and determine the direction of the wind!

Materials recquired for the workshop: paper straw, cardboard, scissors, pencil, needle, glue (or sticky tape), compass.

10. Discussion — 5 min.

Learning objective:
To develop ability to draw conclusions based on reasoning and experience.

ACTIVITIES

Teacher: coordinates activity and leads the discussion.
Pupils: answer the questions and make conclusions.

On the screen: cards with question numbers.

- Is the wind speed the same at all locations near the school?
- Which is the windiest place near the school? Why?
- Why is it important to measure the speed of wind?
- Is this day windy or not? Is it a storm? Or maybe a tornado?
- Is it only important for meteorologists to measure wind speed? Why is it important to engineers?

11. Workshop — 12 min.

Learning objective: To develop creativity and ability to apply knowledge in artistic activities..

ACTIVITIES

Teacher: coordinates activity and acquaints the upils with the blotography technique.
Pupils: watch video about creating drawings using the blotography technique and create own drawings.

On the screen: video material of the work process.

> Blotography is the art of the silhouette. We put spots of paint on a sheet of paper and try to imagine what they look like. We blow air on the stain through a straw and form the shape. We get silhouettes that look like plants, animals, etc. After the stains dry, we continue fantasizing - draw with paint, marker or felt-tip pen and highlight what is hiding in the stains.

Materials recquired for the workshop: sheet of paper, water, paint (watercolour or gouache), brush, cocktail straw, felt-tip or gel pen.

12. Interactive task – test — 5 min.

Learning objective: To test the pupils' knowledge and understanding.

ACTIVITIES

Teacher: coordinates acitivity, gives feedback to pupils.
Pupils: carry out a test individually or in a group (match the description with the correct term).

On the screen: terms and desriptions in mixed order.

Thermometer: a device for measuring the air temperature.
Wind: moving airflow.
Tornado: a vertical vortex, a strongly rotating column of air.
Storm: a meteorological phenomenon with a strong increase in wind.
Anemometer: a device for measuring wind speed.
Rain: precipitation when water drops fall from clouds.
Hail: pieces of ice in various shapes falling from the clouds.

Notes: _____

13. Experiment

10 min.

Learning objective:

To understand the principles of natural phenomena
To simulate natural phenomena using the simplest tools.
To develop cooperative skills while working in groups.

ACTIVITIES

Teacher: coordinates activity.
Pupils: watch the video and perform the tornado experiment**.**

On the screen: video about the tornado experiment.

Extreme natural phenomena are increasingly caused by human activities and climate change. Tropical storms, tornadoes and hurricanes have become more intense and frequent over the past 20 years. In certain regions, the rain has become more frequent and intensified. Over the past 50 years, rainfall in the wettest season has increased by 15%. Over the next few decades, the amount of rain will continue to increase, causing floods and destroying harvests.
Climate change can also lead to water scarcity in different places on Earth. Scientists predict that in 70 years the longest period of no rain will gradually get longer every year.

There's a possibility to create a simulation of nature in the classroom or at home. An experiment allows to observe a tornado safely without the risk of going into the area of an actual tornado. Further more, it is possible to watch it over and over again as much as you want.

Fill the container about ¾ full with water and then fill it all the way with dishwashing liquid. Shake well and observe. A vortex is formed in the container, similar to the most real tornado vortex - wide at the top and narrow at the bottom. To make it even more fun and impressive, it can be filled with paint, glitter, etc.

Materials recquired for the workshop: transparent container, water, washing liquid.

Notes: _____

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