

Acid rain



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ENVI-MOBILE: Integration of mobile learning into environmental education fostering local communities' development

2014-1-SK01-KA200-000481
ERAZMUS+ Programme

Project is co-financed by European Union,
Programme Erasmus+.

Activity No. 1

Part of the lesson: EVOCATION

The aim of the activity: To introduce the topic and find out, what pupils know about acid rain.

Step 1

Brief description of the activity:

Teacher writes down the topic "acid rain" on the board. He/she briefly summarizes the rules of the free writing. The rules can be hanging on a poster on a wall or written on a board. Pupils individually write down on a paper everything that comes to their minds related to acid rain, the causes and consequences. During the writing, teacher prepares the experiment for STEP 1, related to Activity no.3.

Instruction (what you need to tell the students):

Within the time limit of 3 minutes, write down everything that comes to your mind related to the topic of „acid rain“. You have to keep writing, even if you have no more ideas – just write everything that you have in mind. All your thoughts are as important as the thoughts of everyone else.

Step 2

Brief description of the activity:

Some volunteer pupils read what they wrote and discuss it shortly with their classmates.

Instruction (what you need to tell the students):

Those of you, who want to, can read what you wrote. We will discuss it together.

Step 3

Brief description of the activity:

Pupils together with teacher define the causes of the acid rain and the consequences on human beings and our environment. If there is enough time left, pupils can write them down on a board, or the teacher does it.

Instruction (what you need to tell the students):

Let´s try together to define the causes and consequences of the acid rain.

Tools for the activity (everything you need to take to the classroom): Pen, paper, markers, board, stopwatch, the rules of free writing hanging on the wall or flipchart (only in a case this method is new to the pupils)

Estimated time (max. 40 min.): 8 minutes

Notes: Before the lesson, teacher prepares the experiment on measuring the impact of acid rain on the rocks. (STEP1 in Activity no.2)

Activity No. 2

The aim of the activity: To compare pH of the various solutions.

Step 1

Brief description of the activity:

In advance prepared test – tubes with solutions are handed out to pupils. Each pair of pupils receives 1 solution and 1 litmus test and tweezers. The pH scale is available for the entire class on a visible place. Pupils in pairs put the litmus test into the solution, compare the colour of the test with the scale and define the pH of the solution. During the experiment, teacher draws the numeric axis for STEP 2 in this activity.

Instruction (what you need to tell the students):

You have several kinds of solutions in front of you, with different levels of acidity. Your task is to find out their pH. Use the tweezers to put the litmus test into the solution and after a while take it away. Compare the colour of the test with the scale and define the pH of the solution.

Step 2

Brief description of the activity:

On the board there is a numeric axis with marked pH ranking from 1 to 14. Pupils assign different kinds of solutions to the data on the numeric axis according to their findings.

Instruction (what you need to tell the students):

Write down the name of your solution on the board and locate it correctly so that it matches the data on the numeric axis.

Step 3

Brief description of the activity:

At the end of this activity, there are different solutions written on a board, ranked from the most acid one to the most alkaline one.

Instruction (what you need to tell the students):

Compare which of the solutions are acid, which are neutral and which are alkaline

Tools for the activity (everything you need to take to the classroom): Test – tubes or glasses for different types of solutions, several different solutions – purified water, tap water, mineral water, rain water, water from the river, water from the soil, soaped water, solution of soda bicarbonate, vinegar, lemonade, ...

Tweezers, universal litmus tests, scale of pH, board, markers, stickers for test – tubes marking

Estimated time (max. 40 min.): 10 minutes

Notes: Prepare the number of solutions according to number of pairs of pupils. Do not forget to mark the test – tubes with the names of the solutions, so that pupils can identify them and assign numeric data of pH. Ask pupils to mark their test – tubes also for their own needs.

Part of the lesson:
APPRECIATION

Activity No. 3

The aim of the activity: To find out, how the acid rain impacts the rocks.

Step 1

Brief description of the activity:

In the beginning of the lesson (during the free writing) teacher prepares the experiment. Pour the piece of a rock – limestone or chalk or egg shell in the glass filled with vinegar solution and observe the reaction. Find out, that limestone dissolves in vinegar and from this we can imagine how acid rain impacts the rocks in the nature, buildings, statues and eventually other historical monuments.

Instruction (what you need to tell the students):

In the beginning of the lesson we started the experiment. What happens with the limestone (chalk/egg shell) in the vinegar solution? Can you find the analogy of this experiment in nature? Try to explain how this experiment relates to the fact that the monuments transported from Egypt to Europe in the beginning of 20th century, located outside, are often completely destroyed compared to those kept in their original country?

Tools for the activity (everything you need to take to the classroom): Glass with vinegar solution, limestone (or chalk, or egg shell)

Estimated time (max. 40 min.): 7 minutes

Notes: We launch the experiment at the very beginning of the lesson (takes 2 minutes), we keep the limestone poured in vinegar solution and evaluate the results in STEP 1 of Activity no.3

Part of the lesson:
APPRECIATION

Activity No. 4

The aim of the activity: To summarize the information and express opinions on the topic of acid rain

Step 1

Brief description of the activity:

Cinquefoil method. Ask pupils to use this method and write down the topic name “acid rain”. If pupils do not know this method, introduce them the rules (see the Notes below). Pupils in pairs write down their own cinquefoils.

Instruction (what you need to tell the students):

Work in pairs. Use the method of cinquefoils to describe the acid rain.

Step 2

Brief description of the activity:

Volunteers read what they wrote in front of the classroom.

Instruction (what you need to tell the students):

Who wants to, can read us what they wrote.

Tools for the activity (everything you need to take to the classroom): Pen, paper

Estimated time (max. 40 min.): 7 minutes

Notes: If pupils do not have experience with Cinquefoil method, we explain them the basic rules, and show them an example of this method. If possible, we can exhibit the works of pupils on the walls in the classroom.

Cinquefoil method: Cinquefoil method uses 5 lines: in the first line, you name the theme (WHAT), second line needs two words description of the theme (HOW IT IS), third line expresses the action (WHAT DOES IT DO), fourth line expresses 4 words opinion or empathy related to the theme (DESCRIBE IT DIFFERENTLY). The last, 5th line recapitulates the point of the theme – one word again (NAME IT DIFFERENTLY).

Part of the lesson:
APPRECIATION

Activity No. 5

Part of the lesson: REFLECTION

The aim of the activity: To realize that each of us can do something in order to help protecting the environment.

Step 1

Brief description of the activity:

Teacher divides pupils into groups of 3 – 4 people in each. Each group writes down on a paper their ideas on how it is possible to individually contribute to the decrease of acid rain.

Instruction (what you need to tell the students):

Write down your own suggestions on how we can contribute to decreasing of acid rains. Do not be afraid to record all your ideas, even if they seem not realistic.

Step 2

Brief description of the activity:

Finish the activity after 3 – 4 minutes. Each group presents their own ideas in front of the classroom.

Instruction (what you need to tell the students):

Choose someone to present your thoughts on behalf of your group. Explain your arguments and express opinions.

Step 3

Brief description of the activity:

Teacher together with pupils summarizes the activities, through which each of us can contribute to the decrease of acid rains and protection of the environment.

Instruction (what you need to tell the students):

It is important to realize that it is not possible to solve the problem of acid rain only through learning about it. Each of us needs to take concrete action or change the habits, or give up some comfort in order to contribute to positive change.

Tools for the activity (everything you need to take to the classroom): Pen, paper, markers, board/flipchart, stopwatch

Estimated time (max. 40 min.): 7 minutes

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