

## Lesson 10. Plants and global warming.

In this lesson pupils will be introduced to how plants can both suffer from the effects of global warming and help fight it. Pupils will learn how various changes caused by global warming negatively affect plants. The activities in the lesson will help pupils understand that at the same time plants are capable of reducing global warming and that it is important to introduce them into the urban environment as well. The lesson also includes practical activities, making decorative flower pots and models of green cities from reusable materials, as well as greening the classroom with self-made wheat or grass people.

### Lesson duration:

depending on the duration of discussions, eco workshop and additional activities, the lesson takes approximately 80 minutes.

### Before the lesson:

get to know the methodological recommendations for the lesson and prepare materials to successfully plan and conduct the lesson for your pupils.

### Materials necessary for the eco workshop:

Activity 9:

1) decorative flower pot: gouache paint, strings or ribbons, application paper (you can use scraps), napkins, glue, reusable materials (which will become a flower pot): plastic bottle, yoghurt container, metal can, old shoes;

2) wheat/grass man: tights, wheat or grass seeds, soil, glue, decorations (e.g., eyes, felt to make a mouth, moustache and eyebrows, etc.).

cardboard, application paper (old magazines or newspapers also work), glue, scissors, gouache paint, brush.

### Terms:

global warming – *the general increase in air and water temperature over a long period of time, as a result of which climate change begins, for example, unusual precipitation, severe drought, heat or the very opposite – cold,*

carbon dioxide – *a gas in the air that occurs during breathing and combustion (including in car exhausts and factories); too much carbon dioxide or carbonic acid gas causes global warming; plants, like animals and humans, exhale carbon dioxide, but at the same time they are also able to absorb it from the air (reduce its amount in the atmosphere) during photosynthesis,*

oxygen – *a gas in the air that humans, animals and plants breathe; plants produce this gas and release it into the atmosphere during photosynthesis,*

photosynthesis – *the process carried out by plants by absorbing carbon dioxide (carbonic acid gas) from the air, taking in water with roots and, under the influence of sunlight, creating nutrients (glucose) and oxygen from it, which are released into the environment,*

green cities – *cities with lots of parks, trees, green areas, roof gardens.*

### Hand-outs (for printing):

A worksheet for pupils to strengthen the existing knowledge about climate change, as well as to strengthen the new information about global warming and green cities. You can use encyclopedias about nature, plants or internet sources to complete the tasks;

## The lesson

**At the beginning of the lesson introduce pupils to the behavioural rules, emphasizing that they should listen carefully because the board does not repeat information several times. In the lesson you will need to cooperate, express your opinion and be able to catch what others say. For younger pupils or pupils who find it challenging to stay focused on work for longer periods of time, dynamic breaks can be included between tasks.**



Tablets can also be used for the interactive tasks.

### 1. Climate change.

Pupils, based on their experience and the previously heard, discuss about how weather and climate has changed over time, coming to the conclusion that the cause of extreme weather (winters without snow, hot and dry summers or the opposite – winters with a lot of snowstorms, chilly and humid summers) is global warming. Pupils might be aware that decades ago the weather was more predictable, for example, winters were usually evenly colder.

### 3. Global warming and plant life.

Pupils discuss about how plants suffer from global warming. Two pictures are offered – a blooming meadow and a completely arid meadow – to incite ideas. Pupils can think individually first, then discuss in small groups, so that everyone has a chance to speak out, and share their ideas with the entire class later.

### 2. Global warming.

Pupils answer two questions about global warming in the form of a test to strengthen the knowledge gained in lesson 5 and actualize this lesson's topic. To get everyone involved, pupils can vote on the correct answer, for example, by raising their hands, or firstly to agree on the correct answer in smaller groups.

#### Additional activity.

You can invite pupils to complete task 1 on the worksheet (look at the pictures and write what contributes to global warming).

### 4. Global warming and plants.

Pupils put the pictures in the correct order to show how global warming affects plants negatively. After each of the four given situations pupils listen to in-depth information about the pictures and find out how different the effects of global warming can be.

### 5. Reducing the effects of global warming.

Pupils listen to information about the causes of global warming and watch an animation about how plants use carbon dioxide (one of the contributors to global warming) to produce the oxygen that we all breathe.

### 7. Green cities.

Pupils listen to information – how with the help of plants the amount of carbon dioxide can be reduced in places with many cars (one of the main producers of carbon dioxide gas), like in cities and near highways.

### 9. Eco workshop.

At the beginning of the eco workshop explain that it is important to take care of the environment. Natural and reusable materials can be used to create something beautiful and useful at the same time. On the screen there are the necessary materials, instructions and drawings so pupils can make either a decorative flower pot (and then they can seed or plant a houseplant in it), or a decorative wheat/grass man. The teacher must prepare the required materials (see guidelines on Page 1). Pupils can work

### 6. The role of plants in the urban environment.

Pupils discuss the plants' impact on the city. To give everyone a chance to speak out, pupils can think individually, then discuss in small groups and share their ideas with the entire class after. The expected pupils' answers could be that in the urban environment it would be possible to place plants on roofs, in flower pots, next to the road, at the door, in parks, near factories and houses; and the benefit from it would be healthier air, it would be more pleasant to live in, and a bit more cooler.

### 8. Make the city greener!

Pupils drag plants into the appropriate places to make the city greener. Pupils can be asked to describe how the city has changed after the greening. The teacher can also explain that in the next exercise pupils will have the opportunity to work practically to make their classroom greener.

#### Additional activity.

If it is not possible to schedule time for activity 12 (eco workshop) in the lesson, as an alternative you can offer pupils to do task 2 on the worksheet (make the given city greener by drawing trees and other plants in it) after this task. Pupils can also do this exercise at home.

### 8. Survival in pollution.

Pupils get to know the diversity of plants and animals and their ability to adapt to pollution, sorting the given organisms into two groups: those that benefit from pollution (seagull, rat, pigeon, seaweed, algae), and those that suffer from pollution (dragonfly, lichen, salamander, plankton, sea urchin).

#### Additional activity.

With the help of questions, you can lead pupils to the idea that organisms that are sensitive to pollution can help people identify the places with more pollution, for example, a poorer air quality. Pupils can be

individually or in small groups, receiving the necessary support and help from the teacher.

When making a wheat/grass man, it is important to really stretch the tights first, for wheat or grass sprouts to be able to push through. This can be done by both pupils and teacher before the lesson.

After the eco workshop, pupils decorate the classroom with the flower pots or grass men they have made. It is possible to take a photo of the decorated classroom to show parents the outcome of this activity.

### 11. Test – what have you learnt so far?

With the help of the interactive test pupils have the opportunity to test the knowledge obtained in the lesson. The test can be done by everyone together or individually – using tablets. Pupils can also be divided into small groups and invited to discuss each question and agree on the correct answer within the group.

invited to observe in the following days which trees have more lichen (and where they are larger, like small bushes) – those that grow in the forest or those that are in the city, near highways. Lichens are sensitive to pollution and are less numerous and less diverse in cities.

### 12. Eco workshop.

To create a “bridge” to Lesson 11 “What can we do to make the world clean and healthy? Green lifestyle”, pupils let their imaginations run wild and create their own city to decorate the classroom with. Pupils individually, in pairs or small groups create one or more objects (houses, roads, trees, bushes) from cardboard. You can put green roofs on houses or decorate them with flowers and bushes. Scraps from magazines and newspapers can be used instead of application paper or cardboard, therefore promoting reuse of materials. Pupils can be encouraged to use sorting containers in the created city collages or models to keep the street clean. After the activity it is important to invite pupils to clean up their workplace.

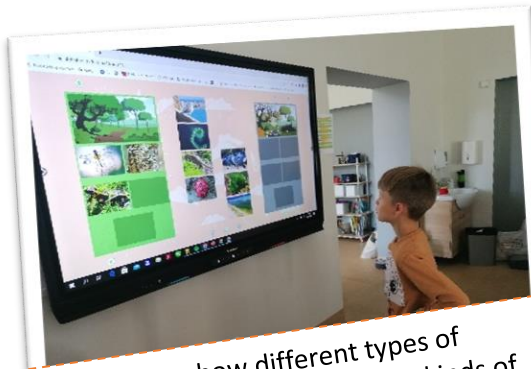
#### Additional activity.

To strengthen the concepts and events learned so far about global warming, climate change and their effects on the environment, invite pupils to do task 3 on the worksheet (write down the number of the corresponding picture next to the given words).

### At the end of the lesson ask pupils:

What did you like the most? What new did you learn? What will you tell your parents? What else would you like to know?

## Images from the lesson process



Pupils learn how different types of environments attract different kinds of animals.



Pupils are planting their own plants and seeds.



Pupils share their ideas on how to make a city "green".



Pupils are planting herbs in an household item that is now beign reused as a pot.

***Pupils are gladly engaging in discussions and want to share their experience with others by talking and sharing their thoughts on the questions given.***

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