

## Lesson 7



# HOT AND COLD DESERTS

Lesson objective: To acquaint pupils with the living environment in the cold and hot deserts. To create an insight about the environmental changes, which are happening under the influence of climate warming.

**Terms:** An oceanographer, a bathyscaphe, a coral reef, the World Ocean, carbon dioxide, microplastics.

#### Materials required for the experiment:

1) 2 transparent glasses, 2 eggs or 2 shells, water, vinegar

**2)** A plastic bottle, scissors or a knife, a container with water, rocks, sand, cotton or a coffee filter, an activated charcoal can be used.



### **1. Discussion with an interactive task**

**Learning** To acquaint pupils with the topic of the lesson and to arouse pupils' interest. To clarify pupils' knowledge about deserts.

#### ACTIVITIES

**Teacher:** switches on the screen and leads the discussion. **Pupils:** answer questions.

On the screen: a swirl of sand with appropriate sound.

"The desert....

What sight do you imagine, when you hear the word "desert"? What colour is it? Are there any plants, animals and people?"

## 2. Interactive task

Learning objective:

To create an idea about the diversity of deserts..

### ACTIVITIES

Teacher: coordinates activity.

Pupils: choose four images that show a desert.

On the screen: 6 images. Four of the images show deserts with different surfaces:

- sand,
- rocks,
- cliffs,
- ice.

Two images show a non-desert environment:

- grassland,
- crop field.

Notes:



5 min. 🕚

## 3. Information (Audio/text)

**Learning** To provide information about different types of deserts and their characteristics.

8 min. 🕚

#### ACTIVITIES

**Teacher:** coordinates activity and leads the discussion. **Pupils:** watch the video and discuss.

**On the screen:** a video about deserts, discussion questions and a follow-up of the video.

Deserts are dry, barren places where it hardly ever rains. They can be found in every continent. They take up almost a fourth of the planet's land surface. In some deserts it is scorching hot during the day, but cold at nights. In some of them cold prevails both day and night throughout the year.

Deserts are different. Mostly they are sand deserts, but there are also rock, cliff, polar and even salt deserts. In the hottest deserts the air temperature exceeds 50 degrees during the day, but the sand and rocks can heat up to 80 degrees, whereas at night the temperature drops to a few degrees above zero.

#### **Discussion questions**

How hot is it in our place in summer? How do you feel during a hot summer? How to take care of plants and animals in the heat? How cold is it in our place in winter? How do we adapt to cold weather?

Strong winds blow in deserts. Dry sand easily rises up into the air, and a sandstorm occurs. The sand swirls are so thick that they cover they sky and you can only see a few steps ahead. There are few plants in deserts, and they are not able to delay wind. In the coldest deserts there is enormous, perennial wide open space of ice. Both poles of the Earth – the North Pole and the South Pole – are covered in ice. It is very, very cold there all year round. In winter the air temperature is around -40 degrees, but in summer around 0 degrees. The soil is frozen all year round, therefore there are almost no plants in these places. Algae, moss and lichen can grow in the warmest places. The biggest polar desert in the world is Antarctica, which is located around the South Pole. Whereas the biggest hot desert is the Sahara sand desert in Africa.



### 4. Interactive task

Learning objective:

To understand the location of the cold and hot deserts on the world map.

5 min. 🕚

5 min. 🕚

#### ACTIVITIES

**Teacher:** coordinates activity.

**Pupils:** mark the hot deserts with a yellow colour, but the cold deserts – with a white colour.

**On the screen:** a world map showing the contours of deserts. On the world map the ocean is blue, but the land is green. Where on Earth are the cold polar deserts and where are the hot deserts located?

### 5. Interactive task

Learning objective:

To get to know the most typical inhabitants of cold and hot deserts.

### ACTIVITIES

**Teacher:** coordinates activity.

**Pupils:** sort the images that match the hot or cold desert. Name the plants and animals in the images.

**On the screen:** two thermometres: one shows the typical temperature of hot deserts, the other – of cold deserts. 8 images of the hot and cold desert inhabitants. The hot desert inhabitants: cactus, scorpion, lizard, meerkat. The cold desert inhabitants: penguin, reindeer lichen, reindeer, seal.

Notes:

### 6. Discussion

Learning objective:

To create an understanding about the harsh living conditions in the hot deserts.

#### ACTIVITIES

**Teacher:** leads the discussion. **Pupils:** answer questions.

**On the screen:** animation with a desert scene. Why are there few inhabitants in the desert? What are the hardships of living in a hot desert?

# 7. Information (Audio/text)

5 min. 🕚

5 min. 🕚

Learning objective:

To explain, how human activity and climate change can affect the expansion of deserts.

#### ACTIVITIES

**Teacher:** coordinates activity. **Pupils:** observe the information on screen.

**On the screen:** an animation about the expansion of deserts. Scientists have found out that long before, where the Sahara desert is now, there were green grassland, big rivers and many animals that are not found there today – antelopes, crocodiles, elephants and giraffes.

The Sahara turned from a green and pleasant land into the world's largest hot desert. The Sahara is still expanding even more to the south.

There are areas also elsewhere in the world, where deserts are slowly expanding. It is due to natural causes – prolonged drought, however irresponsible human activity is also to blame: people allow deserts to expand even faster by cutting down forests, by using fields and pasture too intensively.





### 9. Interactive task - maze

Learning objective:

To arouse interest in a typical desert animal.

5 min. 🕚

#### ACTIVITIES

Teacher: coordinates activity.

**Pupils:** search for the correct answer, while making their way through the maze, listen to information.

On the screen: a maze with 4 choices.

By completing the maze one can find out the biggest amount of water a camel can drink in one go. The options are:

- 1) 25 litres of water,
- 2) 75 litres of water,
- 3) 250 litres of water,
- 4) 100 litres of water.

Notes:

### **10. Information (Audio/text)**

Learning objective:

To provide information about the camel's ability to store up fat and water.

#### ACTIVITIES

**Teacher:** coordinates activity. **Pupils:** observe the information on screen.

On the screen: an animation about camels.

Camels do not store water in their humps, but fat that they gradually use it in case of food shortage. The hump shrinks when the fat reserves are used up. The body of camels can lose a third of its fluid – such a fluid loss would be fatal for a human. To restore the amount of fluid in the body, a one-humped camel can drink even 100l of water in one go.

### 11. Eco workshop

**Learning** To practise the green lifestyle principle – to give things a second life and to develop cooperation skills by working in a group.

#### ACTIVITIES

**Teacher:** coordinates work. **Pupils:** divide into groups or pairs and make a model of a camel.

**On the screen:** instructions on how to make a model of a camel from egg cups and toilet paper rolls

### **12. Discussion**

Learning objective:

To create an idea of the work of scientists in the polar desert.

### ACTIVITIES

**Teacher:** coordinates activity. **Pupils:** express opinion.

**On the screen:** an animated polar desert landscape with an igloo, where polar explorers, that research the life of polar bears, live.

Would you like to go to the cold desert at the North Pole to participate in an expedition together with scientists – "How to help polar bears?"? Why yes or why not?





10-15 min. 🕚

## 13. Information (Audio/text)

**Learning** To create an understanding of the climate change's influence on glaciers and polar bears.

5 min. 🕚

8 min. 🕚

#### ACTIVITIES

**Teacher:** coordinates activity. **Pupils:** listen and observe information.

On the screen: video.

Scientists have found out that the climate on Earth is getting warmer. The warmth affects not only the hot desert, but the cold deserts too. Ice is melting, the vast Arctic blanket is shrinking. If the ocean continues to warm up and glaciers melt, the sea level will rise more and more rapidly. After some time many low-lying villages, towns and islands will be threatened by floods.

The reduction of areas covered with ice seriously threatens the future survival of polar bears. It is constantly more difficult for polar bears to find food.

### 14. Discussion

Learning objective:

To create awareness that each of us can take care of the planet with our actions this very day.

#### ACTIVITIES

Teacher: coordinates activity.

**Pupils:** divide into 5 groups. Each group chooses one of the offered situations and agree on one answer within the group. Groups present their answer to the whole class.

On the screen: discussion questions.

This is Rudis. He learns in the 3rd grade and plays football in his free time. Rudis lives in an apartment close to school together with his parents and little sister. The family of Rudis is concerned about environmental issues, and they really want to help polar bears. Therefore they save natural resources daily, because they know that it affects the climate around the world.

Imagine and tell how Rudis's family acts in these everyday situations:

- 1. How does Rudis go to school and how do his parents go to work?
- 2. What does Rudis's family do with waste
- 3. How does Rudis's family save water?
- 4. How does Rudis's family spend weekends?
- 5. How does Rudis's family save electricity?

### **15. Interactive task – test**

# Learning objective:

To test the pupils' knowledge and understanding.

5 min. 🕚

### ACTIVITIES

**Teacher:** coordinates acitivity, gives feedback to pupils. **Pupils:** carry out a test individually or in a group.

#### On the screen:

- 1. What are the common features of all the world's deserts?
  - Little precipitation, few inhabitants, few plants.
  - Cacti, sand, camels.
  - Deserts get bigger each year.
- 2. Which is the world's biggest desert?
  - The Sahara desert in Africa.
  - The polar desert in Antarctica.
  - The polar desert in the Arctic.
- 3. What is inside a camel's hump?
  - Water.
  - Water in one hump, food in the other.
  - Fat.
- 4. How does climate change affect hot deserts?
  - The territories of hot deserts are expanding.
  - More plants and animals inhabit hot deserts.
  - Nothing changes in the hot deserts.
- 5. How does climate change affect cold deserts?
  - The territories of cold deserts are expanding.
  - Glaciers are melting and the sea level is rising.
  - Conditions for polar bears are becoming more favourable.

Notes:

### **16. Interactive task**

# Learning objective:

To create a content link with the next topic.

3 min. 🕚

#### ACTIVITIES

**Teacher:** coordinates activity, offers pupils to choose the suitable level of difficulty. **Pupils:** put a smiley on the image – where it is easier to endure heat. Put a sad emoticon on the image – where it is harder to endure heat. Listen to information.

On the screen: images of the city and the forest.

The forest. The heat and light of the sun reach the city and the forest equally. However, at the same time, there is a difference un temperature between the city and the forest. In the forest plants receive water from soil through their roots. Then they store water in stems and leaves. The water eventually reaches small holes on the underside of the leaves. There the liquid water turns into water vapour and is released into air. It acts as a natural air conditioner that cools the air.

The city. When visiting the city, you will not see many plants. Instead you will see sidewalks, streets, parking lots and tall buildings. These buildings are usually built from materials such as cement, asphalt, bricks, glass and steel.

These materials are usually dark in colour – black, brown and grey. The dark colour absorbs the heat emitted from sun, therefore it gets even warmer in the city. In summer it is about 4 degrees hotter in big cities than in the forest. It does not seem much, but people often suffer from heat stroke due to this increased temperature.

#### Source references:

- 1) Bērnijs D. Ilustrētā dabas enciklopēdija. Rīga: Zvaigzne ABC, 2005. 320 pages.
- 2) Deinsa K. Vai mēs varam palīdzēt polārlāčiem? Rīga: Zvaigzne ABC, 2022. 48 pages.
- 3) Makvitija M. Tuksnesis. Enciklopēdija. Rīga: Zvaigzne ABC,1999. 63 pages.
- 4) Mērfijs G. Globālā sasilšana Rīga: Zvaigzne ABC, 2008. 64 pages.
- 5) Roulends-Intvisls T. Laikapstākļi un klimats. Rīga: Koolibri, 1995. 63 pages.
- 6) Teilore B. Arktika un Antarktika. Enciklopēdija. Rīga: Zvaigzne ABC, 1998. 63 pages.
- 7) What Is an Urban Heat Island? (online) (Viewed on: 04.10.2022.) Available on:

https://climatekids.nasa.gov/heat-islands/



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