

# Theme 5. Water

Teacher guide - Ages 8-10

## Preparation

Review the material and watch the movies. Do some preparation on the topic. For the Outdoor experience some materials are required (see Materials section below). Feel free to add any resources or materials you have available to enrich the lessons. Also check the Introduction lesson Teacher guide for useful tips and suggestions for preparing and giving the lessons within a theme.

## Learning goals

The students ...

- learn about the oceans.
- know what problems in the oceans are and what causes them.
- know what the terms overfishing and dead zones mean.
- know the solutions to reduce and solve the problems in the oceans.
- know what clean drinking water is and how it is made.
- know what people use water for in and around the house.
- know how to save water.
- want to inform others of what they have learned.

## Key vocabulary

- Earth
- the blue planet
- the ocean
- oxygen
- climate
- overfishing
- plastic
- the dead zone
- acidification
- the water cycle
- drinking water
- water purification plant
- drinking water plant
- save water

## Introduction

[Slides 3 and 4]

Turn on the tap in the classroom and ignore the running water. Just start the lesson. What do the students think of this? Do they think it is a waste? Why is it a waste to keep the tap running when you are not using the water?

After this, discuss the learning goals of this theme.



## Instruction

### Problem

[Slides 5 - 12]

Explain that this lesson is about water. *Water is an important part of our lives. We live on a planet with large oceans and we use water every day. Without water, there would be no life.*

Explain that our Earth is covered by land and water. Do the students think there is more land or more water? The Earth's surface is covered, for the most part, of water, as much as 70%. Demonstrate this ratio in class, for example, by dividing the group into  $\frac{1}{3}$  and  $\frac{2}{3}$ :  $\frac{1}{3}$  is land and  $\frac{2}{3}$  is water.

Complete exercise 1 and explain the answer. *The Earth is called the blue planet because the ocean covers 70% of its surface and therefore appears blue.*

Look at the world map with the students. Name the continents. What oceans can they see? Drag them to the right space. On the world map it is clear that all the oceans are connected.

Watch the film.

Complete exercise 2a and 2b. Explain the answer with next slides:

- *The ocean absorbs a lot of CO<sub>2</sub>. Tiny plants produce their own food using sunlight and carbon dioxide.*
- *Ocean currents influence the weather and climate. In the summer, the air above the sea cools. If the wind comes from the sea, it brings cooling. In winter, the opposite happens.*

[Slides 13 -15]

Explain that we are not being careful with our oceans. *People's behaviour causes problems, for example:*

1. *Plastic*
2. *Overfishing*
3. *Dead zones*
4. *Acidification*

Ask the students what we call plastic waste that is in the ocean.

*Plastic soup is everywhere in the ocean. We are not talking about a kind of floating plastic island. Rather, it is all about the very small particles of plastic (microplastics).*

Are the pupils aware that humans also ingest these microplastics?

*Small marine animals ingest the microplastics (they mistake them for food). Larger animals in turn eat the small animals and these animals are in turn eaten by fish. And what about us? Well, we eat fish and therefore also get plastic into our bodies.*

[Slides 16-18]

Many people rely on fishing as their means of income. People who frequently eat fish from non-sustainable resources are also contributing to the overfishing effects we see today. *Overfishing is catching too many fish at once, so the breeding population becomes too depleted to recover. People throw away too much plastic and fail to clean it up. Another problem is that human activities increase CO<sub>2</sub> emissions.*

Dead zones

*Dead zones occur when the water gets too many nutrients such as nitrogen. Because of this the oxygen levels in some areas in the ocean drops. In the dead zones, the oxygen level is*



*so low that many animals suffocate and die. Plants in the sea also die. Dead zones occur when the water gets too many nutrients such as nitrogen.*

#### Acidification

*The ocean absorbs about a quarter (25%) of the CO<sub>2</sub> we release into the atmosphere. This changes the chemistry of the seawater, this is called ocean acidification. When water is too acidic, animals like mussels, may not be able to make strong shells. Corals could also be affected.*

[Slide 19]

*Global warming causes warmer oceans and rising sea levels. This problem can be solved by stopping climate change, i.e. by making sure that the earth does not continue to warm up. An important part of this is reducing CO<sub>2</sub> emissions. Fortunately, we are working hard on this. For example, by using renewable energy sources (water, sun and wind) and by using less energy.*

[Slide 20-27]

*Watch the film. You have seen that the Earth is a planet with a lot of water.*

*Ask the students: Will the water on Earth ever run out? What do the students know about this?*

Complete exercise 3.

*At points in this water cycle (river, groundwater), we extract water to clean and use in our homes.*

Complete exercise 4.

*Ask: What do we use water for? Let the students share what they know. Also discuss what happens to the water that we flush away in our house (flushing, draining, washing away) and watch the film.*

Complete and discuss exercise 5.

*How do we get clean drinking water? The clean drinking water from the drinking water plant goes to the houses via underground water pipes. So to flush the toilet we use the same clean drinking water as for cooking. That is actually not necessary. Watering the plants or flushing the toilet can also be done with less clean water. Some people do that too. They collect rainwater in a rainwater barrel and use it for the plants or garden.*

Complete and discuss exercise 6.

*Too much water is used and it is important to be sparing with the water we use.*

[Slide 28-29]

*It costs a lot of energy to purify water and make it come out of our taps. For example, the dirtier the rivers, the more energy it takes to clean the water.*

*There is a lot of water in the world, but only little of it can be put to good use. Only 3% of the world's water is fresh, the rest is salty seawater. And it takes much more effort to make salty seawater drinkable.*

[Slides 30-35]

#### **A solution**

*We have seen how humans treat the oceans. Do you remember what the problems are?*

1. Overfishing
2. Plastic



3. Dead zones
4. Acidification

*Thankfully, solutions are being worked on.*

### **Overfishing**

*To prevent overfishing, a fishing quota has been set. A fishing quota indicates how much of a certain fish species each country is allowed to catch.*

### **Plastic**

*Not only must the plastic in the sea be cleaned up, it is also important that no plastic ends up in the sea. Watch the film.*

Complete exercise 7. In addition: consuming less, means wasting fewer resources and thinking about sustainable options for living.

Complete exercise 8a and 8b.

[Slides 36 - 39]

Ask the following trivia question: *How many litres of water does an average family use each day when flushing the toilet?*

Let the students answer. *That is 20 litres of water (as many as 40 half-litre bottles of water).*

Note: the amount can vary.

It is important to use water sparingly. It costs a lot of energy to clean water.

*Not only is water taken from rivers to be turned into clean water in the drinking water plant. The water that has been used in homes goes through the sewers to a sewage treatment plant that makes sure that the water is clean enough to go back into the rivers again.*

*There is also a risk that if too much water is used, water will run out. Just think of filling up swimming and paddling pools in the summer. Watch the film.*

Complete and discuss exercise 9.

[Slides 40 - 47]

### **What can you do?**

Complete and discuss exercise 10. What solutions do the students already know of? Which ones are they going to share with their parents at home?

Then, complete exercise 11.

Think about how things are going at school. Complete exercise 12 and fill in the table together. What things are already going well at school and what can be improved?

## **Suggested related themes**

Theme 7 about air and theme 8 about trees discusses photosynthesis.

Theme 3 about waste links with plastic waste in the oceans.

Theme 1 has solutions for climate change discussed.



## Worksheet

[Slide 48]

Complete the worksheet and discuss the answers afterwards. When students have worked together on an exercise, let them present their answers as a group.

## Practical assignment

[Slide 49]

Put a message on the school's Facebook or Instagram page. Think about what you want to tell the parents and children. Do you want to tell them about the problems in the ocean or about clean drinking water? Or do you want to make people think about saving water and using it sparingly? Make the message short but powerful and add a good photo. You can also think up a challenge. Let your teacher post it on the school's social media. Note: an alternative is to write a message for the school's newsletter or website.

## Closing

[Slide 50]

Discuss the learning goals and agree when and how they can continue working on their practical assignment (message for school's social media). Help the students place the messages. Follow the reactions together.

## Outdoor experience

[Slide 51]

Place rainwater barrels and buckets around school to collect rainwater. Use this water in school, for example, to wash your hands or water the plants. How much water can you save?

## Extras

[Slides 52 - 57]

Game: Hangman

Exercise 1:

Collect different types of water and compare them. To do this, place some glasses next to each other. The glasses contain, for example: tap water, rainwater, waste water (like the washing up, which is normally washed away), water from a river/lake/sea. What can you say about the water? What are the differences and similarities? Which water can you drink, or not?

Exercise 2

*We cannot imagine life without water.*

Draw as many things / moments / places where we use water.

Extra video.



## Materials Required

For the Outdoor Experience, rainwater barrels and buckets are required.

For the Extra Exercise 2 you need to be able to collect water from various sources and collection jars/containers.

For the Extra Exercise 3 you need paper and pencils, pens, or markers.

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## Theme 5. Water

Answer key - Ages 8-10

### Exercise 1

**a. What percentage of the Earth's surface is covered with water?**

- A. 20 %
- B. 50%
- C. 70%**
- D. 80%

### Exercise 2

**Which words fit best in the gaps?**

Choose from:

- cargo ship
- pleasure
- fish

We use oceans for:

**pleasure** – swimming, sailing, and diving

transportation – **cargo ship**

food – **fish**

### Exercise 6

**Choose two places in your home where water is used. What can you do to save water here?**

**Also use the drawing from exercise 5 to show where water can be saved.**

### Exercise 7

You can do things to help our water. For example, by helping our oceans to stay clean. Or, simply to save water at home.

**Share what you think is important and see if there is something that can be improved in the classroom.**

