

Theme 3. Waste

Teacher guide - Ages 11-14

Preparation

Review the material and watch the videos. Do some preparation on the topic. Collect plastic waste from one or more days before the introduction exercise. 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 what waste (also organic waste) and litter are.
- learn what happens with waste.
- know what plastic is.
- discover there is too much waste (excess).
- learn what the term 'plastic soup' means.
- know the causes and consequences of plastic soup.
- know what waste separation is.
- know what residual waste is.
- know what recycling is.
- know what 'zero waste' means and what it entails.
- become acquainted with solutions to the waste problem.
- know what they can do to counteract the excess, the litter, the use of plastic and plastic soup.
- want to share what they have learned with others.

Key Vocabulary

- general welfare
- garbage
- litter
- (residual) waste
- organic waste
- plastic soup
- single-use plastics
- *The Ocean Clean Up*
- microplastics



- reusing/ recycling /refilling
- trash
- separating waste
- zero waste

Introduction

[Slides 3-4]

Collect waste for one or several days and display it on a table or spread it over multiple tables before the students enter the classroom. Be sure to think about including plastic bags, plastic bottles (big and small), screw caps, packaging, old telephone cases, toys and organic waste, like a banana peel, leaves etc. (You can also drag the objects on the interactive whiteboard.)

Ask students what happens to all of this stuff. When the students indicate that it is waste, or that it is trash, you can suggest that they take a good look at what is on the table(s). *What happens with trash after you throw it away?*

Ask two or three students to sort the waste. Give an example of organic waste (for example a banana peel) and plastic. Organic waste also comes from plants, think about the leaves of a tree. This organic waste is usually broken down by other organisms. This is different for plastic; if you leave it for example in a forest, it will stay there for a very long time.

Ask: *What can we do with the plastic bags?* (reuse them).

- *What can we do with the plastic bottles?* (Bring them to the supermarket for a deposit or recycle them).
- *What can we do with the toys?* (Bring them to a thrift store, a local charity, or location that can use them).
- Any plastic that cannot be used at all goes into the plastic recycle bin, or otherwise into the trash.

After this, discuss the learning goals of this theme.

Instruction

Issue

[Slides 5-6]

Discuss the waste issue. Tell students that a thriving economy creates lots of waste. *A long time ago, our problems with waste were not so big. Because there are more and more people, who use more and more things, particularly factory processed and packaged things, our waste has grown too. This creates a huge amount of waste. One of the problems with waste is that it is often burned and burning waste pollutes the air. We now know that there is too much waste (too much to process) and we need to find a solution.*

In addition to producing too much waste, there's another problem.

Watch the video. And ask students to explain which issue the video describes.

Waste that does not end up in the trash can but ends up on the streets causes pollution in nature. Litter does not magically disappear, it simply stays there unless someone cleans it up or it is moved by natural events. That means it can stay for a very long time.



Ask students to say what kind of waste never disappears. Tell them that it is plastic.

[Slides 7-9]

Tell students that plastic was invented halfway through the last century:

Halfway through the last century people discovered plastic. Plastic is a synthetic material that is very versatile- it can be used to form all kinds of products in a huge variety of shapes and colors. Plastic is light, waterproof and cheap.

Place post-it notes or stickers on every object in the classroom that is made of plastic, you can include plastic objects on your person as well (glasses frames, watch, shoes, phone, etc). Can students figure out what the linking element is that all of the marked objects have in common? All of the objects are made of/with plastic. Do the students also have plastic items in their desks, cubbies, bags or on their person?

Complete exercise 1

[Slides 10-15]

Initially everyone was very happy with this product. Plastic seemed like the perfect discovery, but it has one huge disadvantage. Ask students if they know what this is. The problem is that plastic lasts forever.

Complete exercise 2.

Plastics have one huge disadvantage. Because plastics don't break down and always exist, they are pollutants in the environment.

Complete exercise 3. How much plastic waste do the students think is produced each year? (Source: Plastic Soup Foundation; It's an example/ the amount varies).

Tell students that you can split plastics (roughly) into two categories: single use plastics and plastics for longer use. Ask students to come up with three examples for each group. They can discuss in pairs first.

- *Examples of single use plastics: straws, shopping bags, packaging, plastic cups, plates, cutlery, balloons, cotton swabs, bottles.*
- *Examples of longer use plastics: toys, lunch, boxes, telephones, kitchen utensils, pens, markers.)*

Particularly the single-use plastics are bad for the environment. We use too much of them, and create too much plastic waste. And even worse, a portion of that plastic waste ends up on the streets as litter.

Extra info: But it is not just about single-use plastic. People often do not realize that they are polluting the environment with plastic. Car tires are made of rubber and plastic and driving wears them down and releases microplastics. Wearing clothing also causes microfibrils, and care products and paint can contain microplastics that wash away with the wastewater. Cigarette filters also contain a kind of plastic, and even chewing gum.



Complete exercise 4. Tell students that a portion of this waste ends up in the ocean: 100 billion kilos a year. Note: This amount varies, also depending on the source.

[Slides 16-20]

Up until now we have discussed a few issues with waste. Which issues did we mention?

Discuss with students to come to the conclusion that the key issues mentioned were:

1. too much waste
2. litter on the street
3. plastic waste

And there's more to be said about these three problems together- too much plastic waste on the street.

Explain that litter is moved around by natural forces like wind and rain. *As a result, lots of the plastic litter on the streets ends up in rivers, and then flows out to the sea. The plastic that ends up in the oceans does not break down. It keeps breaking into smaller and smaller pieces. These tiny bits of plastic are transforming the ocean into a plastic soup. Note: plastic soup is a combination of bigger and smaller pieces of plastic.*

As you might imagine, all of these tiny bits of plastic in the ocean are harmful to the animals that live in the ocean. But we end up with plastic in ourselves too! Ask students to respond to that. Did they know?

Watch the video and complete exercise 5.

A Solution

[Slides 21-24]

Tell students that people are working on solutions for the plastic soup.

An example: The Ocean Cleanup organized by Boyan Slat. Boyan is a Dutch boy who went to Greece on vacation when he was 16 years old. While diving, Boyan saw more plastic than fish and he decided that something had to change.

For a school project, Boyan worked on a plan. A number of years later, the plan really turned into reality. Boyan's plan collects plastic from the ocean by using tidal power. The plastic floats into the apparatus which means that it then can be removed and cleaned up.

Watch the video.

But when you think about solutions for the issue with waste, it is even better to start one step earlier.

Ask students what they think we can do about the plastic problem. *What solutions are there?*

Let the student write their solutions down. Compare them with the answers on the interactive board:

1. Use less plastic.
2. Come up with alternatives to plastic and start using them.
3. Never litter with plastic waste.
4. Always clean up plastic litter.
5. Reuse plastic waste => which means it is important to sort waste.



[Slides 25-28]

Ask students if they can imagine a life without plastic.

Complete exercise 6. Remind students that we survived before plastics were invented, so we know that we can survive now too. Discuss the assignment.

It is also important that governments and companies start thinking about creating and using less plastic. Different countries and companies are having these discussions.

A few agreements that have been made are:

- *Some single use plastic items are banned.*
- *We must be able to reuse/recycle 90% of plastic by 2025.*
- *The companies that produce plastic must also help clean up plastic trash.*

Watch the video.

[Slides 29-30]

Ask students if they pay attention to their use of plastics. Do they ever make choices to avoid plastics?

Complete exercise 7.

[Slides 31-32]

Watch the video

To reuse plastics it is important to separate waste. Ask students what can be made from plastic. (Those are plastic products.) There is also waste that cannot be reused. But luckily we can also do something with the residual waste.

Complete exercise 8.

What can you do?

[Slides 33-37]

Look at the given table and discuss the options with the students. Discuss what they can do themselves at home and what could happen at school. Review the entire table as a class. Ask students if they have any additions and where they can make changes. As a class, complete the table together, see exercise 9.

Watch the video

There are people who are trying to live a life with as little waste as possible. You call that zero-waste. Zero for none, and waste for any kind of trash. Ask students if they think it is possible. And ask them how they think this works.

If you want to reduce the amount of waste you produce, it is best to start with little steps. Watch the video and ask students where they can make small changes in their lives.

Complete exercise 10. Discuss the exercise with the class and ask students who is really going to make a change going forward.



Suggested related themes

Theme 2 about energy is related because by burning waste you can create renewable energy.
Theme 5 about recycling relates to reusing waste to create circular usage.

Worksheet

[Slide 38]

Complete the worksheet. Discuss the exercises on the worksheet. 1. Litter is trash that ends up on the street or in nature. It is waste that was left behind by people. Residual waste is waste that cannot be recycled or reused. When students work in groups for exercise 2, students can present the answers as groups. The drawing for exercise 3 can be completed on a separate sheet of paper. Exercise 4 is about litter. Are you required to clean up litter- even if it isn't yours? What do students think about that? Tell students for exercise 5 what you will do yourself, are there any things that can be modified for the class? For exercise 6 you can discuss ideas. As a class, select one or two crafts to actually do as a class.

Practical Assignment

[Slide 39]

Make a poster about reducing plastic waste. Use the poster to tell and teach others about this topic. Hopefully this will help motivate others to use less plastic.
Watch the video to learn how to make a good poster.

Closing

[Slide 40]

Discuss the learning goals and set expectations with students about working on their practical assignment. Make sure that the completed posters are clearly posted in your school.

Outdoor Experience

[Slide 41]

Ask students to collect trash around the school. Give each group a box and a trash bag to collect waste. Plastic waste and reusable waste goes in the box. Dirty and residual waste goes into the trash bag. Once back in class, sort all of the waste from the boxes that students collected. Students must decide what happens with the collected waste: sorting or recycling or reusing.



Extras

[Slides 42-45]

Game: Hangman

Exercise 1

Ask students to respond to the following statements.

- If there already is litter on the ground, people are more likely to leave their own litter behind.
- Children can't do anything to help solve the issue with waste.
- It does not make a difference if you are trying to make changes if nobody else is.

Extra video

Materials Required

For the introductory exercise: stickers or post-it notes.

For the poster: Poster paper (or bigger), pens, pencils, and markers.

For the Outdoor Experience: boxes and trash bags.

Theme 3. Waste

Answer Key - Ages 11-14

Exercise 1

Litter and residual waste are related to each other, but they are not the same. What is the biggest difference between the two?

Write your answer.

Litter is trash that ends up on the street or in nature. It is waste that is left behind by people.
Residual waste is waste that cannot be recycled or reused.

Exercise 2

a. Many answers are possible, for example: we use billions of items such as bags, bottles, trays, and food packaging. Some people leave it behind as litter. Another example: car tires are made of rubber and plastic which wears out while driving. The microplastics get released into the air.

b. For example: Billions of kilos end up on the streets and in nature. Wind and rain move the plastic into rivers and parts flow into the ocean.

c. For example: reduce packaging waste in your daily life.

