

Theme 6. Agriculture

Teacher guide - Ages 8-10

Preparation

Review the materials and films beforehand. Do some preparation on the topic. For the outdoor experience you could make an appointment in advance with a farmer or gardener. 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 origin of food.
- learn about the different types of agriculture.
- know how agriculture affects the climate.
- learn about the nitrogen problem.
- know how you can reduce CO₂ emissions.
- know some examples of organic farming.
- know solutions of how to waste less food.

Key vocabulary

- agriculture
- animal husbandry
- processing
- crops
- cultivation
- packaging
- the environment
- food
- cooling
- freezing
- transportation
- CO₂
- nitrogen
- pollution
- organic

Introduction

[Slide 3]

Discuss food waste.

What do you do when you have three sandwiches for lunch, but you only eat two of them?

What do you do with the third sandwich?

If the answer is "throw it away", ask: *Do you think anything of it?*



More and more people are living on this Earth. Therefore, we need more and more food. However, we also waste a lot: we all throw away too much food.
Discuss the learning goals of the theme.

Instruction

Problem

[Slides 5 - 10]

Complete exercise 1.

Much of our food is produced by agriculture. Do the students know what agriculture is? Let them describe it in their own words.

Discuss the different forms of agriculture. Explain difficult words such as: breeding, cultivation, growing, processing.

Arable farming: the cultivation of land to grow crops for consumption. For example: potatoes, grain crops (barley, rice, wheat, peas and broad beans). In arable farming, farmers want to protect their crops from diseases and insects. Some farmers use pesticides to do this. These protect the crops, but are not good for the environment.

Horticulture: the growing or cultivation of vegetables, fruit, plants, flowers, trees, bulbs or seeds in order to consume them. In greenhouse horticulture, farmers grow the plants in a greenhouse. In a greenhouse, you can easily regulate the temperature, the amount of water and light. This uses a lot of energy (electricity).

Animal husbandry: having livestock so that eggs, milk and meat can be produced. Livestock includes: cows, sheep, pigs, goats, poultry (chickens). Having livestock means having manure. Manure is an important nutrient for the soil. But, too much manure is not good for the environment.

There are more forms of agriculture such as fish farming and forestry, but they are not discussed in this theme.

Complete and discuss exercise 2.

[Slides 11 - 13]

Farmers produce food. They want to do this safely with care for the environment. But farmers can't do this alone. We ourselves have to make good (sustainable) choices when we buy a product.

Bio-industry: The farmer has many animals on little land. Animals are given concentrated feed in order to grow faster. This is called bio-industry.

Organic farming: The farmer gives the animals a lot of freedom, they have a lot of room to live in. This is called organic farming.

Complete exercise 3.

[Slides 14 - 17]

A lot of energy (fuel and electricity) is needed for all the things that happen in agriculture. Fossil fuels (e.g. natural gas, coal) are burned to supply this energy. A lot of CO₂ is released in this process. Use the photos to discuss certain examples.



Watch and discuss the film.

Complete exercise 4.

We need CO₂. Otherwise it would be too cold on Earth.

But, people produce too much CO₂ causing the Earth to warm up too much.

Complete exercise 5.

[Slides 18 - 22]

Because we consume more, we produce more. Many harmful gases are emitted by agriculture. Did you know that cows and bulls also emit gases into the atmosphere? Cows produce a lot of manure and gas. This releases substances that are bad for the environment, gases such as methane and nitrous oxide. On top of that, there is the nitrogen problem.

Watch and discuss the film.

About 78% of all the air around us is made up of nitrogen. Nitrogen is a gas that you cannot see or smell. Humans and animals need it. The problem is that nitrogen mixes with other substances. This creates nitrogen oxides and ammonia, which are bad for the environment.

Complete and discuss exercises 6 & 7.

[Slides 23 - 27]

The steps after cultivation in agriculture also require a lot of energy (and therefore fuels). For example, the exhaust fumes from transportation and the plastic packaging of food.

There is another problem: we need more and more food but at the same time, we throw so much food away. Watch the film.

Complete exercises 8 & 9.

If an apple is not 'red' enough it may end up in the rubbish. A lot of food is also thrown away in restaurants.

How do the students feel about this? Note: 'ugly' food still can be good food!

A solution

[Slides 28 - 30]

Thankfully, there are solutions to the problems in agriculture.

- *Emit less CO₂ and other harmful gases.*
- *Stop pesticides from ending up in nature.*
- *Be more economical with energy. Use sustainable energy sources, like wind, water and sun, instead of natural gas and coal.*
- *Treat animals better. Organic farming is more considerate to the environment and animals.*

Watch and discuss the film. What do the students notice?

Complete exercise 10.

What can you do?

[Slides 31 - 35]

Governments are taking steps to reduce nitrogen and CO₂ emissions. But, you can also do something. For example, watch out what you eat. Everything that you eat and drink has an impact not only on your health, but also on our planet.



Watch the film about sustainable and healthy food.

Complete and discuss exercises 11 & 12.

Soft drinks and snacks are not good for your health. In addition, the packaging they come in is bad for the environment. You can also make sure that you waste less food. So only eat what you need and throw away as little as possible.

Complete exercise 13. Examples to discuss:

- Think first how hungry you are (don't take too much food)
- What can you make with old bread? (toasted sandwich, French toast)
- Leftover day
- Buy the B-choice articles in the shop (crooked cucumbers etc.)

[Slides 36-37]

*Most fruit and vegetables are harvested in a particular season. These are called **seasonal products**. They are less harmful to the environment because they can be transported quickly from the land to the shop. Or choose vegetables that are harvested or stored throughout the year. Things like beetroot, broccoli, red cabbage, onion and carrots.*

Products that come from far away cause more CO₂ emissions.

Products produced in faraway countries are transported by plane, for example, and often need more packaging material (for extra protection). This is bad for the environment. The same applies to vegetables cultivated in heated glasshouses. The glasshouses use a lot of energy. So your choice does matter!

Suggested related themes

Theme 1 climate change deals with the consequences of too much CO₂ emissions.

Theme 2 (Energy) discusses fuels.

Theme 9 about air touches upon the nitrogen problem.

Theme 8 about trees shows the problems caused by deforestation. Soil also serves as carbon storage. Plants and trees take in CO₂ from the atmosphere .

Worksheet

[Slide 38]

Complete and discuss the worksheet. When students work together on an exercise they can, let them present their answers together.

Practical assignment

[Slide 39]

Create a collage

Create a collage about agriculture. You can use old magazines for pictures. You can also use photos, drawings and text.



Closing

[Slide 40]

Review the learning goals and agree with the students how and when they will work on their practical assignment.

Outdoor experience

[Slide 41]

Together with the class, visit a farm or someone who has a kitchen garden. What questions would you like to ask? Students write their questions down beforehand. They write a short report about the visit.

The aim is for students to learn about a form of agriculture in practice. For example, a kitchen garden is a vegetable garden where vegetables are grown for one's own use. You can help the students with some example questions:

- What products are there? How do they grow? How are they cultivated?
- If there are animals: how do the animals live and how are they cared for?
- Are crops cultivated? Which crops? How are they cared for?

Extras

[Slides 42 - 52]

Game: Hangman

Quiz

Extra films

Materials Required

For the Practical Assignment: A4-paper (or larger), scissors, glue and colouring pencils, as well as magazines, books, image resources.

You could show examples of vegetables and fruit that do not meet the requirements in terms of form, shape or colour.

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Answer key - Ages 8-10

Discuss the answers to exercise 2:

- Eating less meat is better for the environment (less greenhouse gases)
- Eating less meat is better for your health.

Exercise 5: individual answers, f.e. use less plastic, travel by bike instead of a car. This helps for a better climate: f.e. less pollution, less CO2 emissions, less waste.

