

Theme 4. Circular Economy

Teacher guide - Ages 11-14

Preparation

Review the material and watch the videos. 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 lesson. 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 economies are.
- know what a linear economy is.
- discover the disadvantages of a linear economy.
- know what reusing/recycling are.
- know what a recycling economy is.
- know what a circular economy is.
- know the advantages of a circular economy.
- know that leasing and modular building are elements of a circular economy.
- know how they can participate in a circular economy.
- want to share what they have learned with others.

Key Vocabulary

- economy
- consumer
- product
- service
- producer/provider
- linear economy
- recycling economy
- circular economy
- raw materials
- energy
- fossil fuels
- leasing
- modular products

Introduction

[Slides 3 and 4]

Show the students your mobile phone. Tell students about the model. Then tell students that you have had it for a long time, and it works just fine, but you are thinking about buying a new



model because it looks neater. Tell students that you're not quite sure yet. *What should I do? Should I get a new phone already, or wait and keep using this one?*

Ask students to share their opinions and their own experiences. As a class, discuss why a new model is attractive, even if the phone you have still works fine and isn't even that old. Ask students if it really makes sense to keep buying newer "better" phones. What happens to the old phones? Does this have an environmental impact?

After this, discuss the learning goals of this theme.

Instruction

[Slides 5-8]

Issue

Are students familiar with the term 'economy'? *What is economy?* Ask students where they have come across this word before. Where have they seen it written? Or heard about it?

Complete exercise 1 and watch the video.

Explain that the economy is about making goods for sale and the buying and selling of these goods (and services).

Complete exercise 2.

Ask students what their role is in the economy. They are consumers. Explain that the economy is about how and why products are made and how and why people buy these products. *Companies and people make choices, and these choices have consequences. You can imagine that these choices also have consequences for the environment.*

[Slides 9-10]

Can students name examples of how the economy and environment are related? *Think about the trucks that are required to transport the goods from one place to another. Or think about a factory that makes products but pollutes the environment around it. Or even the waste that is produced from packaging on goods that are no longer used.*

[Slides 11-17]

Explain: We call the way our current economy functions a linear economy. That means in a straight line.

Complete exercise 3.

We buy goods, we use the goods, and then we throw them away (or put them in a cupboard). Before we buy goods, they must first be made.

Complete exercise 4.

Tell: A linear economy starts with the resources and energy that are necessary to make/build things. The end of the linear economy is one great big garbage can. That means there are large resource requirements at the start, and at the end the product simply ends up in the trash can.

Complete exercise 5.

Tell students that linear economies are not good for the Earth and the environment. *If we continue with this trend of making, using, and throwing away, we are going to run into problems.* Look at the four completed arrows and discuss the problematic elements with the students.



[Slide 18-20]

The first problem is the raw materials that are required for production. Fossil fuels like coal, natural gas and oil are often used to power production. At some point we will run out of these fossil fuels. The extraction of raw materials also damages the local environment. Extra info: An important problem is that raw materials extraction itself causes environmental problems at source. Such as soil degradation, water shortages, biodiversity loss and damage to ecosystems (and in some cases even health conditions for workers - e.g. mining).

The second problem is in the production. To make goods, energy is required. To generate energy fossil fuels are burned. Burning the fossil fuels leads to greater CO₂-emissions which contributes to global warming. In addition the fossil fuels that are currently being used to generate electricity are running out.

Finally, there is one more problem at the end of this linear economy: the trash heap. There is too much waste. Burning waste results in polluted air. In addition a portion of that waste ends up on the street (as litter) and a portion of that ends up in nature and in the oceans (resulting in plastic soup).

A solution

[Slides 21-25]

Complete exercise 6 and 7.

Watch the video about deposit return complete exercise 8.

Discuss the answers with the students. Have students explain what a bottle deposit is and how it works. Tell students that there are plans to introduce a deposit on small plastic bottles and on cans. What do they think about that? Note: Glass bottles are also recycled.

[Slides 26]

An economy that reuses materials is called a recycling economy. Recycling is an English word for either reusing materials or converting waste into usable materials. Unfortunately you still have waste left and this is not enough to resolve all of the problems created by a linear economy. We need even more to solve that.

[Slides 27-28]

Watch the video. Make sure that students are familiar with the word 'cradle' for crib/bassinnet.

Complete exercise 9.

Tell students that there is a name for this idea: *This is called a circular economy. In the word circular you recognize the word 'circle' and that is what it is: a circle that keeps on going.*

[Slides 29-32]

Then watch the video and ask students what the advantages of a circular economy are:

Advantages of a circular economy are:

- *raw materials don't run out*
- *they mostly make use of natural or renewable energy sources*
- *there is no more waste.*

Complete exercise 10, 11 and 12. Ask students to explain their answers.

[Slides 33-35]

Tell students that the goal is that by 2050 all companies work in a circular system. Ask students if they think that this is an attainable goal.



In the future planning involving a circular economy, one important element is that the consumer will no longer become the owner of a product. They borrow the product from the producer for a fixed amount per month. This is also called leasing.

An example is the washing machine. If the washing machine breaks down, or the consumer no longer wants it, the washing machine returns to the producer. The producer then repairs the washing machine or uses the parts for new machines.

What do students think about this?

[Slides 36-37]

A final term that comes up within circular economies is: modular products. Another word for this is interchangeable (modular). Do students have an idea of what is meant with this?

Products are made in such a way as to be built of smaller units. This means that the product can be taken apart, a single unit repaired or replaced, and then put back together to extend the life of a product.

What can you do?

[Slides 38-40]

Together with the students, take a look at the linear economy that we still - for the most part - are a part of (buy => use => dispose) Discuss what students could personally do to make a change at each step.

Which questions can you ask yourself before you make a purchase?

For example:

- *Can I buy this item second hand?*
- *Do I already have enough of this item?*
- *Do I really need this? (You can also choose to discuss the term “decluttering”)*
- *Can I borrow this (from someone)?*

Which questions can you ask yourself before using an item?

For example:

- *How long can I use this product?*
- *If a new model comes out, does my model still function?*
- *If it breaks, can it be repaired? Can I repair it?*

Which questions can you ask yourself before throwing something away?

For example:

- *Can I make someone else happy with this?*
- *Can I still use parts from this for something else?*
- *Can it be turned in somewhere specific? (separated waste)*
- *If I cannot give it to someone else nor use it anymore, how should I dispose of it correctly?*

[Slides 41-42]

Take a look at what happens at a school and what could happen at a school using exercise 13. Go through the exercise point by point and discuss why these initiatives fit within a circular economy. Are there any ideas for the school that the students want to make happen? Tell students how they could organize this.

Complete exercise 14 and discuss the exercise with the students. The answer “Nothing” can also mean that you are already doing a lot. Can students name a few of these things?



Suggested related themes

Theme 2: Energy links to the issues related to the use of fossil fuels and the solutions which are being created for this, like the use of renewable energy resources.

Theme 4: Waste links to the huge amount of waste that is created by a linear economy.

Worksheet

[Slide 43]

Complete the worksheet. Discuss the exercises from the worksheet. The answers of exercise 2 can be presented by (a selection of) students. The drawing for exercise 3 can also be completed on a separate sheet of paper. Ask students why they chose a particular economy. Exercise 5 is about consumer behaviour. What do students think about that? Tell students what you would do for exercise 6. Are there any things that can be changed within your own classroom?

Practical Assignment

[Slide 44]

Draw a circle. Select a product and draw the life cycle of that product. Research how the product could be made within a circular economy. You can use the internet to complete your search. Look for examples of cycles. Hang the drawings in a visible place at school to share the information you discover.

Closing

[Slide 45]

Discuss the learning goals and set expectations with students about working on their practical assignment (Drawing the life cycle of a product). Make sure that the completed posters are clearly posted in your school.

Outdoor Experience

[Slide 46]

Plan a visit to (or if this is not possible an online meeting with) a company/organization that is working on/has a greener plan with their product that fits within a circular economy. If it is not possible to find a company/organization, think about a visit to the library, thrift store, flea market or garden. Ask students to collect information before the visit about the company or organization and ask them to come up with questions that they wish to ask. It is particularly important that students are able to see the "circle" within the entire process.

Extras

[Slides 48 t/m 52]

Game: Hangman

Exercise Swap meet

Ask students to bring items from home that are no longer used and organize a swap meet. Make clear rules and guidelines for the swap meet. Tell students that the idea is that you



trade an object that you no longer have use for or interest in, for something that you do want or would use. It is not about earning money, but about making someone else happy with what was seen as “waste” in your house. *How fun is it that you can make someone’s day with something that was simply taking up space in your closet?*

Energizer: Charades

Energizer: ...and I’m **not** taking...

Extra video.

Materials Required

Your mobile phone for the introduction assignment.

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

Theme 4. Circular Economy

Answer Key - Ages 11-14

Exercise 1

linear economy	circular economy
bad for the environment	good for the environment
too much waste using too many raw materials using fossil fuels	using natural or renewable energy resources reusing raw materials no waste

Exercise 2

Example: a disadvantage of a linear economy is it’s not good for the environment (waste, CO2 emission, raw materials running out.)

Example: in a recycling economy you reuse things, but there is still waste.

Example: in a circular economy there will be no more waste (reuse and reuse).

Exercise 4

a. What does the word “modular” mean?

Modular means composed of smaller (sub) parts or modules to make up a whole.

b. Why does this word fit into the elements of a circular economy?

This fits within a circular economy because producers will be encouraged to build more modular products. By doing so the product can be taken apart, and put back together, increasing the chance of repair and recycling.

