

Learning pack #10

Teaching materials for schools and educational institutions
For students aged 12 to 16 years old



What's old is new

Reducing waste with upcycling,
recycling and circular economies



Imprint

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Editorial

My daughter loves old clothes. She takes great pleasure in rummaging at flea markets and in used clothing stores for the perfect shirt or jumper. For her, it's less about achieving a vintage look, and more about environmental awareness. "Why should I buy something new when there is already so much out there?" is her line. Her friend sews beautiful little bags from old clothes as a way to make some pocket money.

Upcycling, or the creation of new, high-quality products from things that have been discarded helps to reduce waste. But this principle of one person's trash becoming another person's treasure is not restricted to clothing. Whether drink cartons, bicycle inner tubes or tin cans, many things can be revived and given a new lease of life. Which is good for the environment and the climate.

70% more trash

Statistics show us that in 2019, every German – adults and children – generated almost 1.5 kilograms (3.3 pounds) of waste daily. That equates to 543 kilos of private trash per person in a single year. Wealthier countries generate more than a third of global waste, yet only account for 16% of the global population. The World Bank predicts a 70% increase in global waste by 2050, with fast urbanization leading to a rapid increase in trash generation south of the Sahara and in Southeast Asia.

Sensible recycling

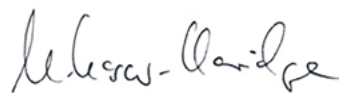
How can we avoid these vast mountains of trash? Recycling or reusing raw materials contained in waste products could be part of the answer – turning yogurt pots into jumpers or old glass into new milk bottles, for example. But the problem with recycling is that it requires high volumes of both water and energy. Some packaging simply cannot be recycled because of how it's made. So what might sensible recycling look like? Could circular economies be the answer to our waste problem?

These are some of the topics in this learning pack "What's old is new." We look at the items we throw away each day and share ideas about how materials can be reused. All over the world, people are working on solutions and concepts to prevent the mountains of trash from getting any bigger, thereby protecting our environment and climate. Each one of us can contribute to waste prevention in some way.

I hope you enjoy learning, discovering and experimenting.



Manuela Kasper-Claridge



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Introduction

This **booklet** is part of the learning pack “What’s old is new – Reducing waste with upcycling, recycling and circular economies” produced by the editorial team from the environmental series **Global Ideas**. It is designed to help teachers prepare and give classes. The content is aimed at children between the ages of 12 and 16, but the materials can also be used outside school settings by environmental groups.

The pack contains four modules with **worksheets** that can be copied for participants, and explanatory **handouts** for teachers. Where necessary, these include the answers. The modules build on each other but can also be used independently of one another. Suggested lesson durations should be regarded as general guidelines. You will be the best judge of the pace at which your group learns.

Articles and **films** are intended to be used as learning tools. Students should watch the films several times in order to complete the film tasks. It would be helpful, but is not essential, for students to have their own devices on which to watch the films. You will find instructions on how to play the films on the last page of this booklet. You will find an overview of all content in the **media index**.

For **distance learning**, we also offer an interactive **workbook for participants**. This only includes worksheets for independent study at a computer, as well as links to the films and articles.

You will find the PDF “workbook for participants,” which can be filled out, as well as all other materials under downloads on the web pages for learning pack #10 “What’s old is new – Reducing waste with upcycling, recycling and circular economies”: dw.com/stop-waste

Tip

If you are interested in other learning packs for either distance or face-to-face teaching, place a visit to: dw.com/learning-environment



Icon for handouts



Icon for worksheets

Structure

How much trash do we throw away every day? What are global waste problems? And how can they be solved? Using this learning pack, you and your group can explore the subjects of waste, recycling and the circular economy from different points of view. The teaching material is divided into four modules, each with a different focus.

Module I – Background and problem

The first module highlights the global waste problem and offers an overview of different types of waste. Get participants interested by asking them to conduct an experiment whereby they collect their rubbish for a day and record it in a waste journal. You can then use a film to open the participants' eyes to the global nature of the waste problem. Participants will gain a deeper understanding of the connections by using the concept mapping technique.

Module II – People working to solve the waste problem

In module II, participants are introduced to three people who have initiated projects designed to provide potential solutions to the waste problem. The focus of these projects is on recycling and upcycling. Participants learn about the projects from three films. Motivated by these possible solutions, they research local projects that the group could become involved in.

Module III – How raw materials remain in circulation

Module III focuses on circular economies. Taking the used clothing sector as an example, one film highlights the problems of a throwaway society. From another film and an article, participants learn about the difference between linear and circular economies, and are also given an example of how electronic waste can be dealt with in a circular way. But can such economic models also be used for plastics? Another film shows how mealworms can digest plastic, encouraging us to reflect on our use of plastic packaging.

Module IV – Waste reduction ideas

In the fourth module, participants are invited to take concrete action. Starting with a reference to the waste journal, discuss how it is possible to avoid waste in everyday life. Participants then get creative, making flower pots from drink cartons or little cases from plastic bottles. They could also organize a small market to sell their upcycled goods.

Bonus – Plastics feature project

Around 99% of all plastics are made from crude oil and natural gas. Participants learn how petroleum is turned into disposable products such as shampoo sachets. Staying with the example of sachets, they learn how the production and existence of plastic packaging damages both our environment and climate.

Module overview

Module I – Background and problem

The global waste problem: How much trash do we really generate? And what are the consequences for people and the environment?

Duration	Content	Learning objective	Material and links
Individual	Waste journal	To estimate how much waste we produce each day	Handout 1 Worksheet 1 (Waste journal)
45 min	Increasing waste worldwide	To understand and be able to explain the global nature of the waste problem	Film 1 "Trash – A problem to be avoided!" dw.com/p/40IXr Handout 2 Worksheet 2 (Concept mapping) <u>Materials</u> Scissors, glue

Module II – People working to solve the waste problem

How waste can be given a new value: Three committed people and their innovative projects

Duration	Content	Learning objective	Material and links
60 min	Possible solutions using recycling and upcycling	Become familiar with exemplary solutions to the waste problem Get to know local projects	Handout 3 Worksheet 3 (Profile)
	Subject A Upcycling in India	Understanding how new useful objects can be made from trash	Film 2 "Finding creative solutions to India's waste problem" <i>dw.com/p/3WXMb</i>
	Subject B Waste separation in South Africa	Understanding how people can be motivated to recycle	Film 3 "The tiny startup bringing recycling to Cape Town" <i>dw.com/p/3u7Uz</i>
	Subject C Waste as a building material in Guatemala	Understanding how waste can be used as a construction material	Film 4 "Building walls with waste" <i>dw.com/p/163Dm</i>

Module III – How raw materials remain in circulation

How does a circular economy differ from a linear economy, and how does it work in practice?

Duration	Content	Learning objective	Material and links
120 min	Role play game: Talk show about "fast fashion"	Understanding how the fashion industry is increasingly contributing to the waste problem	<p>Film 5 "Fast fashion and the flood of used clothes" dw.com/p/39drA</p> <p>Handout 4</p> <p>Worksheet 4 (Observation sheet)</p> <p>Role play game</p>
25 min	Linear economic system and circular economy	Learning the difference between a linear and circular economy	<p>Film 6 "What does circular economy really mean?" dw.com/p/3u41b</p> <p>Handout 5</p> <p>Worksheet 5 (Chart)</p>
30 min	Circular economy: Definition, advan- tages and problems	Understanding the circular economy system	<p>Article "Circular economy: Could rethinking design transform the world?" dw.com/p/42uyN</p> <p>Handout 6</p> <p>Worksheet 6 (Questionnaire)</p>
30 min	Circular economy for electronics	Learning how a circular econ- omy can work for electronic devices through the use of examples	<p>Film 7 "Circular economy: Sustainable and profitable" dw.com/p/3tmnr</p> <p>Handout 7</p> <p>Worksheet 7 (Fill-in-the-blanks text)</p>
45 min	The role of meal- worms in the plastic waste problem	Using an unusual approach to critically question our relationship to plastic	<p>Film 8 "Plastic recycling with mealworms" dw.com/p/31ENm</p> <p>Handout 8</p> <p>Worksheet 8 (Mystery teaser)</p>

Module IV – Waste reduction ideas for everyone

What can I do?

Duration	Content	Learning objective	Material and links
45 min	Thought experiment: Avoid waste	To develop personal solutions for avoiding waste	Handout 9
Individual	Recycling and upcycling	Creative methods to reuse packaging material	Handout 10 Worksheet 10.1 (Craft instructions – drink carton) Worksheet 10.2 (Craft instructions – greeting card) Worksheet 10.3 (Craft instructions – container from a plastic bottle) Worksheet 10.4 (Craft instructions – string of flowers from plastic bottle)
Individual	Upcycling market and clothes swap	To learn that we can place new value on discarded clothes and other materials To organize an event	Handout 11 Worksheet 11 (Upcycling market)

Bonus – Independent, playful learning

Duration	Content	Learning objective	Material and links
30 – 60 min	Illustrated feature project on the topic of plastic production	Independent and in-depth study of the damage caused to the environment through the production of plastic packaging – using a shampoo sachet as an example	Handout 12 Feature project “Plastic – A lifeline for the fossil fuel industry?” dw.com/plastic Mobile devices (Tablets or phones)

Module I – Background and problem

Handout 1



Waste journal

Duration: Individual

Waste is part of our everyday life and is also a global problem. To sensitize participants to the topic, introduce them to it in a practical way by asking them to look at the role of waste in their own lives.

Journal

Using a **waste journal**, have participants reflect on what, and how much they throw away each day. Copy **worksheet 1** and ask everyone to enter the waste they generate over the course of an entire day.

» **Worksheet 1**

Additionally, participants can take photos of either individual items of waste or everything they have collected throughout the day.

Discuss the waste journals in the group. This allows participants to share their experiences. Were they surprised at how much trash they generated? What was the most common form of waste? Which activity, e.g. dinner, created the most waste?

Exhibition

You can introduce the subject in a more visual way by organizing an **exhibition** to display certain items of waste. For this, all participants should bring one piece of trash. It should be something typical of the rubbish they collected; perhaps something that is often thrown away. Be sure that none of the exhibits are perishable, which means no food or plant remains should be included in the exhibition. And remind participants that food packaging in particular should be well rinsed before being offered as an exhibit.

Participants can make a kind of art exhibition with the waste they've brought. Let participants describe their waste and give it a title. They can describe how it came to be trash and what material it is made from. Titles and texts can then be written on folding cards or similar, and placed in front of the relevant exhibit.

Should you decide to have an exhibition, give participants time to look at the items on show. Then discuss their impressions in the group.



Worksheet 1

Module I

My waste journal

We all generate waste every day, including packaging, food leftovers and much more. But what exactly is in our daily trash?

1. Investigate your own garbage. Make a note of everything you throw away over the course of one day in the **waste journal** below. You can also take a photo of what you collect.
2. Talk about your experience with the rest of the group.

Waste from (Name) (Date)

Waste type (examples)	List of the actual waste
Plastics (yogurt pot, styrofoam packaging)	
Glass (milk bottle, jar)	
Paper (newspaper, wrapping paper)	
Tin / metal (food cans, aluminum foil)	
Composite materials* (drink cartons, shampoo sachets)	
Organic waste (leftover food, potato peel)	
Other waste (clothes, batteries)	

*Packaging made from layers of different materials which are usually glued together



Global waste increase

Duration: 45 min

Increases in global consumption lead to an increase in the volume of waste produced. A 2018 World Bank study warned that by 2050, the amount of trash produced worldwide could be 70% higher than in 2016. Some countries are already unable to deal with the mountains of trash already there.

Concept mapping

Participants explore this complex topic by using concept cards to create a diagram. They should work in pairs using the **concept mapping** method.

For this, copy **worksheet 2** and distribute one to each pair. They should also have a blank piece of paper. On the worksheet, you will find concept cards. Give participants time to read them, answering any questions they might have.

» **Worksheet 2**

Watch **film 1** "Trash – A problem to be avoided!", which you will find here: dw.com/p/40IXr

» **Film 1**

Participants cut out the concept cards and arrange them loosely on the blank page. The aim is for them to create a structure that explains the trash problem they saw in the film. When each pair has laid out a rough structure, show them the film again. During the film, participants can move the cards around to create a different structure. If necessary, you can pause the film.

Participants can also add other words to the empty cards. Once they are happy with their structure, they should glue down the cards. They should also use arrows, symbols and captions to clarify relationships between words or concepts. Different outcomes are possible.

Once they have finished, each pair shows their diagram to another pair, explaining how they arrived at their chosen structure.

Group work

As an alternative to dividing participants up into pairs, you can work in a large group. Transfer all the descriptions from worksheet 2 onto (colored) cards and stick them on the board. Once you have watched the film in the group, you can work together on where to put the cards in order to create a structure.



Worksheet 2

Module I

Diagram: Increasing waste

The global population is growing, as is consumption, which means ever more waste. That implies problems and dangers.

1. Discuss why the current global waste situation is a problem. Create a **diagram**.

Instructions:

- Watch the **film** "Trash – A problem to be avoided!", which you will find here: dw.com/p/40IXr
 - Cut out the **concept cards** below.
 - Put the cards down on a piece of paper in an order that reflects the relationships explained in the film. You can add additional words on the empty cards.
 - Connect neighboring cards with arrows and words that describe the relationships between the terms on the cards. Stick the cards down.
2. Show your diagram to another group of two and explain how you arrived at your chosen structure.



Packaging	Consumption	Waste export	Toxic waste
Recycling	Global population	Single-use items	Electronic waste



Recycling and upcycling as solutions

Duration: 60 min

Vimlendu Jha, Chad Robertson and Matt Paneitz have one thing in common. The three men have developed creative ideas for waste disposal and use. In module II, participants will be looking at these projects from India, South Africa and Guatemala.

Divide up topics

Copy **worksheet 3** and hand it out. Participants watch all the films together. They then fill out a profile of their chosen project on the worksheet.

» **Worksheet 3**

Subject A Upcycling in India

Film 2 "Finding creative solutions to India's waste problem" introduces Vimlendu Jha's social enterprise, which turns trash into new things such as bags. You will find the film online here: dw.com/p/3WXMb

» **Film 2**

Subject B Waste separation in South Africa

Film 3 "The tiny startup bringing recycling to Cape Town" follows workers at a startup founded by Chad Robertson. Recyclable household waste is collected for free and recycled. You will find the film online here: dw.com/p/3u7Uz

» **Film 3**

Subject C Waste as a building material in Guatemala

Film 4 "Building walls with waste" introduces a project in Guatemala in which Matt Paneitz works with volunteers from all over the world to make school buildings and homes from waste. You will find the film online here: dw.com/p/163Dm

» **Film 4**

The project profiles will then be presented to the whole group.

You will find **possible answers** below.

Local projects

Together with participants, you can research local waste prevention projects. It might be a clean-up day or an upcycling workshop. If suitable, you could also organize an excursion or plan a project.



Suggested answers for worksheet 3

Subject A Upcycling in India

1. *Name of the person who initiated the project:* Vimlendu Jha
2. *Name of the project:* Swechha & Green the Map | *Place, country:* New Delhi, India
3. *Project idea:* Green the Map specializes in upcycling. The startup uses waste to make things like bags and wallets. These are then sold and the proceeds are used to finance Swechha environment projects.
4. *Reason for the project:* There is no functioning waste disposal system across New Delhi. The municipal refuse service only collects a small part of the trash. Local waste pickers collect everything that can be used or sold. Green the Map buys materials from them.
5. *Participation incentives:* The startup is a good employer, particularly for immigrants. Waste pickers benefit from being able to sell what they collect.
6. *Possible further development of the project:* Swechha places large containers for collecting drink cartons and plastic in certain districts. Swechha runs a waste prevention awareness campaign in schools.

Subject B Waste separation in South Africa

1. *Name of the person who initiated the project:* Chad Robertson
2. *Name of the project:* Regenize | *Place, country:* Bridgetown, a suburb of Cape Town, South Africa
3. *Project idea:* Regenize is a free service that collects recyclable household waste (paper, cans and plastic) once a week. The waste then goes to a recycling company.
4. *Reason for the project:* Very few people in South Africa separate their waste. There are vast waste sites and illegal dumps, particularly in poorer areas, because the municipal refuse service doesn't collect trash from poorer areas.
5. *Participation incentives:* The collection service is free and those who take part are given virtual credit that can be transferred to shopping vouchers. The project also creates jobs.
6. *Possible further development of the project:* To become active in other districts of Cape Town (new collection points). To offer the service across South Africa.

Subject C Waste as a building material in Guatemala

1. *Name of the person who initiated the project:* Matt Paneitz
2. *Name of the project:* Long Way Home | *Place, country:* San Juan Comalapa, Guatemala
3. *Project idea:* Long Way Home constructs school buildings from waste with the help of volunteers. They use tires, glass bottles, tin and plastic bottles filled with waste.
4. *Reason for the project:* A lack of functioning waste collection or recycling systems across the country. Even the legal landfill site in San Juan Comalapa is just a deep gorge into which trash is thrown.
5. *Participation incentives:* Waste is a currency for local children. They can go into a theme park without paying if they take a plastic bottle filled with trash.
6. *Possible further development of the project:* Establishment of collection points for tires and plastic bottles.

Module II

Worksheet 3



Solutions to the waste problem

Sprawling mountains of trash and illegal waste dumps reveal how, in many places across the world, refuse disposal is a problem. But there are people who are working to solve the problem.

Watch the following **films**, which will introduce you to people trying to solve the waste problem.

- "Finding creative solutions to India's waste problem": dw.com/p/3WXMb
- "The tiny startup bringing recycling to Cape Town": dw.com/p/3u7Uz
- "Building walls with waste": dw.com/p/163Dm

Decide on a project you most like and then fill out the **profile** for that one.

Project profile

1. Name of the person who initiated the project:
2. Name of the project: Place, country:
3. Project idea:

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4. Reason for the project:

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5. Participation incentives:

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6. Possible further development of the project:

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Handout 4

Module III – How raw materials remain in circulation

Role play game: Talk show about fast fashion

🕒 **Duration: 120 min**

At the start of module III, participants take part in a **role play** game to explore the advantages and disadvantages of **fast fashion**. They stage a talk show that poses the question “Fast fashion or sustainable shopping?” Seven players are needed for the game. You play the part of the moderator.

Aim of the role play game

During the course of the talk show, all participants should come to understand how fast fashion contributes to the global waste problem. For this, participants take on the role of a character who is either passionately for or vehemently against fast fashion.

Material for the game

For the talk show you need:

- Enough copies of **worksheet 4** for participants not playing one of the game's characters so they can note down their observations.
- The roles for the talk show are on the **role play cards**, which you will find as a downloadable PDF here: dw.com/stop-waste. If you have a hard copy of the learning pack, you will find the role play game in the folder.

» **Worksheet 4**

Introduction to the topic of fast fashion

Introduce participants to fast fashion using **film 5** “Fast fashion and the flood of used clothes,” which you will find online here: dw.com/p/39drA. Answer any questions from the group. Discuss the term “fast fashion” and its relationship to the global waste problem.

» **Film 5**

You can refer back to this **definition**:

Fast fashion

The term “fast fashion” stands for fashionable but low-quality clothing that is cheap enough to enable customers to continually buy new garments and follow the latest fashion trends. The clothes are thrown away after a short time, which results in t-shirts, trousers, jackets or shoes ending up on the trash heap because their low quality often means they can't be recycled.

Module III

Handout 4



Preparing the role play game

1. Divide the large group up into seven small groups, perhaps by having all participants count in turn from one to seven. Everyone with the same number goes into the same group.
 - From here on, participants work in **small groups**. Give them a total of **15 minutes** time.
 - Give each group a **role play card**.
 - Have one member of each group read the front and back sides of their role play card. Encourage all participants to imagine representing the views of the character on their card.
 - Play the **film** "Fast fashion and the flood of used clothes" again. While they watch, participants should use a blank sheet of paper to make **notes** that will be helpful when playing their character.
 - Ask the small groups to pool their notes and use them to formulate **arguments**. Encourage the groups to be creative: What additional arguments could they use to support the position of the role they are playing?
 - Each of the small groups should also draft an **opening statement** that reflects how they feel about the issue. Examples: "**I am against fast fashion because** the flood of cheap old clothes from Europe is threatening my livelihood." / "**I am in favor of fast fashion** because we employ a lot of people in my fashion stores."
 - Ask each group to choose one person who will play the role of the relevant character in the talk show game. This person is given the role play card and the notes from the rest of the group.
 - The small groups now reform as one big group.
2. Inform all participants who are not playing a character in the talk show that they are now the audience. It is their job to take notes during the game. Distribute **worksheet 4** for that purpose.
3. Have the talk show guests form an open circle with their chairs, positioning them in such a way as to ensure they can see and hear well. Participants will need something to lean on to be able complete **worksheet 4**.

Talk show schedule (duration: 30 – 45 min)

- Start the talk show. Have the talk show guests introduce themselves with their names, jobs, views on fast fashion and opening statements.
- Now open the discussion using one of the following questions or theses:
"Fast fashion is fashion for the dump – is that true?" / "Clothes make the person – affordable fashion is more important now than ever before." / "There is no human right to fashion – our environment is more important than fashionable clothes."
- When a talk show guest speaks, they hold the role play card up high enough for everyone in the audience to see its front side.
- During the discussion, audience members make notes on their worksheets.
- Ask about solutions. What could help against the flood of used clothing?

Feedback

After the talk show, the public gives the guests feedback using the observations noted on **worksheet 4**.



Observations

You are in the audience at the **talk show** called "Fast fashion or sustainable shopping?"

Your task: Observe the talk show guests and evaluate the credibility of the points they make.

The following **questions** might be useful:

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1. Write down three good arguments either in favor of or opposed to fast fashion. Who made these points?

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2. Which solutions were put forward? How can consumers buy clothing in a sustainable way? What can be done to stem the flow of used clothes?

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3. Which talk show guest do you think made the most convincing argument? Remember you are assessing how good the arguments were, and not whether they reflect your opinion.

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Linear versus circular economy

Duration: 25 min

The global economy is largely characterized by a linear system in which resources are extracted to make products. We then throw these products away after use, and in doing so, damage the environment. We consume finite resources. An alternative is the principle of a **circular economy** in which nothing is wasted. In this system, which is inspired by cycles observed in nature, discarded products are used to make new ones.

Getting to know the circular economy

In this module, participants are introduced to the topic of circular economies with the aid of films and articles. They start by watching **film 6** "What does circular economy really mean?," which can be found online here: dw.com/p/3u4Ib. The film compares the linear economic system with the principle of a circular economy, referring back to examples already mentioned in module II. This makes it easier for participants to understand the definitions.

» **Film 6**

Copy **worksheet 5** for everyone. Participants should use the table to note down aspects of the two economic systems that were presented in the film. You can give them 10 minutes for this after they've finished watching the film. You can then let them watch the film again and give them additional time to add to their notes. Discuss the answers with the group.

» **Worksheet 5**

Answers

Linear economy

- The common model in the modern economy
- Resources are mined and made into products that are thrown away after use
- Bad for the environment: increasing mountains of waste, growing scarcity of finite resources

Circular economy

- Many would like to see a shift to this system
- Inspired by natural cycles (such as decomposition of dead plants that become fertile ground)
- System in which nothing is wasted

Module III

Handout 6



Circular economy: Definition, advantages and problems

🕒 **Duration: 30 min**

The aim of a circular economy is to avoid as much waste as possible. Old products are made into new ones, thereby ensuring a continuing value. It is a sustainable approach to production that protects the environment. In practice, however, it is not always very easy to implement.

Circular economy – how it works

Once participants have been introduced to the difference between linear and circular economies, they dive deeper into the subject by reading the **article** “Circular economy: Could rethinking design transform the world?,” which you will find online here dw.com/p/42uyN or, where relevant, as a hard copy.

» **Article**

Copy **worksheet 6** for everyone and then give participants time to read the article. Alternatively, you can also read it as a group. Once you’ve finished, participants answer the questions on the worksheet. Discuss the answers with the group. You can also make the answers into a diagram on the board or a piece of card.

» **Worksheet 6**

Answers

1. *What is a circular economy?*
The idea behind a circular economy is to avoid as much waste as possible. Resources should be used over and over again to create new products of equal value. The principle is based on nature’s cycles.
2. *What are the advantages of a circular economy?*
The shift to a circular economy could have global economic benefits to the tune of \$4.5 trillion annually. It would also reduce global greenhouse gas emissions by a fifth.
3. *What new problems could arise in a circular economy system?*
If products were produced in a cheaper and more efficient way, it could create a rebound effect in which consumption increases. The original effects would then be lost.
4. *Functioning circular economy*
In the case of used tires, it is already possible to recover the oil that was used to manufacture them – and it is of the same quality as crude oil. It can be used to make things like functional clothing. It’s easier to optimize the recycling of clothes that have a product passport, because it is possible to determine exactly which materials they’re made from.

Non-functioning circular economy

“To-go cups” made from organic cardboard also have a plastic layer which makes them hard to recycle. In new smartphones, the battery is often installed in such a way that makes it hard to replace. So if the battery stops working, consumers have to buy a whole new device.



Circular economy: How does it work?

A circular economy is sustainable and good for the environment – in theory at least. In reality, however, it can be hard to implement. How can a circular economy work?

Read the **article** "Circular economy: Could rethinking design transform the world?," which you will find online here: dw.com/p/42uyN, and then answer the **questions** below.

1. What is a circular economy?

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2. What are the advantages of a circular economy?

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3. What new problems could arise in a circular economy system?

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4. Give examples of functioning and nonfunctioning circular economies and explain them briefly.

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Module III

Article



Circular economy: Could rethinking design transform the world?

Some argue that switching to a “circular economy” is crucial when it comes to climate protection and sustainability. But what would it entail? And can it work on a global scale?



Turning old into new: Shredded PET can be used in a variety of ways

Whether it's islands of trash in the ocean or the 40 million used tires in the Kuwait desert visible from space, signs that the world is choking on trash are not hard to find. And this has devastating consequences for the climate, ecosystems and human health.

We currently live in a linear economic system “designed to extract raw materials, process them into usable goods, and then ultimately either dump them in a landfill or incinerator, recycle them, or dispose of them in nature,” said Leyla Acaroglu, a designer and sustainability expert.

A circular economy aims instead to create a system that avoids waste as much as possible and reuse resources for new products.

The life cycle of a product

Achieving this requires a complete rethink in how design can extend the life cycle of a product. Take disposable coffee cups: Although made from cardboard, they are often covered with a layer of plastic, which makes recycling challenging, and sometimes impossible.

And, when it comes to electronic devices, it is often more straightforward and affordable to buy an

entirely new product than repair or replace parts in an old one. A circular economy makes sure these considerations are embedded into the entire design and production process.

Circular economy means more than recycling

At least 1 billion used tires are thrown away every year. Because the rubber is made from crude oil that is very difficult to recycle, tires are usually burned, or processed into low-quality rubber mats. However, the goal of a circular economy is to preserve the value of the product and avoid so-called downcycling.

The German company Pyrum Innovations has spent the past few years developing a technology that almost completely recovers the oil from used tires. They say the demand for this process is now increasing. “I can think of almost no country in the world from which we haven't had an inquiry,” said Pascal Klein, co-founder of Pyrum. By 2025, the company plans to build 50 plants in Europe and supply 100,000 tons of oil to chemical giant BASF.



The end of the linear economic chain: a huge car tire graveyard in Kuwait

The role of technology

Ninety-two million tons of old textiles end up in the trash every year, only 1% of which is recycled. Furthermore, products in the fashion industry that are recycled often lose their value.

A key missing aspect of textile recycling is detailed information about the materials involved. That is why the Berlin-based startup circular.fashion is working on technology that automatically recognizes and sorts textile fibers and gives them a “circular ID.” “This allows us to quickly calculate whether reuse or recycling is best for this product,” said Mario Malzacher, co-founder of the company.

i Article

Module III

The concept of the circular ID, known at the European level as a “product passport,” is an essential aspect of the European Union’s Circular Economy Action Plan for a resource-saving economy. The identification label contains information on the origin, composition, repair instructions and end-of-life options for a product.

Circular economy: No silver bullet

A study into the circular economy concept by Yale University warns of the possibility of a “rebound” effect, in which more efficiently designed and cheaper products could lead to more, rather than less, consumption.

Key to recycling is that it uses fewer resources than extraction and disposal – otherwise, it adds to, rather than reduces, the carbon footprint. To prevent that from happening, they argue research needs to continue and circular approaches need to be carefully implemented.

Yet the transition to a circular economy is still in its early stages. Today less than 9% of the global economy reflects circular principles, according to the Circular Economy Gap Report. Resources are being depleted with increasing intensity, consumption is

rising, and little progress has been made in dealing with products at the end of their life cycle.

Research suggests that the benefits of overcoming these challenges could be significant.

According to the World Economic Forum, the switch to a circular economy could have an annual global financial benefit of \$4.5 trillion (€3.8 trillion). Research from the Ellen MacArthur Foundation states that it could also reduce global greenhouse gas emissions by one-fifth, making it a crucial tool in tackling the climate crisis.



Enormous quantities of textiles are thrown away, but recycling possibilities are limited

22.11.2021 | Author Tim Schauenberg | [dw.com/p/42uyN](https://www.dw.com/p/42uyN)

Module III

Handout 7



Circular economy for electronic goods

Duration: 30 min

Having learned what a circular economy is, participants are shown an example to delve deeper into the topic. What might a circular economy for electrical appliances look like? Numerous new electrical products are launched each year, and most of us can no longer imagine life without smartphones, laptops and tablets. But many end up in the trash after just a short period of time. By seeing how a German company does things, participants learn that there are alternatives.

Show participants **film 7** "Circular economy: Sustainable and profitable," which you will find here: dw.com/p/3tmnr

» **Film 7**

Fill-in-the-blanks text

Copy **worksheet 7** for everyone. Ask participants to read through the fill-in-the-blanks text together and answer any questions they might have. Once they have read it through, give them 10 minutes to fill in the gaps. Then watch the film with them again. Give participants time at the end to complete anything they've left blank before discussing the answers in the group.

» **Worksheet 7**

Answers

- | | |
|-----------------|-----------------|
| 1. 53 million | 11. repairs |
| 2. double | 12. 70% |
| 3. 20% | 13. metals |
| 4. recycled | 14. adhesive |
| 5. Africa | 15. softened |
| 6. Asia | 16. shredded |
| 7. water | 17. gold |
| 8. soil | 18. silver |
| 9. air | 19. platinum |
| 10. manufacture | 20. 200 million |



Worksheet 7

Module III

Circular economy for electronic goods

Demand for smartphones, tablets, laptops and other electronics is growing. But the lifespan of most devices is getting shorter. They are often complicated and expensive to repair, although that would be much more sustainable than buying a new device.

1. Watch the **film** "Circular economy: Sustainable and profitable," which you will find here: dw.com/p/3tmnr
2. Fill in the blanks in the **text**.

Electronic trash is the fastest growing waste stream in the world, with (1) tons generated annually. And according to the United Nations, that volume could (2) within the next 30 years.

Currently, only (3) of global electronic waste is (4). The rest often ends up in landfill sites in (5) or (6) where it pollutes the (7), (8) and (9).

The (10) of new smartphones uses vast amounts of resources. That is why it has to become easier to repair and recycle electronic appliances.

The German company AfB (11) old computers, smartphones and laptops. Around (12) of devices they receive can be recycled. That saves some 25,000 tons of (13) and 300 million liters of water compared to the production of new goods.

It also saves a lot of CO2. But repairs are not always that easy. The (14) in some smartphones has to be (15) with a hairdryer in order to dissolve so as to swap out the display.

Components that cannot be repaired are sorted and (16). Among other things, a recycling specialist for precious metals extracts (17), (18) and (19). Each smartphone contains metals with a value of €1.50. With an estimated (20) unused cell phones lying around in German households alone, that implies a million-dollar business.

-
- 200 million 20% 53 million 70%
 - Africa Asia softened soil shredded gold
 - manufacture adhesive air metals platinum recycled
 - repairs silver double water

Module III

Handout 8



The role of mealworms in the plastic waste problem

Duration: 45 min

Plastic was once used to protect food from pests. Could pests now have a role to play in solving our plastic problem?

Mystery teaser

Copy **worksheet 8** for everyone and read through the **mystery teaser** together. It is a sentence worded in a mysterious way, similar to a short riddle, that is intended to pique the reader's interest in the subject. First allow the participants to guess what the teaser might mean, then watch **film 8** "Plastic recycling with mealworms," which you will find online here: dw.com/p/3IENm

» **Worksheet 8**

» **Film 8**

Give participants 10 minutes to answer the questions on worksheet 8. If necessary, you can show the film twice. Discuss the answers, which you will find below, with the group.

Discussion about the plastic waste problem

Ask participants for their opinion on whether mealworms could solve the global plastic problem. Work the scale of the plastic problem into the discussion. What other potential solutions are there?

Answers

1. *What is the difference between plastic and natural materials?*
Natural materials are broken down by bacteria and decompose into their elements. Plastic is broken down into ever smaller parts, but it remains plastic. And it stays in the environment for centuries.
2. *What are the advantages of plastic?*
Plastic is hygienic and resistant to bacteria. In nature, there are only a few materials with similar characteristics to plastic (such as silk and ivory). The animals that provide these materials (such as elephants) have been so severely decimated that they are at risk of extinction.
3. *How did people used to regard plastic? And how do we see it today?*
It was once seen as a means to save the environment, now it is seen as a danger to it.
4. *How can mealworms digest plastic?*
Certain bacteria inside mealworms produce enzymes that allow them to digest plastic.
5. *What does Susan Freinkel see as the main problem with plastic?*
It requires fossil resources to make things that are often unnecessary.
6. *Which plastic products are shown in the film?*
Styrofoam blocks, plastic bags, plastic bottles, toothbrushes, disposable gloves, disposable masks, stadium seats, plastic wrap, plastic flowers, to-go cups, single-use crockery and cutlery, straws, bulletproof vests .



Mealworms: Unsung heroes?

Reporter Christian Caurla is happy when he receives a batch of worms in the post. It means he won't have to use the trash can as often.

Watch the **film** "Plastic recycling with mealworms," which you will find online here: dw.com/p/3IENm

Answer the following **questions**.

1. What is the difference between plastic and natural materials?

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2. What are the advantages of plastic?

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3. How did people used to regard plastic? And how do we see it today?

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4. How can mealworms digest plastic?

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5. What does Susan Freinkel see as the main problem with plastic?

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6. Which plastic products are shown in the film?

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Thought experiment: Avoiding waste

Duration: 45 min

What can individuals do to contribute to global waste reduction?
Start a **thought experiment** with participants.

Refer back to the waste journal

Introduce the subject. Use experience that participants already gained while they were keeping their **waste journals**: What was the most common type of waste, what was the least common?

Collect ideas for waste reduction

Ask participants for ideas about how they could personally reduce their waste. Make them aware of the fact that they can also indirectly prevent waste. Ideas could include:

- Buy used clothing, sell clothes you no longer want or need, or give them away
- Buy unpackaged food
- Take a basket or reusable bags instead of plastic ones when you go shopping
- Buy used items rather than new ones
- Borrow consumer goods rather than buying them

Write the ideas on the board.

Conduct a discussion

When you have finished, ask participants to discuss their ideas: Which of them could easily be implemented? Which ones might prove problematic?

Optional Create guidelines

Participants could use the successful ideas to create **guidelines** on the different ways to avoid waste. They could then write these guidelines on a piece of card, or work together to create a handout that is shared with everyone else.



Handout 10

Module IV

Recycling and upcycling

Duration: Individual

Participants learn more about **recycling** and **upcycling** and get creative with the concepts: They make small objects from drink cartons or plastic bottles.

Begin by asking participants if they know exactly what recycling is. Do they have separate trash cans for recycling where they live?

Discuss the concept of upcycling: Who has heard of it before? What does it mean? Who has already crafted or created something from things deemed to be waste, and what was it?

Make notes in bullet point form on the board about the differences between recycling and upcycling. The definitions below might be helpful.

Recycling

Recycling means the raw materials contained within a waste product are reused to manufacture a new product. At a recycling plant, for example, an empty PET bottle can be processed into plastic granules that can be melted down to make new bottles or fabrics for jackets and jumpers.

Upcycling

When a porous gum boot is made into a flower pot, or an old bottle is turned into a wind turbine or an empty soda can becomes a pen holder, it is called upcycling. Instead of throwing away things like tin cans, paper, glass, old clothes and so on, they are made into new, useful objects. In other words, discarded items are given a new use. In upcycling – unlike recycling – the original product is not broken down into its individual material parts.

Using **worksheets 10.1** and **10.2**, participants can either recycle a drink carton or upcycle it into little artworks.

» **worksheets 10.1 and 10.2**

If you don't have access to drink cartons, **worksheets 10.3** and **10.4** provide alternative instructions for upcycling plastic bottles.

» **worksheets 10.3 and 10.4**

Module IV

Worksheet 10.1

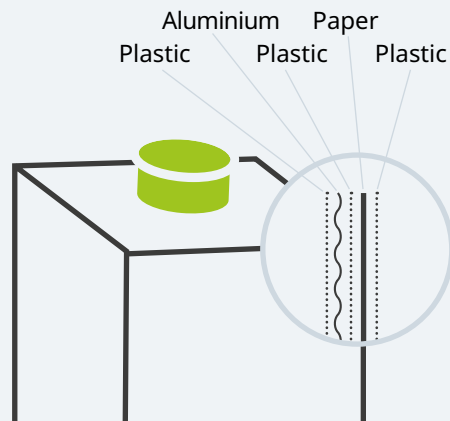


Turn it into something new: Flower pots from drink cartons

Drink cartons - hard to recycle

Milk, juice and in some places, even yogurt, are sold in drink cartons made from card coated in plastic and often also a layer of aluminium.

These layers can be separated from each other in special factories, but the process is energy and water intensive. Often, the paper component is the only one to be recycled.

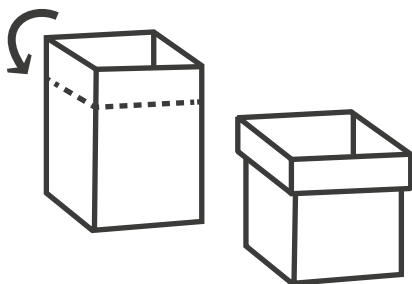


What you need for the flower pot:

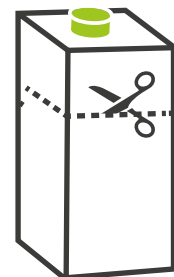
- several used and cleaned **drink cartons**
- a large pair of **scissors** as well as **paint, paint brushes** and **pens**

Instructions

1. Cut off the top of the carton.
2. Wet the outer, printed layer with a little water and carefully try to peel it off. You can also crumple up the drink carton. Just make sure the bottom remains stable..

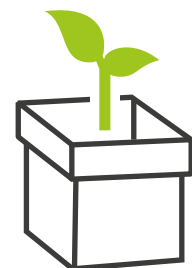


3. When you have peeled off the outer printed layer, fold over the edge of the carton two or three times to create a silver rim.
4. Your planter is now ready for you to decorate as you like.



Tip

If you want to fill your new pot with soil and plant something in it, add a layer of small stones or shells at the bottom, and don't water too much.





Worksheet 10.2

Module IV

Turn it into something new: Greetings cards from drink cartons

Although drink cartons contain paper, they are not paper waste. This single-use packaging also contains aluminum and plastic. Separate the layers and use the paper from your drink carton to make a birthday card or invitation. This saves money and resources.

For the cards, you need:

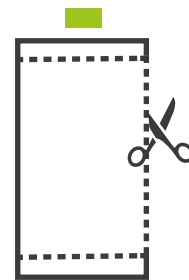
- at least one cleaned **drink carton**
- a large pair of **scissors**
- **pens, stamps** or **stickers** to design the card

Instructions

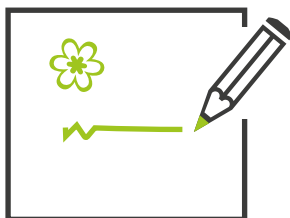
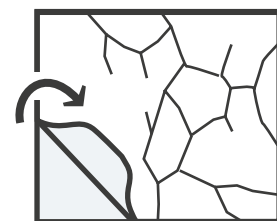
1. Cut off the top and bottom of the drink carton.
2. Separate the card along one of the four folds.



3. Scrunch up the carton and knead it roughly until the different layers of material separate from each other.



4. Spread the cardboard out flat in front of you and carefully separate the paper from the other layers. If it still doesn't separate, knead again.



5. Smooth your paper and cut it to the size you want.
6. Use stamps, stickers and pens to design a creative card.

Module IV

Worksheet 10.3



Turn it into something new: A zipper case from a plastic bottle

Does a water or lemonade bottle have to be thrown away when it's empty? We have another idea! You could transform it into something else.

For a case, you will need:

- the bottom part of **two identical plastic bottles**
- a large sharp pair of **scissors** or a **box cutter**
- a **zip** (long enough to go right around the bottle)
- a **strong needle**, thick **thread** and a thimble

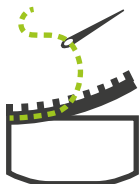
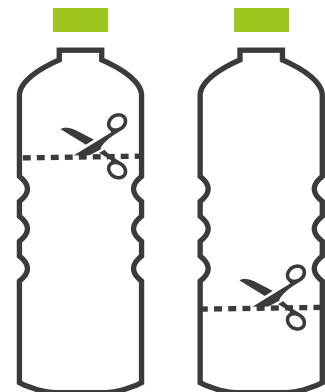
Instructions

1. Clean both bottles thoroughly and remove the labels.
2. Cut one of the bottles to make the long part of the case. Cut the second bottle relatively close to the base. This shorter part of the case will be the lid.

Tip

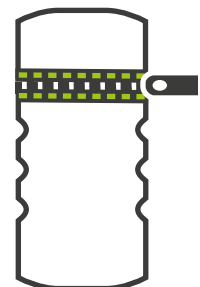
If you would prefer to make a small case, cut both bottles close to their base.

3. Put aside the necks of the bottles, which you no longer need.



4. Sew the zip onto one of the two parts of the case, taking care that the teeth of the zip poke out over the rim of the cut bottle.
5. Open the zip and sew the other half to the second part of the case in the same way.

Finished! Unless you want to paint your creation, or decorate it with stickers or something else, in which case, go for it!





Worksheet 10.4

Module IV

Turn it into something new: Strings of flowers from plastic bottles

Do you have a lot of empty plastic bottles?
This upcycling idea could be just the thing for you!

What you need for a string of flowers:

- the cut-off, upper part of each **plastic bottle**
- sharp **scissors**, possibly a hand drill
- cut-resistant work surface
- **acrylic paint**, **paintbrush** for decorating
- **cord** or strong yarn



Instructions

How to craft the flowers:

1. Cut a flower from the top part of the bottle. You can draw the outline of the flower before starting to cut. Be careful not to cut the petals all the way to the neck of the bottle.
2. Remove the cap and place it flat side down on a cut-resistant work surface. Use a hand drill or the tip of a pair of scissors to make a hole in the middle of the cap. (*Warning: injury risk!*) Make sure that the hole is big enough for you to thread your cord or yarn through.
3. Screw the cap onto the flower.
4. Paint the flower. It looks particularly pretty if you paint the edges in a different color.



How to assemble the string of flowers:

5. Choose a piece of cord or yarn longer than you wish your entire string of flowers to be.
6. Tie a knot at the end of your cord or yarn and pull the other end through the hole of the cap of a flower. Choose the position of the next flower, tie a knot where you want it to be and thread the cord or yarn through the next flower. Continue in the same way until the string of flowers is finished.



Tip

You can use several strings of flowers to make a **mobile**.



Upcycling market and clothes swap

Duration: Individual

Worksheet 11 contains instructions for a **market**, where the upcycled crafts could be sold or swapped for other useful things. A **clothes swap** where everyone can bring good-quality garments they no longer need, could also be organized.

» **Worksheet 11**

Assist participants in organizing such an event. Make sure they get started well enough in advance, have a good time plan and ensure that they divide up the responsibilities.

Tip

Participants can use the proceeds for new projects around the idea of recycling and upcycling. Possible project ideas might be:

- To build a **compost** heap in the school or community garden. Ask participants to do some research online or in books, to learn how to build and maintain a compost heap.
- A **“give box”** for the community or the schoolyard. This is a box in which everyone can put books, toys, clothing or household goods they no longer want or need. The box itself can be a DIY wooden crate made from pallets, an old wardrobe or a discarded telephone box. What matters is that it is in a weatherproof and easily accessible place that lots of people pass by. The box should be regularly sorted and cleaned to prevent it from becoming littered.



Worksheet 11

Module IV

Upcycling market and clothes swap

Below you will find two ideas for events that not only save on waste, but could also generate some money for your project purse.

A Earn money with waste: Upcycling market

Organize a small market at which you sell your homemade upcycling crafts. Everyone from the group should contribute at least one item.

B Swap a skirt for a pair of trousers: Clothes swap

Some of us have clothes in our wardrobes that either don't fit us, or which we just don't like anymore. But it would be a shame to throw them away. As part of the upcycling market, you could hold a clothes swap. How does it work? Put up a shelving unit or a clothes rack, and in the invitations, ask visitors to bring used but wearable garments along with them.

Important: Three to four people from your team should sort the clothes by size and hang them on the rack or fold them to put on the shelves. Visitors to the upcycling market can look through the clothes and if they find something they like, they can take it with them. You can also put out a box so people can make donations if they wish.

For A and B These **questions** will help in the event planning and organization:

1. Who needs to be involved in the organization process from the get-go?
(school leadership, parents)
2. Where should the market be held?
(schoolyard, market square, etc.)
3. When should the market be held?
(e.g. as part of a pre-planned school festival)
4. What do we need for the upcycling market?
(tables, chairs, change, cash box, perhaps food and drink to sell)
5. Who is in charge of what jobs? And what are the deadlines for completion?
6. What tasks will need to be completed on the day of the market and who will be assigned to them?
(setting up, sorting clothes, collecting money, etc.)

Bonus – Plastics feature project

Handout 12



Feature project on the subject of plastic production

 **Duration: 30 – 60 min**

In the time since its invention, single-use plastic has fast become a nightmare for the environment. Not long after it is manufactured, it is thrown away.

Plastic sachets, for example, are used for a multitude of products, such as coffee or shampoo. Although each item is very small, billions are produced every year.

In the **feature** “Plastic – A lifeline for the fossil fuel industry?,” participants embark on a journey. They learn about the role of environmentally damaging fossil fuels in the manufacture of plastic, and accompany a shampoo sachet from its oil-based beginnings to the moment it becomes waste polluting our environment.

» **Feature**

You will find the feature “Plastic – A lifeline for the fossil fuel industry?” online here: dw.com/plastic

Note **Technical requirements**

Make sure participants have access to a mobile device (tablet or smartphone) with an internet connection. Alternatively, participants can work in pairs on a single device.

Media index

Film 1



“Trash – A problem to be avoided!”

[dw.com/p/40IXr](https://www.dw.com/p/40IXr)

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Film 6



“What does circular economy really mean?”

[dw.com/p/3u4Ib](https://www.dw.com/p/3u4Ib)

» Page 19

Film 2



“Finding creative solutions to India’s waste problem”

[dw.com/p/3WXMb](https://www.dw.com/p/3WXMb)

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Film 7



“Circular economy: Sustainable and profitable”

[dw.com/p/3tmnr](https://www.dw.com/p/3tmnr)

» Page 25

Film 3



“The tiny startup bringing recycling to Cape Town”

[dw.com/p/3u7Uz](https://www.dw.com/p/3u7Uz)

» Page 13

Film 8



“Plastic recycling with mealworms”

[dw.com/p/3lENm](https://www.dw.com/p/3lENm)

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Film 4



“Building walls with waste”

[dw.com/p/163Dm](https://www.dw.com/p/163Dm)

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Article

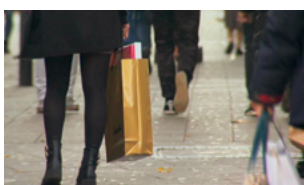


“Circular economy: Could rethinking design transform the world?”

[dw.com/p/42uyN](https://www.dw.com/p/42uyN)

» Pages 23 and 24

Film 5



“Fast fashion and the flood of used clothes”

[dw.com/p/39drA](https://www.dw.com/p/39drA)

» Page 16

Feature project



“Plastic – A lifeline for the fossil fuel industry?”

[dw.com/plastic](https://www.dw.com/plastic)

» Page 37

Global Ideas

The multimedia environment magazine

Around the world, imaginative people and innovative projects are working to protect our climate and biodiversity. Global Ideas tells their stories on TV and online every week.

Global Ideas is Deutsche Welle's multiple award-winning, multimedia environment magazine supported by the German Environment Ministry's International Climate Initiative. Established in 2009, it showcases TV reports, background articles, special feature projects and much more, as a means of informing people all over the world about best practice initiatives to protect the planet.

Global Ideas is more than just television. Think interactive specials such as a visit with Africa's wild animals or easy-to-understand explainers that answers complex questions about the environment and changing climate. The magazine also has an educational element in the form of carefully crafted "learning packs" on key environmental topics. Available free of charge in German, English and Spanish, these learning materials include videos, articles, worksheets and teacher handouts, as well as other educational materials such as posters, picture cards and practical experiments. The learning packs are available in booklet form with an accompanying DVD, as well as online for distance and in-person learning.

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