Learning pack #6

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

GLOBAL IDEAS

Blue gold

Our drinking water and climate change

Imprint

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Contents

Editorial

When the lesson was over, the children gathered for their school lunch of rice and vegetables. No drink was included. For those who could afford it, there was the opportunity to buy small plastic bags of water for the equivalent of few euro cents. For most, that was too expensive. So they drank nothing, although temperatures had soared to 38 degrees Celsius (100.4 Fahrenheit).

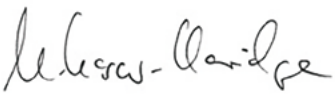
I was visiting a small town in Ghana, West Africa. I was shocked to witness the thirst these children lived with and to see just how expensive and precious drinking water is there. Coming from Germany, I'm used to clean water flowing from the tap and being readily available. In my home country, we can shower multiple times a day, water our gardens, and let the water run for as long as it takes to reach the perfect temperature. At the same time, there are regions in Europe in which easy access to water is not a given.

Access to a safe and secure supply of drinking water varies greatly between continents, according to the United Nations. Just 24 % of the population in Sub-Saharan Africa has access to clean water, compared to 94 % in Europe and North America. Climate change is aggravating the situation in many places. In areas worst hit by drought, soil is drying out, wells are emptying and rivers disappearing. Many countries are already experiencing dwindling water supplies, and the crisis will get worse unless we learn to treasure and protect this precious resource. To do so, we must keep global warming to a minimum.

This learning pack about drinking water highlights several important questions, including: What are the societal consequences of insufficient drinking water? How can I change my own water consumption? What can we do when drinking water is scarce? Depending on location, water filtration systems, desalination plants and fog catchers can all be part of the solution. And who knows, perhaps by engaging with the issue of water scarcity, we can come up with potential new solutions.

This learning pack shines an important light on the issue of drinking water, and I hope you enjoy finding out more.

Yours faithfully,



Manuela Kasper-Claridge

Project leader, Global Ideas
Editor-in-chief, Deutsche Welle

Introduction

This booklet is part of the learning pack “Blue Gold: The dwindling resource of water,” published by Deutsche Welle and produced by the editorial team from the environmental series Global Ideas. It is aimed at children between the ages of 12 and 16 and their teachers and can also be used outside school settings by environmental groups and institutions.

The pack contains four modules with **worksheets** and explanatory **handouts**. The modules build on each other but can also be used independently of one another. **Articles**, **films**, a **quiz** and two mini **experiments** are used as learning tools. Where necessary and possible, students should watch the films a number of times in order to complete the film tasks. It would be helpful to have several devices on which to play the films, but this is not essential.

You will find instructions on how to play the films on the last page of the booklet. Some worksheets come with solutions, while more open-ended tasks do not. Please consider the duration given for each lesson to be a general guideline. You will be the best judge of the pace at which your group learns.

The print version of the learning pack includes a **DVD** containing all the educational material in digital form. Alternatively, the content is also available for free download on the Deutsche Welle website, where you will also find our other learning packs on interesting environmental topics: *dw.com/learning-environment*

Icon for worksheets

Icon for handouts

Structure

Module I
The first module provides students with an introduction to the topic, answering questions such as, where does drinking water come from? Participants will learn how greatly access to clean drinking water varies across the globe, as well as what climate change means for this essential, life-giving resource. The section also addresses the fundamentals of water, such as explaining the water cycle and how it works.

Module II
The second module delves into the individual dimensions of the problem, including per person water consumption. Participants are asked to reflect on their personal water use and compare it to that of people in other countries. Module II will also highlight indirect water consumption stemming from the production of goods such as food or clothes.

Module III
The third module uses two articles and two films to look at solutions to water scarcity in different parts of the world – specifically a water desalination plant in Colombia, fog catchers in Morocco and an environmentally-friendly method in India. The module also highlights potential future technologies.

Module IV
The final module shows students how they could take action themselves and asks them to develop and implement their own solutions for sustainable water use. Two experiments on water cycle and filtration will help them consolidate and deepen their knowledge.

The following table offers an overview of the modules, including how long each one takes, a short description of the contents and learning objectives, as well as a note about any materials required.

Module overview

Module I – Problem and background

Where does our drinking water come from? What impact does climate change have on water supply?

Duration	Content	Learning objectives	Material and links
35 min	An introductory quiz	To prepare participants for the learning pack using a game	**Handout 1** **Quiz cards**
30 min	Drinking water: An essential resource	To create a shared foundation of knowledge about the problems of water scarcity and climate change	**Film 1** "Blue gold – the dwindling resource of water" *dw.com/p/3cbck* **Handout 2** **Worksheet 2** (word puzzle)
30 min	Interview with a researcher about conflict and water scarcity	Analysis of the societal consequences of water scarcity	**Article 1** "Tackling the growing threat of water conflict" **Handout 3** **Worksheet 3** (List of words) Texts on the topic or internet access
45 min	The water cycle: Testing prior knowledge and explaining concepts	Creating an understanding of the water cycle as the basis for our drinking water Clarifying technical terms	**Handout 4** **Worksheet 4** (Explanatory text with diagram)

Module II – Individual dimensions

How much water do I consume daily? How much water do I use compared to other people?

Duration	Content	Learning objectives	Material and links
30 min	Living with water scarcity – an example from Cairo	To create an understanding of the daily challenges faced by people living with water insecurity	**Article 2** "Staying hydrated in Cairo, Egypt" **Handout 5** **Worksheet 5** (Questions about article)
30 min	Self-reflection: My water consumption	Creating clearer awareness around personal water consumption	**Handout 6** **Worksheet 6** (Table of water consumption) Internet access
35 min	Indirect water consumption: In which products do you find water?	Understanding "virtual water" in products and your true water consumption	**Film 2** "What is virtual water?" *dw.com/p/3YMl6* **Handout 7** **Worksheet 7** (fill-in-the-blanks text) Optional Texts on the topic, internet access

Module III – Solutions

Examples of ideas to combat drinking water scarcity around the world

Duration	Content	Learning objectives	Material and links
45 min	Turning salt water into drinking water in Colombia using desalination	Learning about technical solutions for creating drinking water from salt water	**Film 3** "In Colombia, a community goes back to school for clean water" *dw.com/p/2ywW3* **Handout 8** **Worksheet 8** (Questions about the film)
45 min	Traditional methods for fighting water scarcity in India	Understanding ecological solutions	**Article 3** "India's 'water man' keeping liquids flowing despite crisis" **Handout 9**
45 min	Harvesting drinking water with fog catchers in Morocco	Learning about technical solutions in mountain regions	**Film 4** "Fishing for water in the clouds" *dw.com/p/2SJr5* **Handout 10** **Worksheet 10** (Questions about the film)
45 min	Surprising ideas about how to save and treat drinking water	Understanding, presenting and evaluating different solutions	**Article 4** "Innovative clean water technologies" **Handout 11** **Worksheet 11** (Group work)

Module IV – Taking action

How can we improve access to drinking water? How can we save water?

Deepening knowledge: Experiments on water filtration and the water cycle

Duration	Content	Learning objectives	Material and links
90 min	Working out a project plan	Developing and implementing your own solutions	**Handout 12** **Worksheet 12.1** (Project plan) **Worksheet 12.2** (Project workflow)
40 min	Experiment 1: Building a mini water filter	Understanding how rainwater is cleaned via infiltration	**Handout 13** **Worksheet 13** (Instructions) Material for a mini water filter
40 min	Experiment 2: Water cycle in a jar	Imitating the water cycle, thereby deepening understanding	**Handout 14** **Worksheet 14** (Instructions) Material for creating the water cycle in a jar

An introductory quiz

Duration: 35 min

The **quiz** aims to prepare project participants and students for this learning pack on "drinking water" in a fun way.

Divide the participants into equally sized groups, preferably of three to four people. Each group needs paper and a pen and should choose a member to write down the answers. The groups then compete against each other in the quiz.

Slowly and clearly read out the questions from the **quiz cards** and repeat them if required. Each group must write down the answer they've chosen – without letting the other groups see.

» Quiz cards

At the end, go through the questions with the groups. Explain the answers using the information and pictures on the cards. The winning group is the one with the most correct answers.

Drinking water: An essential resource

Duration: 30 min

Show **film 1** "Blue gold – the dwindling resource of water" to the entire group. It's available online under *dw.com/p/3cbck* or on the DVD. ***» Film 1***

You will find instructions on how to play the films on the last page of the booklet. ***» Playing films***

Distribute **worksheet 2** (word puzzle) to participants. They have to match up the sentences that go together. They should do so by drawing a line to connect the relevant parts. If preferred, they can also cut out the puzzle pieces and glue the matching sentences together. ***» Worksheet 2***

Answers

1. 1 + B 2 + A 3 + F 4 + E 5 + D 6 + C

2. City and water use (per person and per day):
   - New York – 447 liters
   - Berlin – 114 liters
   - Beijing – 100 liters
   - Kampala – 24 liters

Word puzzle for the film “Blue gold – the dwindling resource of water”

Watch the **film** “Blue gold – the dwindling resource of water”: *dw.com/p/3cbck*

1. Match up the sentences correctly. You can either use a pen to connect the first part of the sentences **1 – 6** with the corresponding sentence endings **A – F**. Or you may cut them out and match up the correct parts.

We get drinking water …	1	A	… periods of drought are getting longer and more frequent.
It’s becoming warmer …	2	B	… from lakes, rivers, ground and rainwater.
Groundwater stores …	3	C	– at around 70%.
More than 2 billion people …	4	D	the growing world population and climate change.
Water scarcity is being worsened by…	5	E	… have no access to clean drinking water.
Agriculture uses by far the most water …	6	F	… are increasingly disappearing.

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2. In which cities is most water consumed and in which cities is least water consumed? Match water consumption rates with the right city.

City	**Water consumption** (per day and per person)
• Beijing	447 liters
• Berlin	114 liters
• New York	100 liters
• Kampala	24 liters

Interview with a researcher about conflict and water scarcity

Duration: 30 min

Distribute **article 1** "Tackling the growing threat of water conflict" to the participants. You will find a copy included in the learning pack. You can also find the article online: *dw.com/p/3Z6pf*

» Article 1

Give the group time to read the text. They may read it themselves or take turns reading sections of it out loud.

Distribute **worksheet 3** (list of words) and discuss the exercise.

» Worksheet 3

The participants must create a list of words from the text. Encourage the group to write down all the words and concepts they don't know. For research purposes, the participants will require books or internet access.

Afterwards, discuss the words and their definitions with the entire group. What do they mean in the context of the article?

Tip

The participants can add to their list of new words and concepts as they work their way through this learning pack.

List of words

Read the **article** "Tackling the growing threat of water conflict": *dw.com/p/3Z6pf*

In it, Charles Iceland, director of water initiatives at the World Resources Institute, explains how water scarcity can aggravate existing conflicts in society.

The text contains some uncommon words and concepts. Some are already in the table below. Are there any other words in the text that you don't understand? Note them in the table.

What do these words mean? Research online or in books. Please write their definitions in the right-hand column.

Word / Concept	**Definition**
Water conflict	
Water scarcity	
Climate change	
Desertification	
Threat multiplier	
Non-violent conflict	
Diplomacy	
Hotspot	

Tackling the growing threat of water conflict

Climate change and rapid population growth are among the reasons for rising water insecurity. Charles Iceland of the World Resources Institute spoke to DW about how it's driving conflict in Africa and across the globe.

Ever more of the world's population is living with water insecurity and is unable to consistently access safe, clean drinking water.

A number of factors, including climate change and poor water management, are worsening water scarcity, which coupled with other social problems like rising inequality and ethnic tensions, are threatening conflict between states and within states.

Charles Iceland, director of global and national water initiatives at the World Resources Institute, spoke to DW about disputes over the essential resource and how they can be avoided, as well as the new Water, Peace and Security (WPS) tool that forecasts where water disputes are likely over the next 12 months, and how they might be avoided.

DW *What is a water conflict and what does it look like?*

Charles Iceland In many places throughout the world, there's just more and more demand for water with respect to what's available. Sometimes the conflicts are nonviolent – like in Australia or California where people go through the legal system or they work their issues out without violence. But in a lot of places, the problem is grave enough and the ability to resolve the problem is not well developed. So you can see the wrestling over these scarce resources develop in violent ways.

DW *Where would you say are the regions and countries in which water, water scarcity, water quality are playing a role in conflict?*

Charles Iceland Populations are growing very quickly in sub-Saharan Africa – going up fourfold between 1960 and today. Resources have either stayed the same or you have a reduction in resources, because of climate change or because desertification is reducing arable land. So you have a lot of violent conflicts between these smallholder farmers and pastoralists wrestling over scarce land and water resources. We've seen over the past couple of years pastoralists massacring farming communities and retribution by farming communities.

We're also seeing a lot of violent conflict play out in the Middle East. So, for example, in Iraq, a lot of the demonstrations that led to the prime minister's resignation a few months ago. But part of the grievances entailed lack of services, which included lack of access to clean water and lack of access to electricity. They're getting sick. About a year and a half ago, 120,000 people in Basra had to be hospitalized because they were drinking contaminated water.

And it's [water scarcity] is also a problem in places like Iran, Afghanistan and India. So those are some of the hotspots.

Mass protests broke out in the southern oil-rich province of Basra, Iraq, in 2018 and 2019, with people demanding better public services, including access to water

DW *So it could be an interstate conflict, but it could be intrastate as well between various stakeholders in society?*

Charles Iceland When you have violent conflict, it usually plays out at a subnational level. While you have international conflicts over water, those are rarely resolved through violence. So, for example, we have India and Pakistan wrestling over water in the Indus. We have Iraq and Turkey wrestling over water in the Tigris and Euphrates. We have Egypt and Ethiopia wrestling over water and in the Blue Nile Basin. The parties try as much as they can to resolve the issues in a nonviolent way through diplomacy.

DW *Will we see a future of water wars and water as the new oil?*

Charles Iceland Both, like a lot of metaphors, are not really accurate. Wars are rarely fought over water as a single issue. Rather, we see the problem as a threat multiplier. So it's one issue in the background. If you have other issues leading to instability, maybe problems between ethnic groups or anything could trigger violence, the background of having water scarcity, has destabilized the society and made it less able to resolve problems amicably.

DW *How much of a role does climate change play in water scarcity or water quality?*

Charles Iceland We have trouble attributing any particular drought or flood to climate change, but we are seeing very dramatic increases in the incidence and severity of drought in parts of sub-Saharan Africa and the Middle East. So we're having a general decline in rainfall in some of these areas. In some of these areas, the amount of rainfall stays the same but you have very large intermittent drought and flood periods. That's what's been predicted by climate change experts.

DW *What other factors can lead to water scarcity?*

Charles Iceland The management of water resources is a critical factor. So people, in theory might have enough water in some places, but they're mismanaging it. They're losing water. They are polluting the water. And then there are upstream, downstream issues. There are many instances where the upstream users are accessing water, but downstream users suffer because they're getting less water.

DW *What exactly is the Water Peace and Security tool?*

Charles Iceland We're a consortium of nine organizations in the United States and Europe that are working together to both try to identify hotspots of water insecurity and then try to help local people and the global community do something about this to either avoid conflict or minimize the impacts of conflict. So we've developed a machine learning based model that tries to predict where conflict might break out in the next 12 months. We're using a number of factors – political, economic, social, demographic – that might point at imminent conflict. And to that group of indicators, we add water and food insecurity indicators. We try to identify these hotspots, whether they are water related conflicts and what are the drivers of the conflict.

DW *How can you resolve a water conflict?*

Charles Iceland There are lots of examples on the subnational and international levels where either global or national entities have brought competing [water] users together.

A very good example of this was in 1960, the World Bank brought the governments of India and Pakistan together to develop a treaty that divided up the water in the Indus River Basin. That treaty has come under pressure recently but it's still been able to keep India and Pakistan from having problems boil over – at least to date.

19.03.2020
Jennifer Collins conducted the interview, which has been shortened and edited for clarity.
dw.com/p/3Z6pf

The water cycle:
Testing prior knowledge and explaining concepts

Duration: 45 min

Brainstorm the water cycle with project participants to gain an insight into their existing knowledge of the topic. The following questions may help:

1. *What is the water cycle?*

2. *What different states and forms can water come in?*

   Answer Solid e.g. as ice or hail; fluid e.g. as rain or sea, river or lake water; a gaseous state in the form of clouds. Solid, liquid and gas are the three physical states of water.

3. *Where does water appear in large quantities on our planet?*

   Answer Above ground in oceans, lakes and water courses like rivers and streams; frozen as ice in the North and South Poles, in the atmosphere as clouds

4. *Why should we talk about "water use" instead of "water consumption?"*

   Answer Experts talk about "water use" instead of "water consumption," as not a single drop of water is lost in the global water cycle. If something is "consumed," on the other hand, it is gone for good and can no longer be reused. *

Collect and cluster participants' answers on the board or a poster. This will provide an overview of the topic.

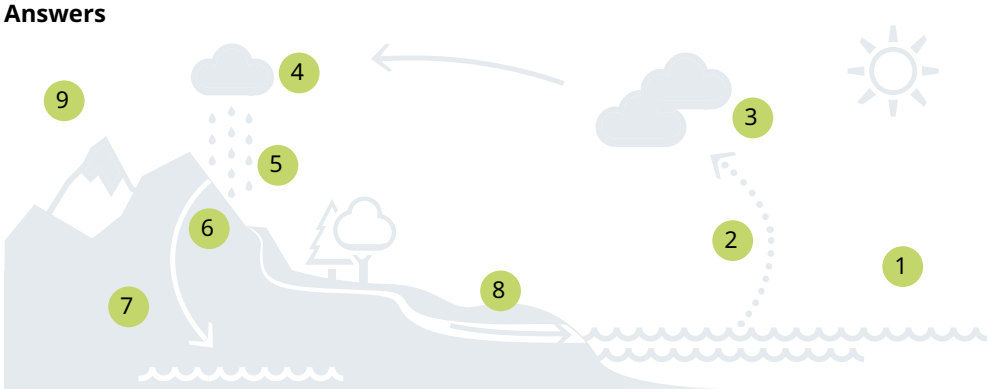
* The colloquial term "water consumption" is used instead of "water use" throughout this learning pack.

Distribute **worksheet 4** (explanatory text with diagram) on the water cycle. Give participants time to read the text. Discuss new words and concepts. These can be added to the list of words.

» Worksheet 4

Once the concepts have been explained, participants should match the highlighted words in the text to the corresponding numbers in the diagram.

Answers



The water cycle

Read the following **text** on the water cycle carefully. Match the highlighted terms with the corresponding parts of the **diagram** by entering the numbers behind each term into the appropriate field e.g. 1.

Our drinking water's journey
By the time a drop of water finds its way into our bottles or glasses, it has often undertaken a long journey. The water cycle shows the various stages of this voyage, during which water takes on various forms.

From the sea to the skies: How salt water becomes freshwater
Humans can't drink salt water from the ocean (1). But that changes when the sun warms up the surface of the water. When temperatures rise, countless tiny drops – invisible to the naked eye – rise into the atmosphere as vapor. During this evaporation (2) , the salt remains in the sea and the salt water becomes freshwater.

The journey back to Earth: Why it rains
The vapor can appear in the sky as clouds (3). Because it's colder higher up in the atmosphere than on Earth, the water vapor cools and reforms into tiny droplets – scientists call this condensation (4). When it gets even colder, the tiny water droplets collect to form bigger drops. When they're heavy enough, they fall back to Earth as precipitation (5). Depending on the temperature, this can take the form of snow or rain.

Hidden water: How rivers stay topped up
When it rains, some of those water droplets seep into the soil. This infiltration leads to the creation of out-of-sight underground lakes (6). Due to natural processes, this groundwater (7) comes back to the Earth's surface in the form of springs, which feed lakes, streams and rivers that eventually lead to the ocean.

The forest: Nature's air conditioner and drinking water delivery system
If you take a walk in a deciduous forest in high summer, you can feel the process of evaporation as it occurs in rivers (8) and oceans. As trees store water, evaporation occurs via their leaves. Rising water vapor cools the air. The amount of water on Earth remains the same, regardless of whether it's hidden in plants, glaciers (9) or up in the sky. That's because water droplets are contained in an eternal cycle as old as the planet itself. Our supply of this precious resource is secure only if this cycle remains intact.

Living with water scarcity – an example from Cairo

Duration: 30 min

Distribute **article 2** "Staying hydrated in Cairo, Egypt" to the participants. You will find a copy included in the learning pack. ***» Article 2***

Distribute **worksheet 5** (questions about the article) and go through the questions with participants. Give the group time to read the text. They may read it themselves or take turns reading sections of the text out loud. ***» Worksheet 5***

Allow the participants to work quietly on the answers. Once they have finished, discuss the answers as a group.

Answers

1. "Her daily life is restricted by a pipe system that works only for seven hours from the early morning and total water shutdowns that can last weeks."

2. Water from boreholes is contaminated with runoff from industry and agriculture.

3. The authorities are building treatment plants to treat wastewater.
   New desalination plants are being constructed. In Cairo, water-saving taps are being installed (in mosques and public buildings), leaks are being fixed.

4. Agriculture is responsible for 80 % of water consumption.

5. Flood irrigation; planting water-intensive crops such as rice, wheat and tomatoes.

Questions about the article "Staying hydrated in Cairo, Egypt"

Read the **article** "Staying hydrated in Cairo, Egypt" carefully. You will be introduced to Suzan Ghany, who has access to water for only a few hours a day. Sometimes she has no water at all.

Answer the following questions:

1. For how many hours each day does the water supply work in Suzan Ghany's house in Cairo?

   .....

2. What are the problems that arise when locals drill their own wells to access water?

   .....

   .....

   .....

3. What is the government doing to ensure the population has access to water?

   .....

   .....

   .....

   .....

4. What is most of Egypt's water used for?

   .....

   .....

5. What water-intensive practices are used in the agricultural sector?

   .....

   .....

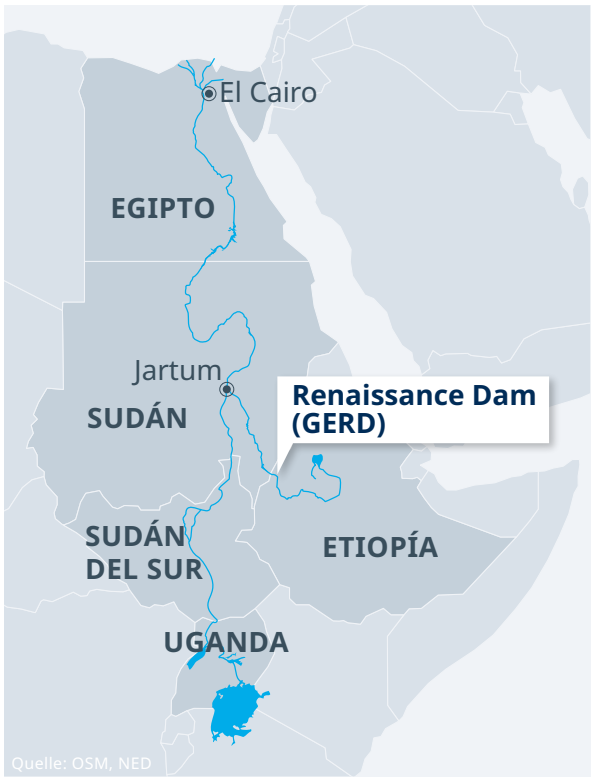
   .....

Staying hydrated in Cairo, Egypt

Water is hard to come by in Egypt, which receives little rainfall and is mostly desert. Already below the UN's threshold for water poverty, Cairo is on its way to "absolute water scarcity." Residents of the densely populated city, one of Africa's largest metropoles, face daily water challenges.

Egypt is home to much of the Nile, Africa's longest river, whose fertile banks nurtured some of the world's first cities. For millennia, Egyptians have relied on the Nile to drink and feed crops.

But its waters surge from springs over which Egypt has little control.



Egypt is the Nile's most downstream country. The Blue Nile starting in Ethiopia and the White Nile flowing from the African Great Lakes region join in Khartoum, Sudan, before flowing into Egypt.

Some 1,200 kilometers from Egypt, Ethiopia is building what is set to be Africa's biggest source of hydroelectric power: the Grand Ethiopian Renaissance Dam (GERD).

As the GERD reservoir fills, it could reduce the Nile's water supply by up to 25 %, a study from the University of Maryland found in 2017.

Climate change, which is set to increase evaporation and make rain patterns more erratic, will leave less water to share out. And in hot and dry years with little rain upstream, the GERD's effects on the Nile could be catastrophic. Egypt fears the GERD will limit water for its growing population, which already stands at 100 million.

Even as it reduces flow, the dam could help long-term water security by storing water in wet years and releasing it in dry ones, if the countries through which the Nile flows agree to share it fairly.

Egypt and Ethiopia have yet to agree how much water the latter will allow through the dam as it fills, and over what period of time. Bitter negotiations regarding water rights between Egypt, Sudan and Ethiopia have threatened to flare into war as recently as October.

In Greater Cairo – a sprawling metropolis of 20 million people that is predicted to grow by a further 9 million by 2035 – population growth will strain the city's ability to cope. Residents of poorer suburbs bear the brunt of water scarcity.

Suzan Ghany, a journalist, lives in Giza, a city on the west bank of the Nile within Greater Cairo. Her daily life is restricted by a pipe system that works only for seven hours from the early morning and total water shutdowns that can last weeks.

"When the water returns, you fill bottles, pans, anything you could find," says Ghany, who spends an hour at a time filling bottles to use later. She filters water for cooking and drinking and uses unfiltered water for cleaning, washing dishes and in the bathroom.

In her neighborhood of Kafr Tuhurmis, 786 households are not even connected to the public water network, official data shows. They rely mostly on bottled water, wells and pumps. Both those with mains supply – such as Ghany – and those without have taken matters into their own hands.

Most houses on the street have drilled for groundwater and use motor pumps to compensate for low pipe pressure. But when residents of her building took that step, says Ghany, the water was not suitable for human use. Industrial wastewater and agricultural runoff plague the Nile, with factories and farms offloading pollutants that sully the river and leach into groundwater.

In October, Egypt's Ministry of Water Resources and Irrigation hosted Cairo Water Week, an international conference responding to water scarcity. The Egyptian government is focusing efforts on infrastructure, farmers and families.

"Egypt has caught up tremendously in the last few years with regards to scarcity," says Helmy Abouleish, director of SEKEM, a farming and research organization that invests in sustainable agriculture and has converted desert near Cairo into fertile oasis. "For the first time the government is aggressively addressing this issue in public."

Egyptian authorities are building sewage plants to recycle water and desalination plants to remove salt from brackish groundwater and the sea. In Cairo, they are installing water-saving taps in public spaces, government buildings and even mosques, where washing rituals take place several times a day. They are also trying to fix leaky pipes and inefficient taps.

But distributing water fairly is as important as reducing wastage, says Harry Verhoeven, a Qatar-based researcher who has written a book on the politics of the Nile. Egypt relies on the river for 97 % of its water needs. "What the number veils, of course, is how that water is allocated internally."

Eighty percent of Egypt's water is used in farming, with inefficient practices such as flood irrigation compounding shortages, as well as water-intensive crops such as rice, wheat and tomatoes. Despite pressing water scarcity, Egypt was a net exporter of rice until 2016, after which it intermittently banned exports. Official data is not publicly available, but a report in 2018 by Transparency International, an NGO, found that the Egyptian military has "unrivalled power over public land" and owns, through an agency, several of the country's major water and agriculture firms.

"As long as people are unwilling to talk about distributional questions – and the ways in which water and environmental issues more broadly are linked to political power – [it] is going to be very difficult to make any progress," said Verhoeven.

Dezember 2019
Author: Ajit Niranjan
dw.com/african-megacities
(shortened extract)

Self-reflection: My water consumption

Duration: 30 min

Distribute **worksheet 6** (table of consumption) to the participants. Each participant should use the table to reflect on their daily water usage habits. Where no average is given in the table or the average values fluctuate greatly, the participants should try to estimate themselves how much water they really consume.

» Worksheet 6

Use a glass, bucket, watering can or another container to estimate the average for activities such as cooking, drinking or cleaning. For dishwashers, toilets or bathtubs, it's helpful to know the manufacturer or model or to research the national average.

Ask participants to read out their overall results and discuss what each person learned in the group.

Touch on the following questions:

1. When the participants compare their water consumption, what are the main differences and similarities?

2. How does each participant's water consumption compare to average consumption in other countries?

   Use the list with average water consumption in cities from **worksheet 2** for this task: Water consumption (per person and day) – New York 447 liters, Berlin 114 liters, Beijing 100 liters, Kampala 24 liters

   Do the participants use more, less or around the same amount of water?

3. What happens to the water once it flows down the drain? Where does it end up? Is there a treatment plant in the region?

My water consumption

Figure out how much water you need in a day by filling out the **table** below.

Write other activities for which you use water in the free spaces on the table.

Not all amounts are easy to quantify. For instance, bathtubs come in different sizes and older flush toilets use more water than modern water-saving ones. When showering or washing your hands, it depends on how long you let the water run. Where there are no averages included in the table, you will have to estimate how much water you really use. Note your answers in the table.

Water consumption of ..... *(Name)* ..... *(Date)* ..... *(Place)*

Activity	**Average water consumption** (liters)	**My water consumption** (liters)	**How often do I engage in this activity each day?**	**Total** (liters)
Showering	12 – 15 (per minute)			
Brushing my teeth				
Cooking				
Cleaning				
Drinking (e.g. tea or water)				
Washing my hands	1 – 3			
Taking a bath	80 – 150			
Washing dishes (by hand)				
Dishwasher	6 – 25			
Using the toilet	3 – 26			
Washing machine	30 – 130			
Overall total				

Indirect water consumption: In which products do you find water?

Duration: 35 min

The terms “indirect” and “virtual” water consumption describe how much of the resource is used in the manufacture of consumer goods, such as groceries and clothing. Participants should learn that their daily water consumption is much higher when virtual consumption is taken into account.

Distribute **worksheet 7** (fill-in-the-blanks text) to the participants. Give participants time to read the text. They may read it themselves or take turns reading sections of the text out loud. If required, explain new terms and concepts.

» Worksheet 7

Show **film 2** “What is virtual water?” either online at *dw.com/p/3YMl6* or on the accompanying DVD.

» Film 2

You will find instructions on how to play the films on the last page of the booklet.

» Playing films

Watch the film as a group, playing it at least twice, so everyone has time to fill in any blanks they missed out the first time around.

The text provides the information in the same sequence as the film. If the participants are alone or watching in small groups, please replay the film as often as is required to fill in all the blanks. In this case, plan more time. Discuss the text with the group afterwards.

Answers

1) 8,000 liters of water **2)** cotton **3)** unseen water

4) 19,000 liters **5)** 184 liters **6)** 15,000 liters **7)** production of certain goods

8) salty toxic wasteland **9)** southern Spain **10)** Brazil

11) 3,900 liters of water a day **12)** cooking, showering and laundry

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Optional

If you have internet access, ask participants to research virtual water consumption for popular products.

Examples

Smartphone – around 1,000 liters
100 grams of chocolate – 1,700 liters
An A4 piece of paper – 10 liters

Fill-in-the-blanks text for the film: “What is virtual water?”

Watch the **film** “What is virtual water?”: *dw.com/p/3YMl6* and fill in the blanks in the text.

The terms can be found at the end of the text but are not in the correct order.
Cross out the words you have already used.

What is virtual water? Let’s take jeans as an example …
It takes around …….(1) to make one pair. That’s 53 bathtubs full. How come? Growing the ……. (2) uses most of the water — it’s a very thirsty plant. If the rains fail, cotton fields have to be irrigated.

And if the cotton is to be spun into jeans, it also needs to be colored, rinsed and bleached. That pollutes a lot of water. Virtual water is the …….(3) that goes into the manufacturing of a product.

Nearly …….(4) for one kilo of coffee, …….(5) for a kilo of tomatoes and over …….(6) for one kilo of beef.

In a country with adequate natural water resources, high consumption is not a problem. Unless of course a lot of it gets polluted.

But in many regions, water is scarce – or supplies have been depleted by …….(7).

The water level in the Aral Sea has dropped 18 meters because of irrigation in cotton fields. It’s turned part of Uzbekistan into a …….(8).

Tomatoes are cultivated in the parched reaches of …….(9) – using water piped into enormous greenhouses.

And in …….(10), where there’s a shortage of drinking water, the country’s huge coffee plantations are never short of a drop. Coffee is a major export for Brazil.

Europeans import these water-guzzling goods and by extension all the virtual water needed to produce them.

Seen from this perspective, someone living in Germany uses …….(11), slightly over the global average. But …….(12) make up only a small part of that. Most water used here is virtual water, hidden in the products around us.

3,900 liters of water a day | 8000 liters of water | southern Spain
salty toxic wasteland | cotton | unseen water | 19,000 liters
184 liters | cooking, showering and laundry
production of certain goods | 15,000 liters | Brazil

Turning salt water into drinking water in Colombia using desalination

Duration: 45 min

Distribute **worksheet 8** (questions about the film). Give the group time to read the questions. » *Worksheet 8*

Show **film 3** "In Colombia, a community goes back to school for clean water" to the group. You will find it online under *dw.com/p/2ywW3* or on the DVD. » *Film 3*

You will find instructions on how to play the films on the last page of the booklet. » *Playing films*

After the group has watched the film, allow everyone time to quietly answer the questions.

Discuss the answers with the group once the task is completed.

Answers

1. Clogged well; water scarcity; unemployment; drought; salty drinking water at the boarding school; illnesses from polluted water
2. Hasn't rained for many years (indirectly: climate change)
3. Desalination plant with water filters to produce high quality drinking water; wind and solar energy used to run this; 1,500 liters of drinking water a day
4. The boarding school provides the children with free food, clean drinking water and a place to sleep
5. Clean drinking water for pupils, fewer illnesses; to function as a role model and motivate others to build similar plants; the school, as well as locals, benefit from the sale of drinking water

Questions about the film “In Colombia, a community goes back to school for clean water”

Watch the **film** “In Colombia, a community goes back to school for clean water.”
You will also find it online under: *dw.com/p/2ywW3*

Answer the following questions:

1. What problems are the people in the film facing in Colombia?

   .....

   .....

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   .....

2. Why is it so dry?

   .....

   .....

3. How does the boarding school get clean drinking water?

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4. What does the boarding school provide for the children?

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5. What are the positive impacts of the desalination plant?

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Traditional methods for fighting water scarcity in India

Duration: 45 min

Read aloud **article 3** "India's 'water man' keeping liquids flowing despite crisis." You may also ask the participants to read the text aloud. You will find article 3 below or online under *dw.com/p/337fU*

» ***Article 3***

Discuss "water man" Rajender Singh's prize-winning solution with the group. His ecological and traditional method of supplying water has reportedly replenished 250,000 formerly dried-up wells.

Possible questions for leading the discussion include:

- 600 million people in India are "facing what is termed extreme water stress" – what does this passage from the article mean in concrete terms for people living in the area – particularly for women?
- How does Rajender Singh's method work?
- Who benefits from the method?
- Do you think Rajender Singh deserves to have won several awards for his work, including the "Nobel Prize" for water? Please give reasons for your answer.

India's "water man" keeping liquids flowing despite crisis

India is suffering from the worst water crisis in its history. But Rajender Singh has been working to restore supply to more than a thousand villages, and has rejuvenated 11 rivers using traditional techniques.

It's early morning in the northern Indian city of Alwar, 95 miles (153 kilometers) south of the capital New Delhi. Scores of women have gathered at a municipal tap to get water for their families. Each of them has brought numerous vessels to collect as much water as possible, as supply is limited.

Millions of livelihoods are under threat from India's water crisis, according to a recent report by the National Institution for Transforming India, a policy think tank.

The report says that about 200,000 Indians die every year due to inadequate access to safe water, with 600 million facing what is termed "extreme water stress."

That stress is evident when the water stops flowing from community water taps such as this one. One person left in exactly that situation was 55-year-old Morchi Bai.

Women arrive to at community taps each day to fill up on as water as they can before the source runs dry

"This is not the first time that the water supply has stopped before my turn has come. Again today, I will have to beg my neighbor for a bucket of water," Bai told DW. "The government needs to look at our problems."

Running low

India's rural poor are highly susceptible to the effects of extreme weather and climate change. As many as 63 million Indians do not have access to clean drinking water, as reported by WaterAid, a global advocacy group on water and sanitation. However, there are people battling to bring about change.

Rajender Singh, popularly known as the "water man of India," has brought water back to more than a thousand villages, and has rejuvenated 11 rivers which are now flowing year-round as a result of conserving water through earthen bunds – embankments built to hold water in a catchment area.

For his community-based water management efforts, he has been granted the Ramon Magsaysay award, and the Stockholm Water Prize – sometimes referred to as the "Nobel Prize" for water.

Singh's organization Tarun Bharat Sangh is located just 40 miles from Alwar, in the village of Bheekampura. But water levels at the two locations are considerably different.

Bheekampura is a naturally arid area, but with the lush, green leaves of trees rustling in the breeze, the atmosphere is pleasant; the water stress evident in Alwar is not apparent here. Earthen dams, built by the locals to capture and conserve rainwater, are a common sight.

For 92-year-old Shyoji Ram, the memories of building one such dam alongside his fellow villagers in Bheekampura, under the guidance of Rajender Singh 34 years ago, remain clear.

He compares a dark past with a much brighter present. "There is a massive difference," Ram told DW. "What once was barren land is now filled with water and blooming trees. The river which used to run dry now overflows sometimes."

Working with others, Singh blocked monsoon streams and used hills slopes to gather the water. “Rajender’s technique has helped the village see water again,” Ram said.

Women at the frontlines

Ram is speaking at a so-called water parliament – a community forum where hundreds of farmers have gathered to discuss issues around water. The forum is taking place at Bheekampura, and caters to residents of Alwar and surrounding districts. It is an inclusive gathering in India’s multi-layered society, with men and women of many different castes and creeds taking part.

At the event, Singh thanks people for their efforts in protecting local water supplies. “A community management system is the best method to deal with natural resources,” he said.

“We were able to build 11,800 annicuts [dams in India constructed in order to supply waterways leading from it], check dams, and bunds in the last 34 years. We were also able to restore water to around 250,000 wells that had long since run dry.”

Addressing the assembly, he explains how “johads,” or earthen dams – an ancient Indian method for catching rainwater – can prevent flooding and raise groundwater levels.

The dam’s low walls help slow water flow in the wet season, and allow water to percolate into the earth. It remains there once dry weather returns.

Women are often at the frontlines of water stress in India. One of them, Lakhi Bai from the district of Karauli, is attending the parliament to learn ways to combat the severe shortages she faces. “Rajender advised us to form self-help groups for women to construct water harvesting structures to catch and store rainwater,” she told DW.

Each structure, with a storage capacity of 1,500 cubic meters per hectare [21,500 cubic feet per acre], was able to raise the water table by about 6 meters [20 feet]. “This was quite evident to see in the wells,” Bai said.

“The day when no water is left”

Singh emphasizes the urgency of India’s current water crisis, saying action must be taken immediately. He thinks that developing an effective system for the management and utilization of water that can be collected in vessels, as well as groundwater, is absolutely essential.

“When India achieved independence from British rule in 1947, only 232 villages were devoid of drinking water – but the number has today increased to 250,000,” he pointed out.

Droughts have increased tenfold, while the chance of flooding is eight times higher, he continued. “Most of the water bodies are facing the effects of pollution, encroachment, sand mining and water extraction.”

India holds just 4 percent of the world’s freshwater, despite having 16 percent of the world’s total population. It is expected that by 2030, water demand in India will have doubled. That could mean severe water shortages for hundreds of millions of people.

Indian Water Minister U.P. Singh is well aware of the potential catastrophe, and the importance of sustainable supply for the future. “India is the world’s largest user of groundwater, accounting for 25 percent of the global total. The aquifers are drying up, and with the way the water is being exploited ... there may come a day when there is no water left.”

Such a looming bottleneck makes the work of Rajender Singh all the more pressing.

14.08.2018 | Author: Jasvinder Sehgal (India) | dw.com/p/337fU

Harvesting drinking water with fog catchers in Morocco

Duration: 45 min

Distribute **worksheet 10** (questions about the film) to the participants. Give them time to read the questions. *» Worksheet 10*

Show **film 4** "Fishing for water in the clouds" to the group. It is available online under *dw.com/p/2SJr5* or on the DVD. *» Film 4*

You will find instructions on how to play the films on the last page of the booklet. *» Playing films*

Please allow the participants time to answer the questions. Discuss the questions with the group once they've completed the task.

Answers

1. The nets catch fog by collecting water droplets in the weave of their fabric. The water can then be used for drinking.
2. Agriculture and livestock farming
3. Droughts and dry periods are increasing
4. The fabric should be able to catch a good yield of water, withstand wind and be easy to install.
5. Women can now devote the time they would usually spend collecting water to learning to read and write. Children attend a water school, while the men work.
6. The water can be used to plant vegetables in a small garden near the house, for instance.

Questions about the film "Fishing for water in the clouds"

Watch the **film** "Fishing for water in the clouds." You will also find it online under *dw.com/p/2SJr5*

Answer the following questions:

1. How do the fog catchers work?

   .....

   .....

   .....

2. What do the people in the area live from?

   .....

3. What effect is climate change having on the area?

   .....

   .....

4. Different kinds of fabric were tested to improve the fog catchers?
   What should the fabric ideally be able to do?

   .....

   .....

5. How has daily life for those in the area changed since they got piped water at home?

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6. Do you have any other ideas for what people could do with piped water?

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Surprising ideas for how to save and treat drinking water

Duration: 45 min

Distribute **article 4** "Innovative clean water technologies" to the participants. You will find a copy below or online under *dw.com/p/341So* ***» Article 4***

Distribute **worksheet 11** (group work) to the participants and divide everyone into groups of roughly the same size. Assign each group one of the technologies written about in the article. Give the groups five minutes to read their assigned sections. ***» Worksheet 11***

Afterwards, they should discuss the questions on worksheet 11 and note important points.

Each group should appoint a person to present their innovative technology to everyone.

Each participant should then decide for themselves which innovation is most effective. To do so, write the subheading for each of the four technologies on the board or a poster and ask the participants to mark their favorite with a sticker or color.

This will provide an overall picture of what the participants think is the best technology. Which innovation was most popular? Discuss the results with the group.

Group work on innovative technologies

Split up into groups and have the **article** "Innovative clean water technologies" to hand. You will also find it online under *dw.com/p/341So*

Each group should take a closer look at one of the technologies by reading their assigned section and answering the questions. Choose one person from your group to give a 2 to 3-minute presentation on that technology to the class.

Innovative technology: .....

1. What is the current situation? What problems are people facing?

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2. How does the technology work?

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3. What advantages does the solution offer to deal with the current problem?

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4. Who would benefit from this new technology? How does it change daily life?

.....

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Innovative clean water technologies

Clean fresh water is scarce throughout much of the world, with more than 2 billion people lacking safe drinking water at home. And climate change is adding to the stress. These innovations could help.

Producing drinking water, no power needed

In many parts of the world, the problem isn't just a shortage of water, it's that the available water is dirty. Not surprising considering that 80 percent of the sewage in developing countries is discharged untreated.

That's where devices like the *SunSpring Hybrid* come in. The shiny cylinder houses a self-contained water filtration system that can turn more than 20,000 liters of dirty water into drinking water every day.

Perhaps more importantly, it can be set up quickly just about anywhere, as long as there is a water source like a river or a well nearby.

Built-in solar panels and an optional wind turbine means it doesn't need a power supply, which means it could be used in remote regions without access to electricity or places hit by extreme weather events or natural disasters.

Drinking fog

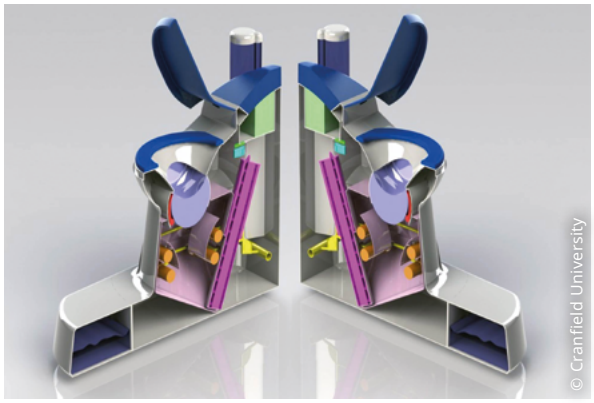
There are those places where even dirty water is scarce, like the Atacama desert in northern Chile, or parts of the Anti-Atlas Mountains in Morocco. One thing those places do have in common though, is a lot of fog. But you can't drink that. Or can you?

Fog collectors make the seemingly impossible, possible. As the misty mass passes through the weave of large vertical nets, tiny droplets of water get caught on the fabric and slowly trickle down the meshing into a collection system.

The idea isn't new, but people have been tinkering to make fog collectors more efficient and durable, and to bring the technology to the remote areas that are ideally suited for its use.

Don't flush

But getting your hands on clean water isn't everything. Using it economically is very important too. One place where we waste a lot of water is the toilet. A single flush on a traditional US toilet can use up to 26 liters of the precious resource. At the same time, one third of the world's population still doesn't have access to a real toilet, a massive burden on the environment and a major health risk. So how can we provide toilets to those who don't have them and avoid flushing so much water down the pan?



The *Nano Membrane Toilet* just might do the trick. The odorless high-tech toilet uses no water or external power and turns excrement into water (though not of drinking quaity) and ash, using the biomatter as an energy source in the process. And as futuristic as this may sound, it's no pipe dream. The design by researchers at Cranfield University won the Bill & Melinda Gates Foundation "Reinvent the Toilet Challenge" and working prototypes are already being tested in the field.

Floating farm

About 97.2 percent of water on the planet is salty, making it unsuitable for the cultivation of food. But Leilah Clarke, a design student from the University of Sussex turned that notion on its head when she created floating farm pods that generate their own fresh water.

The idea is quite simple: As the pods float on the ocean, water evaporates below them and rises in the dome. When the vapor hits the glass, it condensates and runs down the sides, watering the plants growing inside. While still a prototype, farms like this, floating off the coast of sun-drenched desert countries could provide food without tapping into limited groundwater.

30.08.2018
Author: Harald Franzen
dw.com/p/341So

Planning a water project

Duration: 90 min

The aim of this section of the learning pack is to plan and implement a project that would improve the water situation where the participants live. Discuss the challenges and problems relating to water in the area. Is clean drinking water always available? Have participants noticed water being wasted? Where do these problems occur e.g. at school, at home or in a certain establishments in a village, town or city?

Possible questions to lead the discussion:

- Where is water consumption too high, and why?
- Where is accessing drinking water difficult, and why?

Potential problems:

High water consumption when watering the schoolyard or garden; old, water-guzzling flush toilets at home; students who are unable to bring enough water from home to drink at school.

Form groups of maximum five participants and distribute the worksheets. Participants can jot down their initial thoughts on the project on **worksheet 12.1** (project plan). The groups should formalize the steps they need to take to realize their project on **worksheet 12.2** (project workflow) and present these plans to the class.

» *Worksheet 12.1*

» *Worksheet 12.2*

You may use the following phrases to explain the tasks required for each worksheet:

Tasks for participants

Worksheet 12.1 – project plan
Decide with the group which water challenge you wish to address and fill out the project plan in bullet-point form.

Worksheet 12.2 – project workflow
What concrete steps will you need to take to complete your project? Include deadlines in your workflow. Write down each step in one of the fields and note who should complete the task and by when. Every project is different, and you may leave some fields blank or add extra ones as required.

Structuring your project into two phases, namely "preparation" and "implementation" will help you complete your plan.

Nominate someone in the group as a speaker, who will present your project to the class. Try to take critique of your project on board and if necessary, rework your project workflow after the presentation.

Tip For projects with many steps, participants can copy the workflow to a larger piece of paper, so they have more space.

Project plan: Our water idea

Project participants .....

Date .....

Area ○ School ○ At home ○ In the village/town/city .....

---

1. What **water challenge** would we like to address? What is our **goal**?

   .....

   .....

2. We want to solve this problem with the following **idea**:

   .....

   .....

3. What **materials** do we need for the project?

   .....

   .....

   .....

4. Do we need **money** to implement our idea? Where can we get such funding?

   .....

   .....

5. Who would we like to **support** our project? Who do we need to contact to get approval, a permit or official **permission**?

   .....

   .....

   .....

6. **Schedule:** When do we want our project to begin and end?

   .....

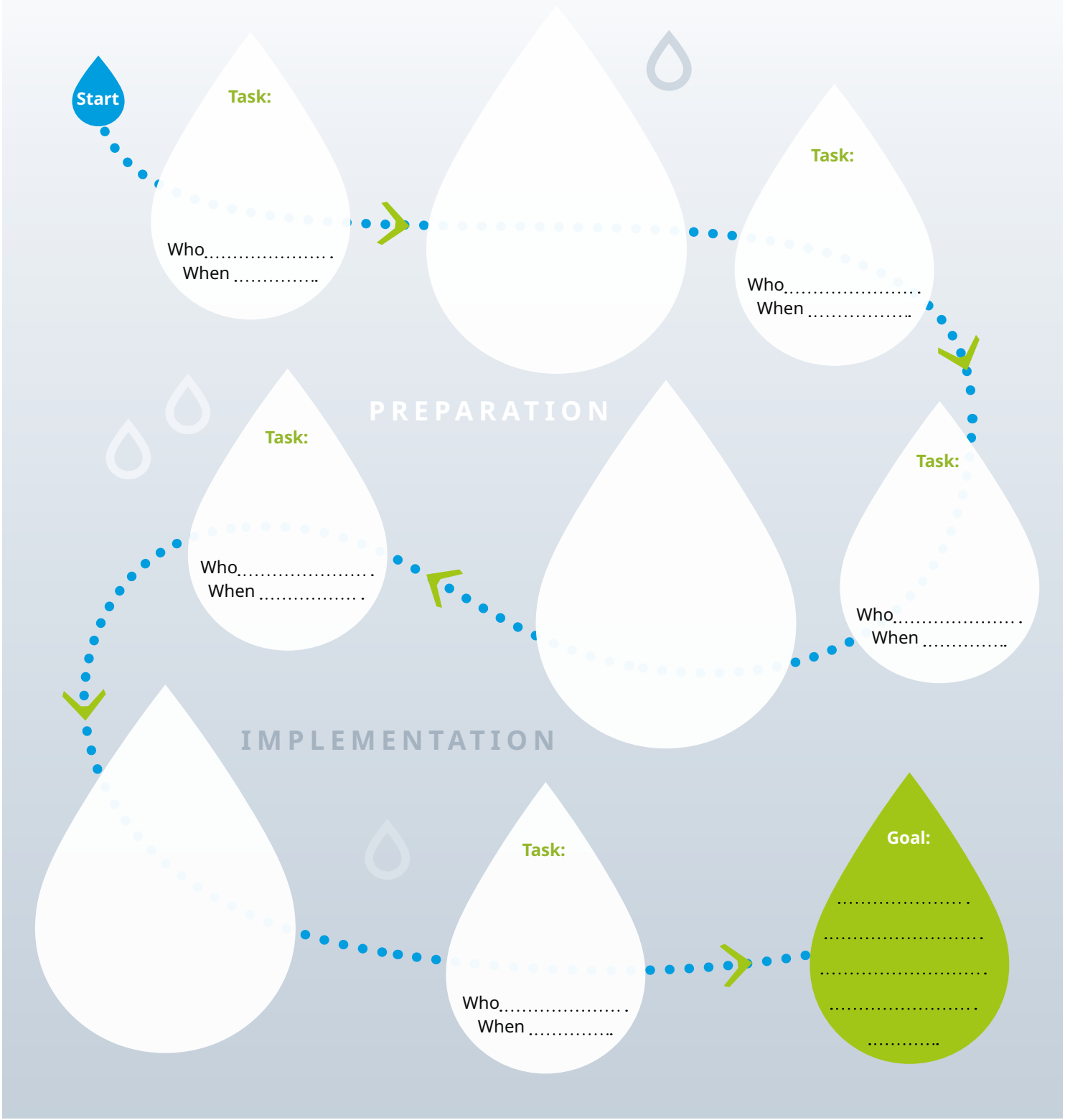
   .....

7. What do we want to call ourselves? Think of an interesting **name** for your project.

   .....

Project workflow

Project name .....



Experiment 1:
Building a mini water filter

Duration: 40 min

Discuss the following questions with the group before starting this section:

- Where have the participants previously encountered the idea of water filtration? Refer to the water cycle introduced in module I.
- Where in the water cycle does natural filtration occur?

Distribute **worksheet 13** (experiment instructions). Go through the instructions step-by-step with the group and clarify any open questions. Divide the participants into groups of three or four. *» Worksheet 13*

Discuss the materials that are required, as well as the assignment of various tasks within each group. Each of the groups will make a mini water filter. Participants may also work alone as an alternative to group work.

WARNING

The water filter can only remove large particles. Invisible contaminants and pathogens will not be filtered out. The participants should not drink the filtered water.

Optional **Further experimental tasks**

- The water is still dirty? Then filter it again.
- If the water is flowing through the filter too slowly, participants can make more holes in the cap or widen the existing ones.
- What happens if the participant's make larger holes or remove the cap?
- Participants can try different filtration layers. What happens if they use a coffee filter instead of a t-shirt?
- What happens when an additional filtration layer is placed between the charcoal, sand and pebbles?

Building a mini water filter

Mineral water comes from deep underground. On its journey, it passes through a natural filtration system of soil and rock. This experiment will allow you to simulate the underground journey of water droplets by building a mini filter.

What you will need

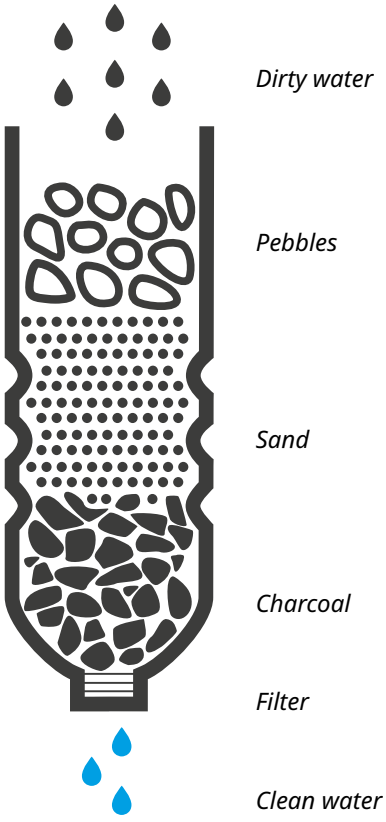
- 1 **plastic bottle** with a cap
- **Scissors** (or a sharp knife)
- **Hammer** (or a large stone)
- A cup of **coarse sand**, a cup of **pebbles** and a cup of **charcoal** (e.g. from a campfire or barbecue coals from the supermarket)
- 1 paper **coffee filter** (or fabric scraps such as an old t-shirt)
- **Bucket** or a bowl
- A **stick** to mix the dirty water (with soil, leaves, etc.)

Warning:
Don't drink the water!

The water filter can only remove large particles. Invisible contaminants and pathogens will not be filtered out. Therefore, please don't drink your filtered water.

Instructions

1. Smash the **charcoal** with a **hammer** or large stone to make the pieces as small as possible.
2. Cut off the bottom of the **bottle** (it will be used later to collect droplets) and carefully make two or three small holes in the cap with the **scissors** or knife.
3. Place the **coffee filter** or fabric in the upside-down bottle.
4. Fill the bottle with layers of **charcoal**, **sand** and **pebbles**.
5. To make the dirty water, fill a **bucket** or bowl with water and add soil, tiny sticks and leaves or grass. Give it all a good mix with the **stick**.
6. Ask someone to hold the "water filter" over the bottom of the bottle you put aside earlier to catch the droplets. Pour the dirty water slowly over the first layer so that it doesn't overflow.
7. If the mini filter is working properly, the water should be clear when it drops out.



Experiment 2:
Water cycle in a jar

Duration: 40 min

Distribute **worksheet 14** (experiment instructions). Go through the instructions step-by-step. Clarify any open questions.

» *Worksheet 14*

Discuss the materials that are required, as well as the assignment of various tasks within each group. Each group will create a water cycle in a jar. Participants may also work alone as an alternative to group work.

First discuss where to place the jar. A sunny, dry spot like a window sill is most suitable. Ask the participants to explain why the plant in the jar does not have to be watered with reference to the water cycle (module I).

Answers

The water in the jar circulates as it does in nature's water cycle. The water evaporates on the plant's leaves and from the wet soil. Condensation appears on the cling film. Precipitation of droplets occurs like rain in nature. Infiltration of water into the earth, where the plant absorbs it through its roots.

Optional **Further experimental tasks**

- What differences do the participants notice if they place their jar in the blazing sun for a day and in the shade for another day?

  Answer: More water droplets will appear on the cling film when the jar is in a sunny spot, as more evaporation occurs.

- What changes can be observed in the jar after one day, three days, a week and two weeks?

  Have participants noted the changes over a longer time period. Discuss the results with the group.

Water cycle in a jar

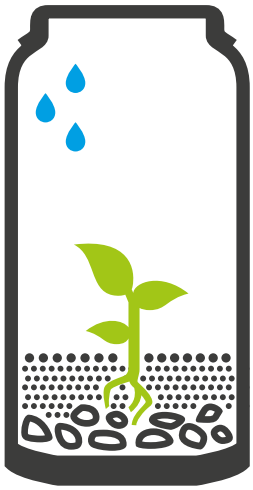
Not a drop is lost on water's never-ending journey. For that reason, the amount of water on the planet doesn't change. This experiment allows you to simulate the water cycle.

You will need:

- 1 big **jar** (e.g. an old mason jar)
- **Cling film** and an **elastic band**
- A handful of **pebbles** and **sand**
- Potting **soil**
- A small **plant** with roots
- A small **spade** or **trowel**

Instructions

1. Put some **sand** and **pebbles** into the jar. Put some **soil** in on top.
2. Dig up a small **plant** using a **trowel**. You can take one from a meadow, for instance, but ask an adult if you're unsure. Your plant, including the roots, should be maximum two thirds as tall as the jar.
3. Insert your plant into the soil and water it. The soil should be wet through but the plant shouldn't be standing in water.
4. Cover the top of the jar with the **cling film** and **elastic band**.
5. Place your jar in a spot with enough daylight, for instance, on a window sill.



Tip

If you want to make the experiment keep for longer, first place a layer of charcoal from your last campfire or barbecue into the jar. That will prevent mold from growing. But the experiment will still work if you don't use charcoal.

Instructions for playing films

You have several options for playing the films accompanying this learning pack:

1. Playing films from DVD

If you have a hard copy of the learning pack, you will find all the films in two formats on the accompanying DVD. You can play the films using a DVD player (PAL format). You will also find the films as mp4 files on the DVD. These can be played on a computer.

2. Playing films from the internet and download

If you don't have the learning pack DVD, you can download or stream all the films directly from Deutsche Welle's website. You will find the film links in the handouts, as well as in the module overview. We recommend you download the films before class to ensure your lessons run smoothly.

To download the films, follow the links in the handouts and module overview. Then click on "Download Save MP4 file." You can save the film as an mp4 file on your computer or mobile storage device (e.g. USB key). Downloading the material can take between a few seconds and a few hours depending on the speed of your internet.

Note: **Good sound quality**

If you're playing the films on a projector connected to your DVD player, PC or laptop, we recommend you use loudspeakers.

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, web specials 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 answer complex questions like "does global warming really exist?" 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.

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