

3.2 Water in our everyday life – drinking water and waste water

Graduate Biologist, *Silvia Schubert*, ANU Hamburg e.V.

Short description and goal

In Germany, the supply of clean drinking water and sanitation is guaranteed throughout the country. High technical standards ensure that we get well controlled water from the tap every day and that the waste water from our households is purified in sewage plants.

Not so in many developing countries. There the lack of access to clean drinking water and sanitation causes a lot of disease, which in turn leads to high infant mortality.

The United Nations formulated eight fundamental millennium goals, one important point is: to halve, by 2015, the proportion of the population without sustainable access to safe drinking water and basic sanitation in comparison to 1990). (Source: www.un.org/millenniumgoals/environ.shtml)

The goal of this unit is: The participants should be made aware of the importance of clean drinking water in their everyday life. By using different methods, the participants focus on their own water consumption; they get an idea how to save drinking water; and they get ideas about how to avoid water pollution.

Basic conditions

Target group Children and youth aged 10-14 with or without parents
Location Class room or open air class room with tables and seats, access to water inside and outside
Materials..... see worksheets
Time frame..... approximately 3 hours

Background knowledge

Drinking water

Every inhabitant in Hamburg has an average water consumption of approximately 110 litres per day (see illustration on page 25); only 3-5 litres are needed for cooking and drinking, the greatest part is used for flushing the toilet, showering and washing.

In Hamburg a municipal enterprise is responsible for the supply for drinking water and for the sanitation (Hamburg Wasser: www.hamburgwasser.de).

The demand for drinking water is covered 100 % via groundwater, e. g. from the region of the »Lüneburger Heide«, a heath landscape to the south of Hamburg. To protect this

1

Education partner and target group, content and goal

2

Abstract of the examined themes and target group

3

Eight Concepts on water issues

3.1

Experience of water by working at learning stations

3.2

Water in our everyday life

3.3

Research on waterbodies, organisms and water quality

3.4

Water Art on paper

3.5

Water and climate change

3.6

Water and history

3.7

Water and energy

3.8

Water games

4

Attachment

unique cultural landscape it is important not to take out too much groundwater – one more reason not to waste this precious resource.

Although water is the best controlled beverage in Germany, many people don't use tap water for drinking, but buy mineral water in bottles instead – with significant impact on the environment. Water in non-returnable packaging, increasingly sold in the large discounter shops, is transported over long distances (250 km on average) and causes a huge amount of plastic waste (hereafter PET). Water in refillable glass-bottles produces only half the amount of climate killing carbon dioxide (CO₂) than water in disposable packaging. Reusable bottles get refilled 50 times or more, and are only transported over short distances (50 km on average). The best CO₂-balance, however, is achieved by using tap water: no additional transport and no packaging is necessary.

Waste water

More than 95 % of household waste water in Germany is purified in public sewage plants. Because of this, the ecological quality of rivers and lakes became much better over the past few years. Simple waste water from private households can also be purified very effectively in local reed bed treatment plants, so that the clean water which results is available for reuse again very soon. Especially in rural areas of developing countries this is an economical possibility to improve the sanitation situation.

Links

Background information

- www.hamburgwasser.de
- www.vdg-online.de/www.virtuelles-wasser.de
- www.un.org/millenniumgoals
- www.aktionsprogramm2015.de
- www.eea.europa.eu/themes/water/european-waters/european-waters-introduction
- www.eco-label.com/default.htm
- www.umweltbundesamt.de/chemikalien/waschmittel/zeichen.htm

Educational materials

- www.wasser-macht-schule.com
- www.bmu.de/files/pdfs/allgemein/ap-application/pdf/lebensstil_lehrer.pdf
- www.bne-portal.de/coremedia/generator/unesco/de/o2__Was_2oist_2oBNE/o4__Lehr__und__Lernmaterialien/Lehrmaterial_2oThemen,page=Wasser.html



Photo: River in Bitola

1

Education partner and target group, content and goal

2

Abstract of the examined themes and target group

3

Eight Concepts on water issues

3.1

Experience of water by working at learning stations

3.2

Water in our everyday life

3.3

Research on waterbodies, organisms and water quality

3.4

Water Art on paper

3.5

Water and climate change

3.6

Water and history

3.7

Water and energy

3.8

Water games

4

Attachment

Activities			
Time table	Content	Method	Material
Module1: (15 min) Smell different water samples	4-5 glass vessels with water from a pond, a creek, a dish, rainwater or a well are presented on a table; the participants shall use their own senses to find out what clean water means	All participants look at and smell several water samples, compare them, and discuss, if the water is drinkable. Variation: If there is enough time, the participants can collect the water samples themselves (4-5 groups)	4-5 glass vessels; worksheet 1
Module 2: (15 min) Taste the diversity of drinking water	4-5 glass vessels with water from the tap and different mineral waters are presented on a table: water from the local region; from another country; in refillable glass bottles; and in non-returnable plastic bottles	All participants taste and compare the flavour of different »waters«. They find out where the water comes from, how much one litre costs, and discuss.	glass vessels for everyone and different mineral waters; worksheet 2
Module 3: (30 min) Create an advertising spot for your favourite drinking water	Getting an idea of the advertising strategies of big companies	Working in groups; discuss, write down and present your spot	Paper, coloured pens; worksheet 3
Module 4: (30 min) Think about your drinking water consumption	The participants become more conscious of what they need 110 litres of drinking water every day for and visualise their water usage in concrete detail	The participants distribute lots of pieces of cloth on 6 points, each representing a different type of water consumption	About 110 pieces of blue cloths (each symbolizing 1 litre of water); graphic table that shows the solution; worksheet 4
Module 5: (15 min) Take a pantomime shower and measure how much water can you save	Visualizing one possibility of saving water	Pantomime and measuring	Stopwatch, 2 buckets; worksheet 5
Module 6: (20 min) Saving water by composting toilets	Sharing ideas about water saving measures and discussing one concrete example	Visiting a compost heap; discussion in 2 groups	Pictures of composting toilets; worksheet 6
Module 7: (30 min) Build your own waste water purification system	The participants discover how difficult it is, to get pollution out of the water by mechanical filtration.	Mixing water with detergents, ink, oil, sugar, dust... and then trying to clean it by using a sieve, gravel, sand or filtration paper.	Pots, vessels, sieves, gravel, sand, filtration paper, cotton wool; worksheet 7
Module 8: (30 min) Cleaning water in a reed bed treatment plant	The participants should understand the most important processes in a reed bed treatment plant and examine in a more detailed way water pollution in their everyday life.	Excursion to a reed bed treatment plant; know important eco-labels and discuss about alternative detergents.	Detergents, shampoos etc.; worksheet 8

1

Education partner and target group, content and goal

2

Abstract of the examined themes and target group

3

Eight Concepts on water issues

3.1

Experience of water by working at learning stations

3.2

Water in our everyday life

3.3

Research on waterbodies, organisms and water quality

3.4

Water Art on paper

3.5

Water and climate change

3.6

Water and history

3.7

Water and energy

3.8

Water games

4

Attachment

Worksheet 1: Smell different water samples

Material: glass vessels

The participants divide into four or five groups. Each group looks in the nearby surroundings for water and takes a sample in a vessel. All the samples are presented on a table and everyone can watch and smell the water samples.

Sample	Origin	Appearance	Smell
1			
2			
3			
4			

Discuss in the group:

- Would you like to drink this water?
- What could you do to make it drinkable ?
- What is the difference between this water and water from the tap?

Worksheet 2: Taste the diversity of drinking water

Material: glass vessels for everyone and different mineral waters

All participants taste and compare the flavour of different »waters«. They find out where the water comes from, how much one litre costs, and discuss their findings.

Name	Water from the tap			
Price per litre				
Taste				
Origin				
Packaging				
Non-returnable OR refillable				

Try to find out as much information as possible about each sample of water (e. g. what happens with the packaging) and discuss:

- Which water is the best choice for the environment and why?

1

Education partner and target group, content and goal

2

Abstract of the examined themes and target group

3

Eight Concepts on water issues

3.1

Experience of water by working at learning stations

3.2

Water in our everyday life

3.3

Research on waterbodies, organisms and water quality

3.4

Water Art on paper

3.5

Water and climate change

3.6

Water and history

3.7

Water and energy

3.8

Water games

4

Attachment

Worksheet 3: Create an advertising spot about your favourite drinking water

Material: Paper, coloured pens

The participants work in groups of 4-5 persons. They create on a large piece of paper a commercial. Pantomime action is also possible.

Worksheet 4: Think about your drinking water consumption

Material: About 110 pieces of blue cloth (each symbolising 1 litre of water); graphic table (next page)

First you ask the participants what they need water for every day. Then place 6 signs of water consumption in the room, representing the following fields:

- drinking and cooking
- personal hygiene (bath, shower, washing hands, brushing teeth)
- toilet flush
- dish-washing
- washing the clothes
- other (cleaning rooms, water for flowers and garden)

The participants should estimate, how many litres they need for every point and, according to this estimate, they distribute the blue cloths (each symbolising 1 litre of water). After that you can compare their estimates with the statistical averages.



1

Education partner and target group, content and goal

2

Abstract of the examined themes and target group

3

Eight Concepts on water issues

3.1

Experience of water by working at learning stations

3.2

Water in our everyday life

3.3

Research on waterbodies, organisms and water quality

3.4

Water Art on paper

3.5

Water and climate change

3.6

Water and history

3.7

Water and energy

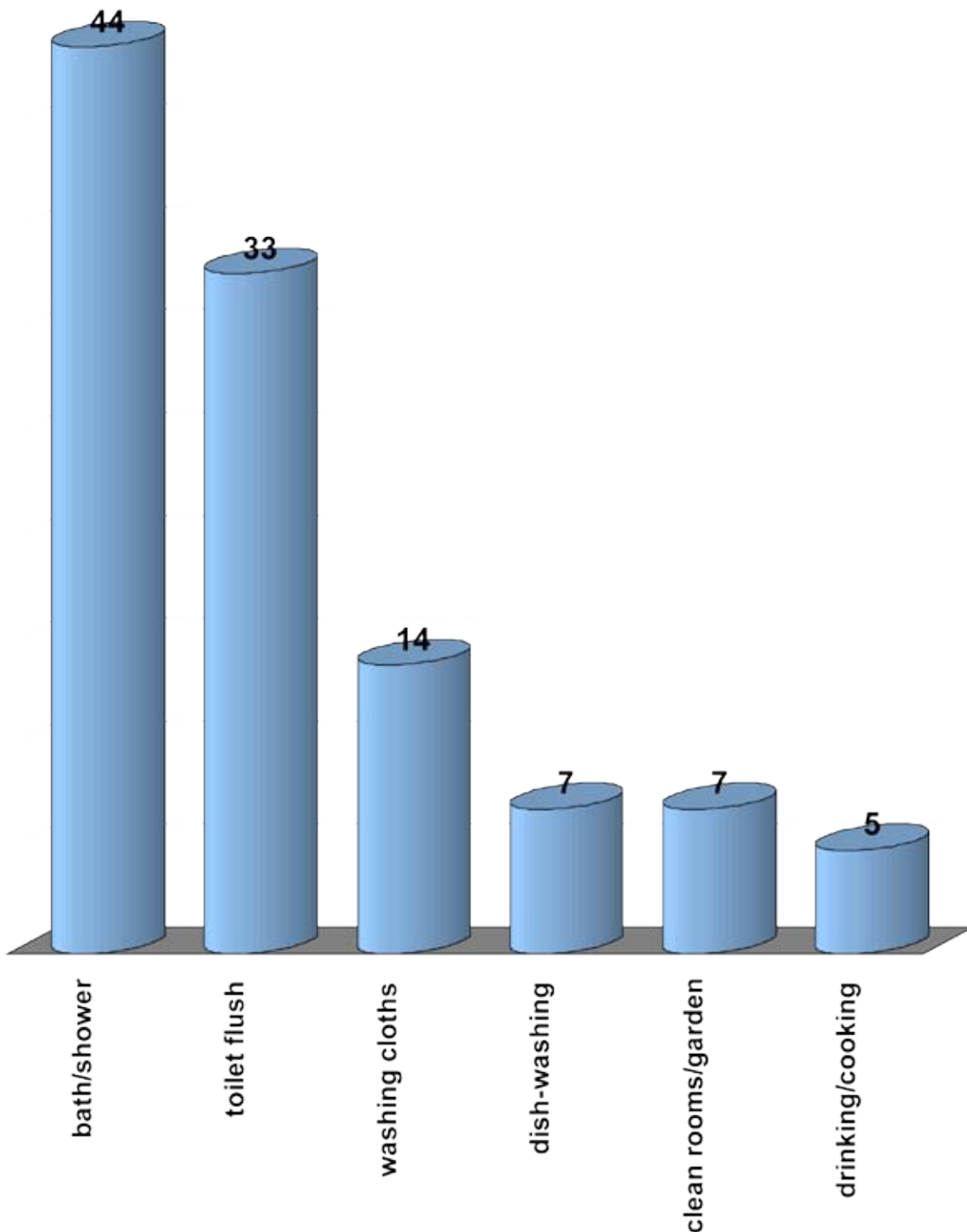
3.8

Water games

4

Attachment

110 litres every day



Statistical averages of water-consumption in Hamburg (Source: Schriftenreihe der Vereinigung Deutscher Gewässerschutz, Band 73, 2008).

1
Education partner and target group, content and goal

2
Abstract of the examined themes and target group

3
Eight Concepts on water issues

3.1
Experience of water by working at learning stations

3.2
Water in our everyday life

3.3
Research on waterbodies, organisms and water quality

3.4
Water Art on paper

3.5
Water and climate change

3.6
Water and history

3.7
Water and energy

3.8
Water games

4
Attachment

Worksheet 5: Take a pantomime shower and measure how much water you can save

Material: a stopwatch, 2 ten-litre buckets

One child takes a pantomime shower; another child keeps time with a stop-watch: how much time does it take to soap body and hair? During that time it is not necessary to let the water run. Now the children can measure how much water can be saved during one shower. They let water flow into the buckets for as long as they stopped the time for during the pantomime shower. Later the children can calculate how much water their family can save every day, every week and every year, if everyone were to stop the water while soaping during a shower.

Stopped time seconds.

Water in the buckets..... litres.

There are..... people in our family.

We take..... showers every day.

We can save litres of water every day,

litres every week and

litres every year.

Discuss other possibilities to save drinking water.

1

Education partner and target group, content and goal

2

Abstract of the examined themes and target group

3

Eight Concepts on water issues

3.1

Experience of water by working at learning stations

3.2

Water in our everyday life

3.3

Research on waterbodies, organisms and water quality

3.4

Water Art on paper

3.5

Water and climate change

3.6

Water and history

3.7

Water and energy

3.8

Water games

4

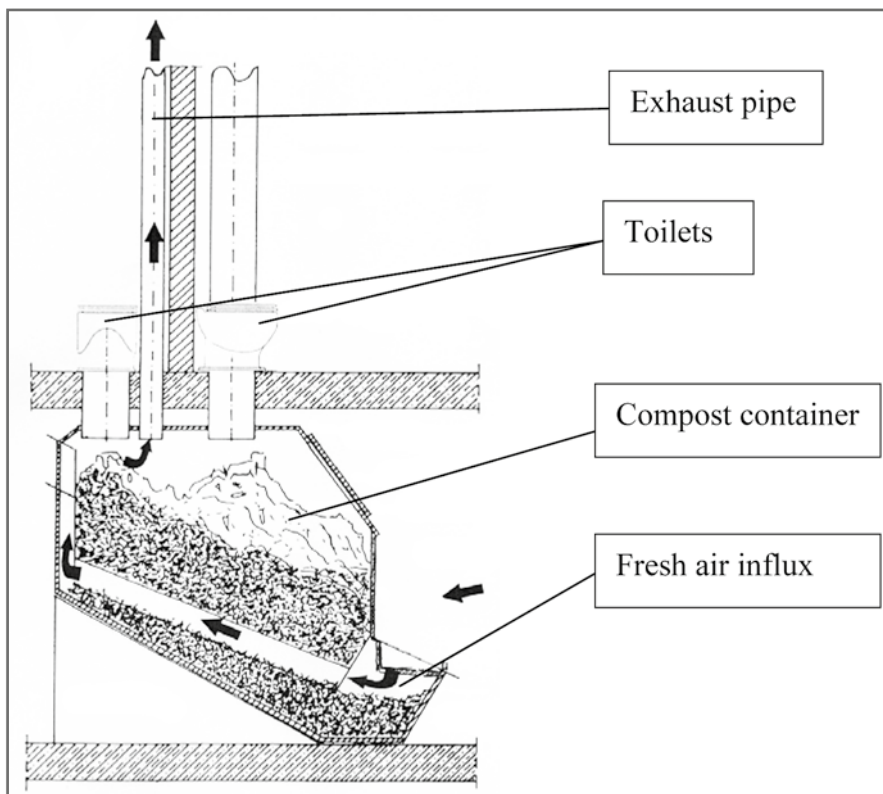
Attachment

Worksheet 6: Saving water by composting toilets

At first the group should have a look at a garden compost heap to see how different organisms convert organic waste into useful soil. Then you can explain the principle of a composting toilet (see graphic below).

- Let the participants calculate how much water and how much money one can save by using this toilet every day and every year in a family.
- Discuss in 2 groups the pros and cons of composting toilets.

Composting toilets function without any water and produce several litres of compost every year (from toilet and kitchen waste). The owner of such a toilet can use the compost as a useful fertilizer for the garden.



Source: www.berger-biotechnik.de

How much water can a family of four save by this toilet?

litres every day; litres every year (= m³)

How much money can the family save every year? Euro

(Tip: The everyday consumption of water in Hamburg is about 110 litres per person; about 33 litres of that amount are used for flushing toilets; in 2009 the fee for 1 m³ fresh-water in Hamburg was € 1.57, the fee for 1 m³ waste water was € 2.23)

1

Education partner and target group, content and goal

2

Abstract of the examined themes and target group

3

Eight Concepts on water issues

3.1

Experience of water by working at learning stations

3.2

Water in our everyday life

3.3

Research on waterbodies, organisms and water quality

3.4

Water Art on paper

3.5

Water and climate change

3.6

Water and history

3.7

Water and energy

3.8

Water games

4

Attachment

Worksheet 7: Build your own waste water purification system

Material (per group):

4 flower pots, 2 vessels, 1 sieve, 1 spoon, filtration paper, sand, gravel and cotton wool

Work in groups (3-4 children per group); each group prepares waste water in a vessel (with ink, detergents, soap, soil, oil, etc.), watches the water and writes down their observations.

Colour

Smell.....

On the surface I can see

On the ground I can see.....

Try to filter all the waste out of the water and describe step by step what you observe .

1. Pour the water through a sieve into a clean vessel.

Appearance of the filtered water

Rest in the sieve.....

2. Fill a pot half-full with gravel and pour the water into it.

Appearance of the filtered water

Rest in the pot with gravel

3. Fill a pot half-full with sand. Watch out: first put gravel on the hole in the ground, so that the sand cannot pass through, then pour the water into it.

Appearance of the filtered water

Rest in the pot with sand

4. Fill some cotton wool into a pot and pour the water into it.

Appearance of the filtered water

Rest in the pot with cotton wool.....

5. Put a filtration paper into a pot and pour the water into it.

Appearance of the filtered water

Rest in the pot with filtration paper.



Can you still see or smell any pollution in the water? Compare it with water from the tap.

1

Education partner and target group, content and goal

2

Abstract of the examined themes and target group

3

Eight Concepts on water issues

3.1

Experience of water by working at learning stations

3.2

Water in our everyday life

3.3

Research on waterbodies, organisms and water quality

3.4

Water Art on paper

3.5

Water and climate change

3.6

Water and history

3.7

Water and energy

3.8

Water games

4

Attachment

Worksheet 8: Cleaning water in a reed bed treatment plant

Material: Photo and graphic of a reed bed treatment plant (next page)

If possible visit a reed bed treatment plant with the children or show a picture of it.

Make a list:

- What kind of pollution gets into the water in your house (in the kitchen and bath)?

Look at the packaging of detergents, washing powder, shampoo etc. Can you find one of the following labels? Discuss the difference to other products.

Products with the »Umweltengel«-Label or the EU-Eco-Label:

- have a reduced impact on the aquatic environment
- do not contain specific dangerous substances
- have a limited effect on the growth of algae in water
- are largely biodegradable
- use less packaging
- contain information for correct environmental use



1

Education partner and target group, content and goal

2

Abstract of the examined themes and target group

3

Eight Concepts on water issues

3.1

Experience of water by working at learning stations

3.2

Water in our everyday life

3.3

Research on waterbodies, organisms and water quality

3.4

Water Art on paper

3.5

Water and climate change

3.6

Water and history

3.7

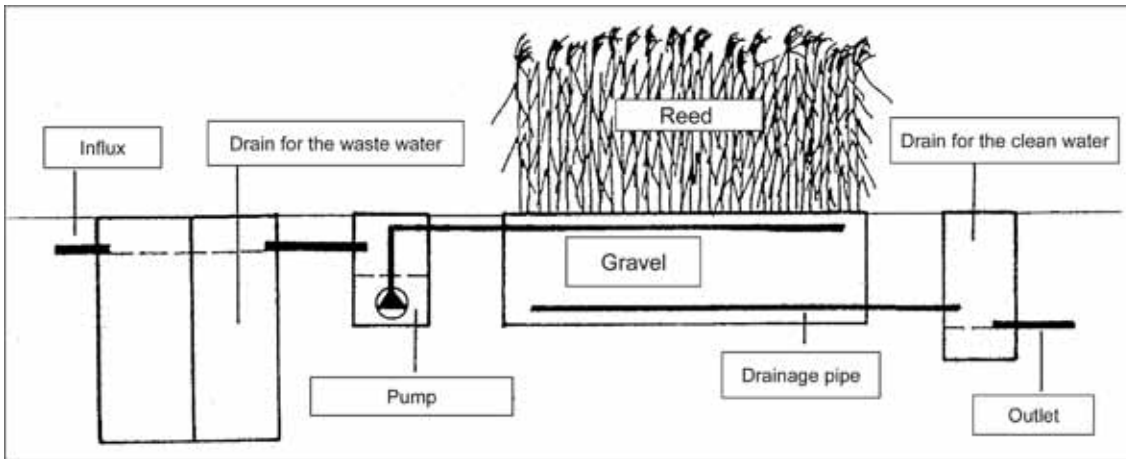
Water and energy

3.8

Water games

4

Attachment



Reed bed treatment plant (Grafik: Silvia Schubert, Foto: Michael Stölken)

1
Education partner and target group, content and goal

2
Abstract of the examined themes and target group

3
Eight Concepts on water issues

3.1
Experience of water by working at learning stations

3.2
Water in our everyday life

3.3
Research on waterbodies, organisms and water quality

3.4
Water Art on paper

3.5
Water and climate change

3.6
Water and history

3.7
Water and energy

3.8
Water games

4
Attachment