»Waterworld without borders«

Non-formal education for sustainable development from region to region

Eight concepts for workshops on water issues

ANU
Arbeitsgemeinschaft NATUR- UND UMWELTBILDUNG Hamburg e.V.

BIOSFERA

With support from
@UE
Norddeutsche Stiftung für Umwelt und Entwicklung

STIFTUNG NATURSCHUTZ HAMBURG UND STIFTUNG LOKI SCHMIDT
ZUM SCHUTZE GEFÄHRDETER PFLANZEN

Content

Publication Data

Publisher ⇢ ANU LV Hamburg e.V. | c/o Hamburger Umweltzentrum | February 2010
Karlshöhe 60d | 22175 Hamburg | Tel. 0049 40 63 70 24 90
geschaeftsstelle@anu-hamburg.de | www.anu-hamburg.de
Text and project coordination ⇢ Heike Markus-Michalczyk
Authors of the concepts ⇢ Neshad Azemovski, Natasha Ginova, Heike Markus-Michalczyk, Dr. Ursula Martin, Silvia Schubert, Alexandra Stojarnovska, Toni Stojanovski and Ludmila Wieczorek
Photos ⇢ Neshad Azemovski, Heike Markus-Michalczyk, Sajjad Haider, Frank Walensky-Schweppe
Editors ⇢ Neshad Azemovski, Regina Böttcher, Dr. Katharina Henne, Heike Markus-Michalczyk, Dr. Ursula Martin, Silvia Schubert, Ralf Thielebein-Pohl, Ludmila Wieczorek
Editor english language ⇢ Henry Holland (www.teatimetalk.de)
Graphic design and programming ⇢ LingoVision Hamburg

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

1 Education partner and target group, content and goal

What does the concept: »Waterworld without borders« non-formal education for sustainable development from region to region mean?
»Waterworld without borders« is the title of the project in which this educational material was developed by the non-governmental organization ANU LV HH e.V. (Association for Nature and Environment Education: Regional Association Hamburg) and the non-governmental organization (hereafter NGO) Biosfera Bitola, Republic of Macedonia.

With reference to the fact that access to drinking water is one of the most important themes of the 21st century, these NGOs decided to cooperate on water issues in the area of education for sustainable development (hereafter ESD).

Both NGOs support the UN-Decade for ESD mainly by participating in putting the goals in practice, which means the creation and implementation of workshops, seminars, actions and events along the lines of ESD.

In addition, both NGOs participate in the »Water for life« Decade which was launched on 22nd March 2005 by the United Nations Secretary-General Kofi Anan with the following message:

»Dear friends, Water is essential for life. Yet many millions of people around the world face water shortages. Many millions of children die every year from water-borne diseases. And drought regularly afflicts some of the world's poorest countries. The world needs to respond much better. We need to increase water efficiency, especially in agriculture. We need to free women and girls from the daily chore of hauling water, often over great distances. We must involve them in decision-making on water management. We need to make sanitation a priority. This is where progress is lagging most. And we must show that water resources need not be a source of conflict. Instead, they can be a catalyst for cooperation. Significant gains have been made. But a major effort is still required. That is why this year marks the beginning of the »Water for Life« Decade. Our goal is to meet the internationally agreed targets for water and sanitation by 2015, and to build the foundation for further progress in the years beyond.
This is an urgent matter of human development, and human dignity. Together, we can provide safe, clean water to all the world's people. The world's water resources are our lifeline for survival, and for sustainable development in the 21st century. Together, we must manage them better.«

Source: www.un.org/waterforlife decade/background.html

Following this idea, ANU LV HH e.V. and Biosfera Bitola promote this decade of action in order to increase public awareness about water issues by developing these educational concepts.

The two NGOs involved developed the educational material through a number of processes: discussing shared experience; reflecting on their own practice and evaluating the current ESD work. The results should be used in the environment and educational centres, and for educators outwith the centres too. The modules are created in such a way that everyone can implement them everywhere. The modules developed in this paper don't need a large amount of money to be put into practice. This means free access to this type of education for everyone.

The reasons behind a cooperation between ANU LV Hamburg e.V. and Biosfera Bitola

Both NGOs work mainly in non-formal ESD. They work in environment centres and in field study locations in their region too. With this project they want to deepen their partnership which began in 2006, developed through internet communication and initial visits in 2007, and really blossomed in 2008 during the project, » Learning partnership – from Region to Region«. This was an international exchange in non-formal ESD in biological and cultural diversity. The decision to work together on water issues was a result of the participation in the project »Learning partnership« in 2008.

According to the principle of sustainability, knowledge of places and of participants should be used in order to create additional products which can in turn be used by the NGOs involved, and by every other multiplicator as well.

During this process, both NGOs also follow the idea of the water-framework directive:

»The increasing demand by citizens and environmental organizations for cleaner rivers and lakes, groundwater and coastal beaches has been evident for considerable time. It has recently been reconfirmed by a representative opinion poll Eurobarometer all 25 EU countries:

When asked to list the five main environmental issues that Europeans are worried about, averaged results for the EU25 show that nearly half of the respondents are worried about »water pollution« (47%), with figures for individual countries going up as far as 71%. This demand by citizens is one of the main reasons why the Commission has made water protection one of the priorities of its work. The new European Water Policy will get polluted waters clean again, and ensure clean waters are kept clean. In achieving these objectives, the roles of citizens and citizens' groups will be crucial. This is why a new European Water Policy has to get citizens more involved.

European Water Policy has undergone a thorough restructuring process, and a new Water Framework Directive adopted in 2000 will be the operational tool, setting the objectives for water protection for the future.«
source: http://ec.europa.eu/environment/water/water-framework/index_en.html

Bearing this background in mind, the project partners decided to work on focal points which promote both the directives of the UN Decade ESD and the European Water framework directive:

- Access to basic knowledge about the medium and resource »water« in relation to its properties

- Access to drinking water for everyone, sustainable treatment of waste water
- Knowledge and awareness about good ecological condition of water resources
- Learning in order to gain awareness about forms of appearance and importance of water in a interdisciplinary and individual way
- Water and climate changes
  Discussing the relation between the natural water cycle and the effects of climate change, and how this is affecting life forms on the planet.
- Water and history
  Linking ancient civilizations and our modern one related to water issues.
- Water and energy
  Explaining the benefits of energy production using water as a sustainable energy resource
- Water games
  Enjoying water experiences by playing together

What exactly happened during the development of the concepts on water issues?

Both sides identified the following needs: a need to swap information and experiences on non-formal ESD; a need for training for trainers; and the need to develop educational material and to record the work in papers. During the last few years there have been many activities and events (for example, more than 400 groups participated in the activities organized by the ANU LV HH e.V. at the Hamburg environment center, where more than 1000 multiplicators took part each year in the events; Biosfera Bitola for example managed big events in non-formal ESD like exhibitions and tours by bike along the lines of ESD).

But the concrete themes, contents and methods have not been published yet, so they are not available yet for other groups. According to the principle of reflection on and spread of the practised work, the further use and evaluation of the educational material should be worked out. The material should be used in the environment centres and also for educators working outwith centres.

Since there is a lack literature of this kind, these methods will be used in the state school system in Macedonia as background support for the teachers providing environmental education and education for sustainable development.

In order to ensure the quality of the results, several working steps were realised:

- Creating working groups with four participants in each group in Hamburg and Bitola
- Agreement about themes for the eight concepts which should be worked out and responsible participants
- Interchange of information during several meetings in the working groups in both NGOs, in order to fine tune the themes and the structure of the educational material
- Study visit: Hamburg group in Bitola – interchange regarding themes and methods
- Testing the worked out concepts in both regions – working as critical friends
- Incorporating results and finishing the papers.

During the work on the educational material it value was placed on the development of modules in relation to the dif-

ferent curriculum areas covered by the themes and methods:

- Natural sciences and math
- Languages
- Social sciences
- Music and art

In addition, diverse learning approaches are integrated in the concepts:

- Learning with all senses
- Learning through research and experiments
- Learning through manual, craft and technological approaches
- Learning in a cognitive way

2 Abstract of the examined themes and target group

The concepts which have been worked out are aimed specifically at children aged between 10 to 14, and at interested adults in general. The material can be used in free leisure time but also in schools. It is developed in such a way, that it functions nearly everywhere without a big amount of material being needed. The modules do function on their own but the combination of them during a project week is recommended. Bearing in mind the different areas of education and approaches to learning, the following eight concepts with a variety of themes and methods have been developed:

1. Experience of Water by Working at Learning Stations
Graduate biologist *Dr. Ursula Martin*

Using the method of a study workshop, the main properties of water will be researched. There are four experiment-based stations:

- Cohesion and surface tension
- Adhesion, capillarity and chromatography
- Density
- Buoyancy

2. Water in our everyday life
Graduate biologist *Silvia Schubert*

The value of clean drinking water, our daily water consumption, waste water and its treatment are the focal points in this module.

3. Research in water bodies, organisms and water quality
Graduate biologist *Ludmila Wieczorek*

Through the determination of water organisms, the ecological relationships in the ecosystem of a water body will become understandable and water quality assessment will be possible. In addition, macroscopical-biological research on the forms of animals will lead to a classicfication of the degree of eutrophication in standing water bodies.

4. Water Art
Graduate biologist
Heike Markus-Michalczyk

The subject of this concept are the forms of water appearance in nature and art. Hand made paper is created in an water based process. The selfmade papersheets are used as a surface for testing methods to make some properties and appearances of water visible.

5. Water and climate change
Graduate manager in the medicin
Aleksandra Stojanovska

Here we are concerned with the relations between the natural water cycle and the effects of climate change; and how this is affecting life forms on the planet. Freshwater resources are highly sensitive to variations in weather and climate. This educational method contains the following message: save and protect water!

6. Water and history
Graduate biologist *Neshad Azemovski*

The method is making link between ancient civilizations and our modern one related to water issues. Water as an essence of life and its appriciation are the most important messages of this method.

7. Water and energy
Graduate biotechnologist
Natasha Ginova

Human civilization depends on energy. This educational approach is concerned with explaining the benefits of using water as a sustainable source of energy production.

8. Water games
University student – cinematographer
Toni Stojanovski

Water games express connections between human life and water. The games can be enjoyed by children, young people and adults alike. Their purpose is to learn about: the importance of water for our everyday life; life on planet earth; and measures for saving water. Using the internet is important as a resource for data collection related to water and water issues.

Waterworld at the former inner German border river elbe (Mecklenburg/Lower Saxony)

3 Eight concepts for workshops on water issues

In the following chapter you find eight concepts on water issues.

The concepts comprise

1. Short description on the theme

2. Goals of the concept

3. Basic conditions
   - Target group
   - Location
   - Material
   - Time frame

4. Background knowledge

5. Methods/Worksheets

The structure varies in relation to the concept. The concepts intend to guide you in participating setting ESD in water issues in practice.

Lake Prespa, viewpoint in Republik of Macedonia.
The lake belongs to Greece, Albania and Republic of Macedonia.

3.1 Experience of Water by Working at Learning Stations

Graduate Biologist *Dr. Ursula Martin*, ANU Hamburg e.V.

Short description and goal
The set-up of learning environments provides self-guided learning.

Learning stations are established as separated areas in the room and equipped for small group interactive learning. Students are allocated to small groups, maybe three to four, which rotate from station to station, as each activity is completed.

There are four experiment-based stations to explore the main properties of water and subsequently learn how water behaves in the environment. Thus the importance of water to all living beings will become obvious. The four stations are as follows:

- Cohesion / surface tension
- Adhesion / chromatography / capillarity
- Density
- Buoyancy

For each station there is a worksheet including the physical explanation of the property, the outline of the connected experiments and the materials needed.

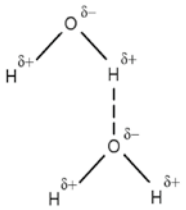
Conclusions and solutions are separately provided on page 18/19.

Basic conditions
Target group ..... Children and youth aged 10-14 with or without parents

Location ..... Room with tables and access to water

Materials..... see worksheets

Time frame..... approximately 3 hours

Background knowledge


All the above mentioned properties are ultimately caused by the structure of the water molecule. Each molecule of water is made up of two atoms of hydrogen connected to one atom of oxygen. This is summarized in the familiar formula, H_2O. However, due to »hydrogen bonding« – the attraction between the positively charged hydrogen atom of one water molecule and the negatively charged oxygen atom of another water molecule – water molecules are attracted to each other like small magnets. Further background knowledge concerning the individual properties is provided in the worksheets.

Activities			
Time table	Content	Method	Material
Module 1 (30 min) Introduction	Explanation of learning environments, introduction of the four learning stations by giving some background information on the properties of water and providing hints for the conduction of the experiments	Discussion of activities and procedures Allocation of groups and rotations	Prepared working stations according to the worksheets
Module 2 (2 hours) Working at the stations	Four experiment-based stations to explore the main properties of water: • Cohesion / surface tension • Adhesion / chromatography / capillarity • Density • Buoyancy	Small working groups rotating from station to station – about 30 min. per station	See description of the working stations
Module 3 (30 min) Debriefing session with the entire group	Discussion of activities and outcomes. Each station should be presented by one small group and discussed by the entire group.	Discussion and reflection	Paper, pens

Station Cohesion / Surface Tension

Materials
plastic bowls, paperclips, water cans and washing up liquid
coins (1 or 2-cent), droppers and cleaning cloth
different surfaces: waxed paper, glass, filter paper, wood, leaves etc.
glasses and corks

Information
The hydrogen bonds between the water molecules are rather weak and can rapidly break and form again. This is what gives water its cohesive and adhesive properties.

Cohesion is the tendency of like molecules to be attracted to one another.

Surface tension is a special case of cohesion which occurs at the surface of liquids. Water has a very high cohesion and hence a very high surface tension. This creates a type of »skin« which allows floating of light objects and enables small insects like the water strider to walk on the water surface.

Experiments
1. Try floating a pin or a paperclip on the top of a glass of water. Add a drop of dish soap – what happens and why?

2. Clean and dry a coin carefully. Using a dropper, place drops of water onto the coin – one by one. How many drops fit onto the coin – what is the shape of the water like?

3. Add drops of water onto the different surfaces – what happens, what are the shapes of the water drops like?

4. Fill a glass about two-thirds full with water and add a cork. How can you make the cork floatin the middle of the water surface?

Station Adhesion / Capillarity / Chromatography

Materials
Different straws and tubes (clear), shallow bowls, water and food colouring felt pens, round filter paper, glasses, water and scissors

Information
Adhesion is caused by weak hydrogen bonds between the water molecules. Whereas cohesion is the attraction between like molecules, adhesion means attraction between the molecules of a liquid and the molecules of a solid boundary surface in contact with the liquid.

Capillary action is the result of adhesion and cohesion.

If you place water, for example, in a narrow tube, there are molecules of the water that are attracted towards the walls of the tube by adhesive properties. Simultaneously, all water molecules in the tube are cohesively attracted towards each other. This results in the water rising within the tube. Capillary action is limited by gravity and the size of the tube.

Capillarity is one of the causes of the upward flow of water in soil and in plants.

Capillary action can be used for chromatographic purposes.The attraction of water molecules to paper (adhesion force) is larger than the attraction of the water to itself (cohesion force): hence water moves up the paper.

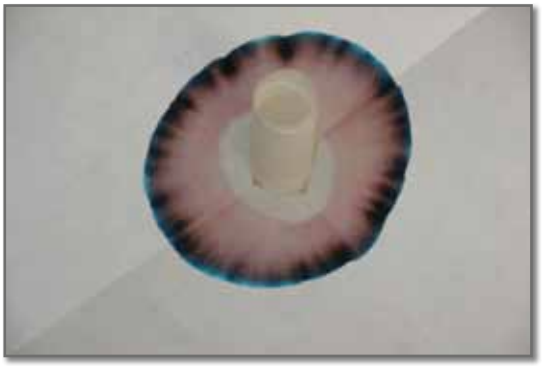
Experiments
1. Capillary action:
- Fill a bowl with water and add some drops of food dye.
- Place different straws and tubes upright in the bowl (straws and tubes should be as thin as possible)

What do you observe?

2. Radial chromatography:
- Fold one filter paper to make a semi circle then fold to make a quarter.
- Cut off the top of the created right angle. This paper will be your chromatogram (the paper used to separate the ink dyes).
- When you unfold the filter, it has got a little hole in the middle.
- With a felt pen (best a black one), draw a circle at a distance of about 1 cm of the centre hole or make little dots.
- Roll a second filter paper to form a cone and place it through the hole of the chromatographic paper as a wick.
- Fill a glass with water– be sure that the rim is dry!

- Place the spotted piece of filter paper over the cup so that it rests on the rim with the wick extending down into the water.

Watch the experiment for 10 to 15 minutes. Describe your observations and try to explain the phenomenon!



Station Density

Materials

White bowls or caps of glasses and coloured chocolate buttons (or sugar lumps with food colouring)
glasses or cups, small cylinders or narrow glasses, droppers, teaspoons, water, hot water, ice cubes, salt, sugar and food colouring (blue, red, green)
soda cans with and without sugar (cans of same brand, size and shape).

Information

Density describes how much something weighs in relation to its size. It is determined by the mass of a given volume of that matter. Thus density equals mass divided by volume. On earth, mass is equal to weight. Density explains why some things float on water and some things sink – things which are less dense than water will float, things which are denser will sink. This is also true for liquids. Moreover, density of water is affected by temperature and the contents of soluents like salt or sugar.

Experiments

1. Experiment with chocolate buttons (or sugar lumps coloured with one or two drops of food colouring)

- Fill a plastic bowl with water – about 1cm high.
- Wait 20 seconds for the water to settle.
- Place four different coloured chocolate buttons (red, blue, yellow, green) in the bowl or cap well apart from each other.

What happens? Why?

2. Density influenced by temperature:

- Fill two glasses with about 100 ml water each - one with cold water (ice cubes) and one with hot water.
- Add several drops of blue food colouring to the cold water and some drops of red food colouring to the hot water.
- Pour some of the blue water into a cylinder or narrow glass.
- Using a pipet, slowly add red water one drop at a time and watch what happens. Hold the pipet near the water surface and be careful not to mix the colours.

What do you observe?

3. Density influenced by salt and sugar:

- Prepare three glasses with about 100ml water each.
- Add food colouring to make blue, red and green water
- Add 2 teaspoons of salt to the blue water and 2 teaspoons of sugar to the red water.
- Stir until all is dissolved.
- Pour some of the blue (salty) water into the cylinder or glass.
- Using the pipet, slowly add the red (sugar) water one or two drops at a time.

- Which is more dense – the salty or the sugar water?
- Add the green (pure) water drop-by-drop to the other two and record what happens.

4. Experiment with soda cans

- Place one soda can and one same sized diet soda can of the same brand in a container filled with water.

What happens – and why?

Station Buoyancy

Materials

Clear basin filled with water, waterproof box and different stones
plastic bottles, dropper, glass and water

Information

Buoyancy is the force of a liquid pushing up on something. This force is equal to the weight of the liquid the object displaced. That's why some objects float and others sink. The amount of displaced liquid depends on the weight and on the shape of the object. That's why a very heavy container ship can float. It displaces a large amount of water.

Experiments

1. Displacement and buoyancy

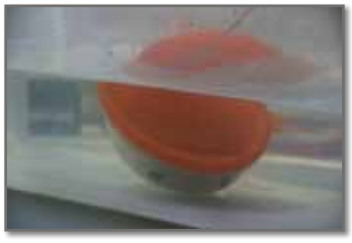
- Fill the basin with water.
- Put the stones in the water – one by one – do they float?
- Take the empty box, close the lid tightly and put it in the water. It should float – otherwise take another box.
- Take the stones and the box out of the water.
- Put the smallest stone in the box, close the lid and put the box back to the basin. Does it still float?
- Add more stones – one at a time- and each time close the box and see if it still floats.

Eventually the box will sink – when does this happen?

2. Build a »Cartesian diver«:

- Fill an empty plastic bottle completely full with water.
- Put just enough water into the dropper so that it will just float upright in the water.
- Place the dropper in the bottle and screw on the cap tightly.
- Gently squeeze the bottle.
- As you squeeze, the diver will sink to the bottom of the bottle. If you stop squeezing, the diver floats back to the top.

Can you explain why?



Observations and Solutions

Station Cohesion / Surface Tension

1. The dish soap will bind with the water molecules and interfere with the hydrogen bonds. The »skin« of the water will be destroyed and the paper clip will sink.

2. Surface tension not only creates the »skin« on top of the water, but it is also what causes water to stick together in drops. Because of the strong cohesion, the water molecules of each added drop are implemented into the former drop until the water will finally spill from the coin.

3. On hydrophilic surfaces – with polar compounds – the adhesion between the molecules of the water and those of the surface is stronger than the cohesion and the water is more or less soaked by the surface.

   On hydrophobic surfaces – with non-polar compounds – there is no adhesion at all and the water pulls itself into a shape with the smallest amount of surface area – a bead or sphere.

4. If you float a cork in a glass of water, eventually the cork drifts to the side because of adhesional effects. If you fill the glass with water until the water bulges over the top, the cork which is less dense then water moves to the highest point and is held in the centre of the water surface by surface tension.

Station Adhesion / Capillarity / Chromatography

1. Depending on the diameter, the water may »climb« up the straws and tubes or not. Capillary action is limited by gravity and the diameter of the straw. The thinner the straw or tube, the stronger the capillary action will pull the water.

2. If the paper gets soaked with water, the components of the ink at the bottom of the paper will be attracted to the paper as well as to the moving water. Thus components will move different distances according to their weights (mass), and the ink will be separated into different colours.

   Chromatography is an important method used to separate and / or to analyze complex mixtures.

Station Density

1. The sugar coating of the chocolate buttons dissolves quite rapidly and the food colouring in the outer layer of the sugar coating travels with the dissolved sugar. Because sugar is more dense than water, it sinks as it dissolves and spreads to areas of lower sugar concentration. There will be four quadrants of unmixed colours for quite some time, because the sugar concentration is equal on both sides of the junction. The final bleeding of the colours into each other will only happen very slowly.

2. The red (hot) water is less dense then the blue (cold) water and forms a distinct layer above the cold water.

3. Salt will increase the density of water more than sugar. Thus, there will be three layers – the salty water at the bottom, the sugar water in the middle and the pure water on top. Because the density of sea water is also controlled by temperature and the amount of dissolved salts in the water, this results in large ocean currents.

4. The regular soda will sink and the diet soda will float. That is because the sugar in the regular soda weighs much more than the sweetener in the diet soda.

Station Buoyancy

1. The stones sink because they are heavier than the amount of water they are displacing. The empty box floats because it displaces the same amount of water as its own weight. By filling the box with stones, it gets eventually heavier than the water it displaces and sinks.

2. The dropper floats, because there is a small air bubble in the dropper. As you squeeze the bottle, you apply pressure to the air bubble and make it smaller. The dropper becomes less buoyant and starts to sink. As you stop squeezing, you release the pressure on the bottle, the air bubble recovers its original size and the dropper floats back to the top.

Some fish keep themselves from either sinking or floating to the surface by regulating the volume of the gas within their swim bladder.

Literature

- Dieken, Christel van: Lernwerkstätten und Forscherräume , Herder Verlag 2004
- Wertenbroch, Wolfgang: Lernwerkstatt Wasser, Kohl Verlag 2007
- 365 Experimente für jeden Tag, Moses Verlag 2002
- Press, Hans Jürgen: Spiel das Wissen schafft, Ravensburger Verlag 1995

Links

- www.biologylessons.sdsu.edu/classes/lab1/lab1.html
- www.physikfuerkids.de/lab1/wasser/
- www.scheringstiftung.de/images/stories/pdf/Baustein_F.pdf (Unterrichtsmaterialien)
- www.chemieunterricht.de/dc2/tip/11_02.htm (Kartesischer Taucher)

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

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 (CO_2) 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 CO_2-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.dewww.virtuelles-wasser.de
- www.un.org/milleniumgoals
- 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/application/pdf/lebensstil_lehrer.pdf
- www.bne-portal.de/coremedia/generator/unesco/de/02__Was_20ist_20BNE/04__Lehr__und__Lernmaterialien/Lehrmaterial_20Themen,page=Wasser.html

Photo: River in Bitola

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

Worksheet 1: Smell different water samples

Material: glass vessels

The participants divide into four of 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?

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.

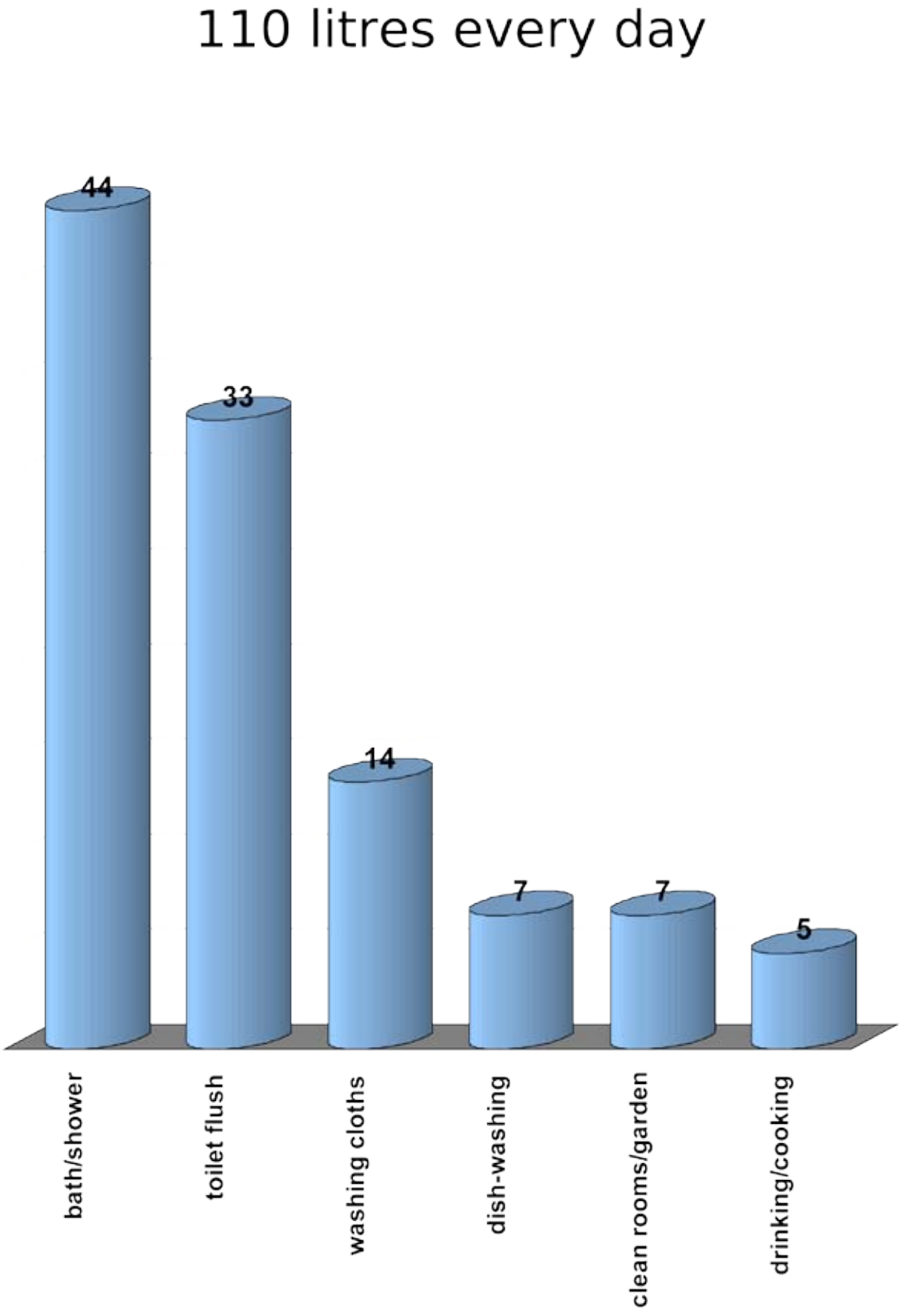
Worksheet 4: Think about your drinking water consumption

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.



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

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.

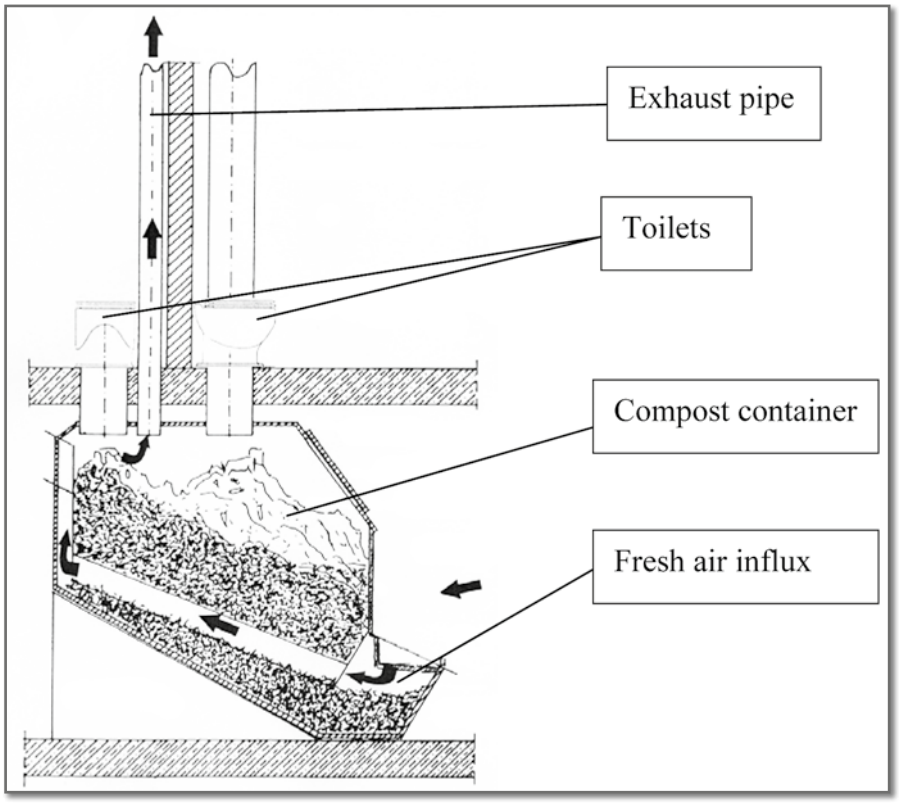
Discuss other possibilities to save drinking water.

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 (= _____ m^3)

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 m^3 freshwater in Hamburg was € 1.57, the fee for 1 m^3 waste water was € 2.23)

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.

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.

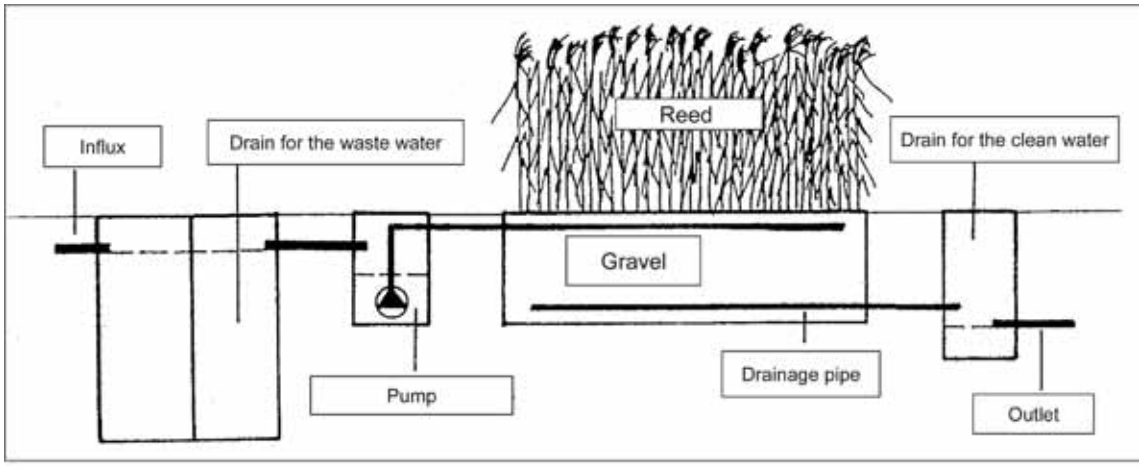
Make a list:

- 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



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

3.3 Research into water bodies, organisms and water quality

Graduate Biologist *Ludmila Wieczorek* ANU, Loki Schmidt Foundation

Short description and goal

As a result of the classification of water organisms, the ecological relationships in the ecosystem of a water body will become understandable and water quality assessment will be made possible. In addition, the macroscopic-biological research on the forms of animals enables a classification of the degree of eutrophication in standing water bodies.

The goals of this unit are that: Participants learn about the life cycle of organisms; learn to identify some of them; and learn to observe that some organisms are more tolerant of polluted water conditions than others.

Basic conditions

Target group ..... Children and youths aged 10-14 with or without parents and other adults
Location ..... outside, where the bodies of water are
Material ..... see worksheets
Time frame..... 3-4 hours

Background knowledge

Introduction – Water Quality and Aquatic Macroinvertebrates

Aquatic Macroinvertebrates are found in lakes, streams, ponds, marshes and puddles. These are animals without a backbone living through one stage of their life cycle, usually the nymph or larval stage in water bodies. The life cycle of a Macroinvertebrates goes from egg to adult form and can undergo either complete or incomplete metamorphosis. Complete metamorphosis has four stages: egg, larvae, pupa and adult. Organisms that undergo complete metamorphosis include true flies, beetles and caddis flies. Many of these organisms are aquatic for the egg and larval stages, but not in the adult stage. Incomplete metamorphosis has three stages, egg, nymph and adult. Organisms that undergo incomplete metamorphosis include stoneflies, mayflies, dragonflies and true bugs. The length of the life cycle of a Macroinvertebrate can vary from less than 2 weeks for some midges and mosquitoes to two years or longer for some stoneflies, dragonflies and the dobsonfly.

Living organisms can serve as an indicator of water quality. Here, the importance of aquatic organisms for controlling water quality will be considered. Organisms have a huge influence on water quality. Phytoplankton produce large amounts of organic material through photosynthesis and release large quantities of oxygen into water during

this process. This in turn has a pronounced effect on pH and concentration of carbon dioxide and dissolved oxygen in water. While some organisms cannot live without oxygen, other organisms cannot exist in environments with oxygen. There are individual organisms which can live in Good Water Quality, Fair Water Quality and Poor Water Quality. In the process of monitoring lake water quality, research teams collected an enormous amount of information about: water clarity; water temperature; dissolved oxygen levels; and biological information, including counts of phytoplankton, zooplankton and bottom dwelling organisms. Looking at each parameter individually provides valuable insights into a lake ecosystem, but it is important to recognize how these factors interact and influence one another. Scientists have worked hard to develop appropriate multi-parameter indices that can help describe the health of a water body.

The trophic classification of lakes results from the division of a trophic continuum into a series of categories called trophic states. The trophic state of lakes is indicative of their biological productivity, that is, the amount of living material supported within them, primarily in the form of algae. The least productive lakes are called oligotrophic – an example of which is the Ohrid lake in Macedonia – are typically cool and clear, and have relatively low nutrient concentrations. The most productive lakes are called eutrophic and are characterized by high nutrient concentrations which result in algal growth, cloudy water, and low dissolved oxygen levels. Those lakes with a trophic status that falls along the continuum somewhere between oligotrophy and eutrophy are termed mesotrophic.

Activities			
Time table	**Content**	**Method**	**Material**
Module 1, 20 minutes a) Water acoustic game b) Dialogue about background knowledge	The acoustic rain game as greeting form. Presentation of the background knowledge in relation to the concept.	The participants make a circle. Moderator makes sounds with hands. Observance of freshwater habitat and the animals. 5 minutes calm	
Module 2, 15 minutes Making chemical formula of water density	Explain that the water has highest density and gravity with 4 °C	Making chemical formula of water density	30 red circles and 60 blue circles 30 long straw and 30 short straw (25% of length)
Module 3, 10 minutes Division of children into groups	Division of children into groups - Sense game with water plants.	Divide students into teams of four or five	Lycopus europaeus, Juncus effusus, Mentha aquatica, Iris pseudacorus or other plants
Module 4, 20 minutes a) Making small fish nets b) Dispersal of materials and explain the activities	The participants make a robust fishing net. The participants get given materials. They will study two parts of freshwater habitats – shallow and deep areas.	a) The members fasten a colander on the stick with a wire and tape. b) transfer water, handle organisms gently	a) Colander, stick 2 m, wire, tape, 2 metre wooden stick b) Big and small buckets, bowls, paintbrush, loupes, moor base, stick, forceps
Module 5, 60 minutes Working in teams 60 minutes	Looking for water organisms and looking at the type of organisms in identification keys, write into table to evaluate common organisms – classify them, determine water health.	First, the group members may find some adult or immature insects and so on, and can classify and count them.	• pieces of paper • identification keys • table to evaluate common organisms
Module 6 Creating a big water picture 20 minutes	All participants create a picture.	Making of colours with curdcheese and pigments. Creating a big water picture, put plants and picture of water animals into the picture.	2 kg of curdcheese and blue and green pigments Grey wrapping paper. 2 x 1 m picture of water animals. Plants from water habitat. Paintbrush, eraser.

Worksheet 1

Module 1: 20 minutes

a) The acoustic rain game as a form of greeting

The members make a circle. Moderator makes a sound with his / her hands; the participants make the same sound. Very good effect with 20 to 30 people.

When i do this action, i stay face to face to the first person and make a sound with my hands. The rain starts:

1. I rub my hands and then the first person begins to make the same sound, I go to the next person and do the same sound to the next person and I continue until I've given the sound to all people in the room.

2. The second sound is finger-clicking. I make this sound to all participants again.

3. The third sound is clapping on my legs.

4. The fourth sound is fast clapping.

5. Slow clapping on my legs again.

6. Finger-clicking.

7. Rubbing my hands together. After that I will gesture to everybody to stop making sounds. The rain stops.

b) Presentation of background knowledge in relation to the concept

Discuss characteristics of freshwater habitats, living organisms and aggregate states of water. The member describes the plant and animal life that they would expect to find there. Observance of freshwater habitat and the animals. 5 minutes calm.

Worksheet 2

Module 2: Making a chemical formula for water density. 15 minutes

Creating a water molecule. Each molecule of water is made up of two atoms of hydrogen H connected to one atom of oxygen O. This is summarized in the familiar formula, H2O. However, due to »hydrogen bonding« – the attraction between the positively charged hydrogen atom of one water molecule and the negatively charged oxygen atom of another water molecule – water molecules are attracted to each other like small magnets. The same thing occurs between several water molecules. Water order in hydrogen bonds results when water cooled below 4 ° C results in an anomalous decrease of density. The water has highest density and gravity at 4 ° C.

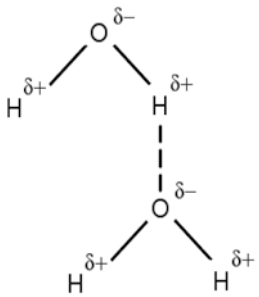
Figure one: 25 ° C. Lay red circle (oxygen) and two blue circles (hydrogen) on the floor, connecting them with two long straws at an angle of 104 - 45 °.

Figure two: 4 ° C. Do the same with the short straw, which should be 25% of the length of the long straw.

Show me 4 fingers and say out loud: »The water is heaviest at 4 ° C«.

Discuss with a group why these facts are very important for water organisms.

Materials: see table



Worksheet 3

Module 3, 10 minutes

Division of children into groups – Sense game with water plants.

Divide students into teams of four or five. You need 4 or 5 different shore-plants. Everyone makes a circle. The children put their hands behind their backs, you put one plant into the hands of each child. Each child walks backwards towards the other children, feeling the other plants with their hands, but not looking. The two children with the same plant have to find each other. Each pair of children gets given a teams name, for example Mentha aquatica or Lycopus europeus.

Worksheet 4

Module 4

Team members make a robust fishing net. They fasten a colander onto the stick with a wire and tape. Teams get given the materials. Demonstration of how to find organisms.

Transfer water from habitat into the buckets, bowls and magnifying glasses. Explain to members that they will study two parts of freshwater habitats –shallow and deep areas. Demonstrate this. Explain to participants that they have to handle organisms gently and that they have to return them into the water carefully. Demonstrate this. Each participant has to catch some organisms a few times.

Questions
Where do you find the organisms?
Tell members they have to decide for themselves what to observe. They should record where different organisms are found and the conditions or characteristics of the place.

Include the following information about where they are found:
Are they in a shady or sunny area? Is the bottom gravel, sand, or something else? Is the water shallow or deep? Is the water moving really fast, or sort of slow, or not moving at all? Are there trees or grasses or reeds, or no plants at all along the bank? Are there any man-made objects nearby? What are they? Be specific about what is observed.

Worksheet 5

Module 5, 60 minutes

Working in a team
Observe the organisms.

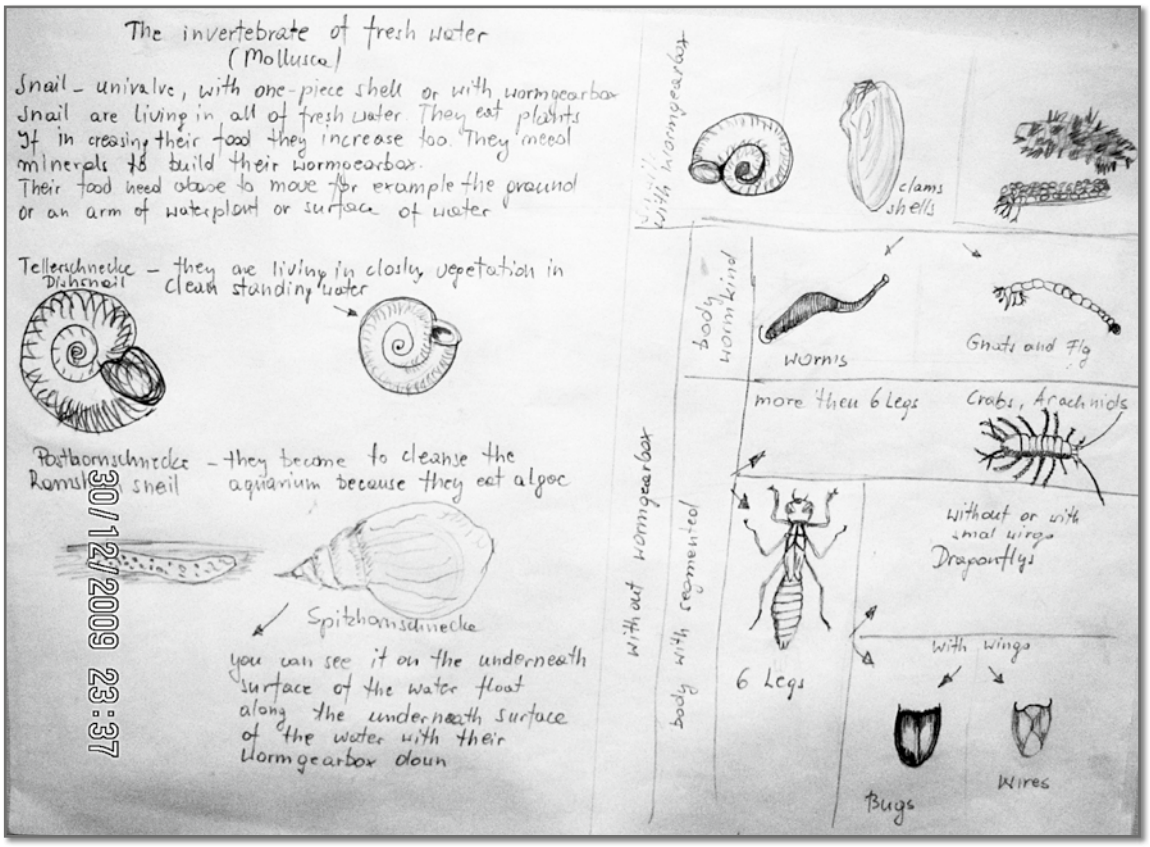
Question
How many different organisms can you find?
Observe the organisms closely using a magnifying glass. For classification, place the small organisms in front of the loupe to see them better. What features or characteristics does the organism have? How does it move? What colour is it? Does it have a head? Does it have legs? What do they look like and how many legs do they have?

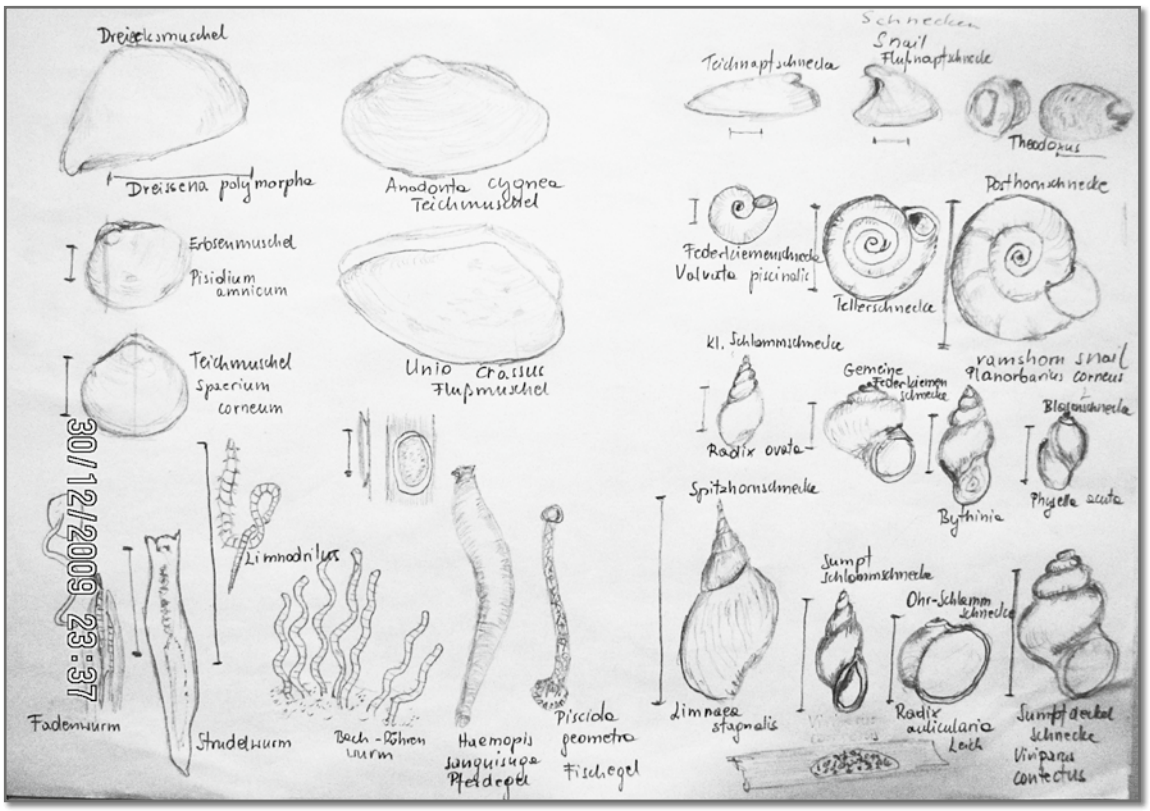
Observe and record the different kinds of organisms using the recommended keys.
How many different kinds have you found? Which number and name do they have? Make up a table to evaluate common organisms. Record all of your data on a table with a stick and mud.

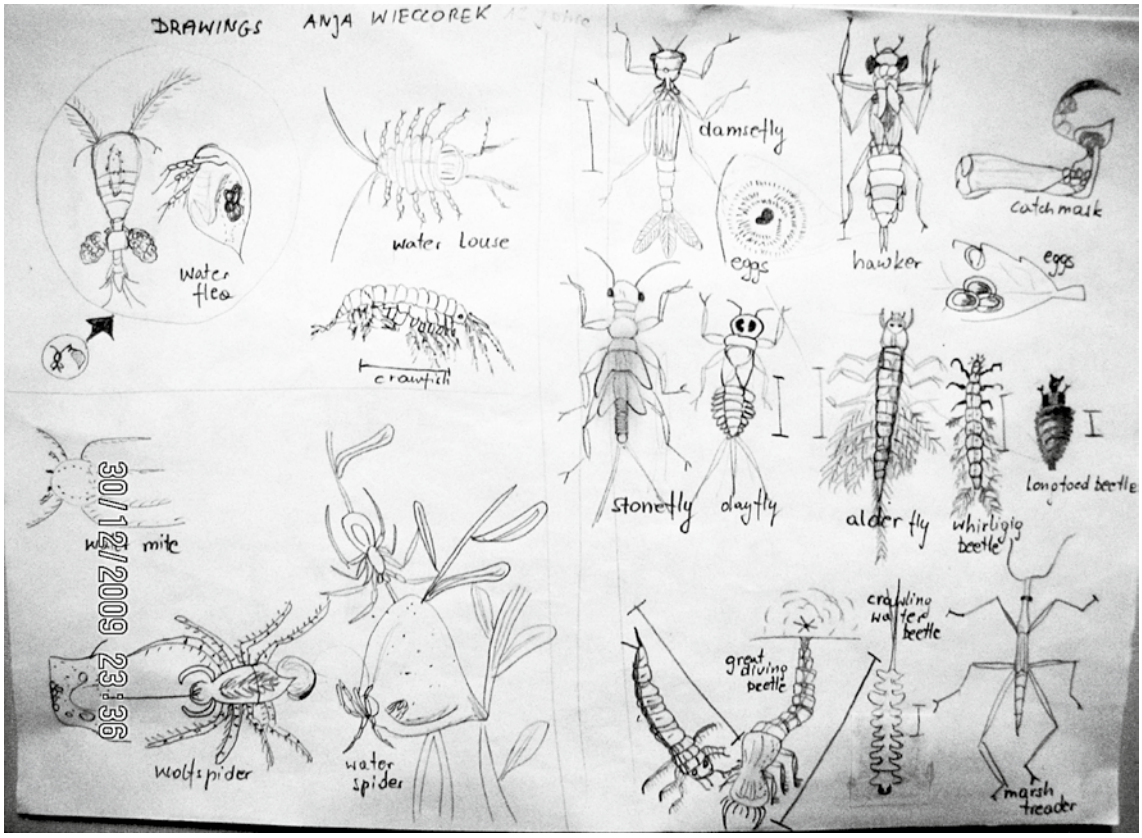
Count the organisms.
Write if possible with »moor base« (moor base is a natural fluid found in a bog. It is important to demonstrate that it is possible to write with a stick and base, or with mud). Using a paintbrush allows a careful touch for making records of animals. In your evaluation, record the name and number of common organisms. Determine water health using the evaluation and findings.

Questions
How many different kinds of organisms did the participants record? How many were they likely to find? Is there a lot of diversity in the water habitat? What are the organisms called? What questions should one ask when bio-monitoring for water quality? What might this answer tell us about the water quality of this ecosystem? Is our water in good, fair, or poor shape?

What would make the body of water and its banks better?
Participants learn that water quality can affect the number and variety of organisms that live in and around it. With the use of picture keys, members classify common aquatic macro- invertebrates based on their physical characteristics. Participants also learn that some species of aquatic organisms can be monitored and therefore act as biotic indicators of water quality. Participants observe that some organisms are more tolerant of polluted water conditions than others. Participants learn about food chains. This leads them to study the characteristics of populations and communities.







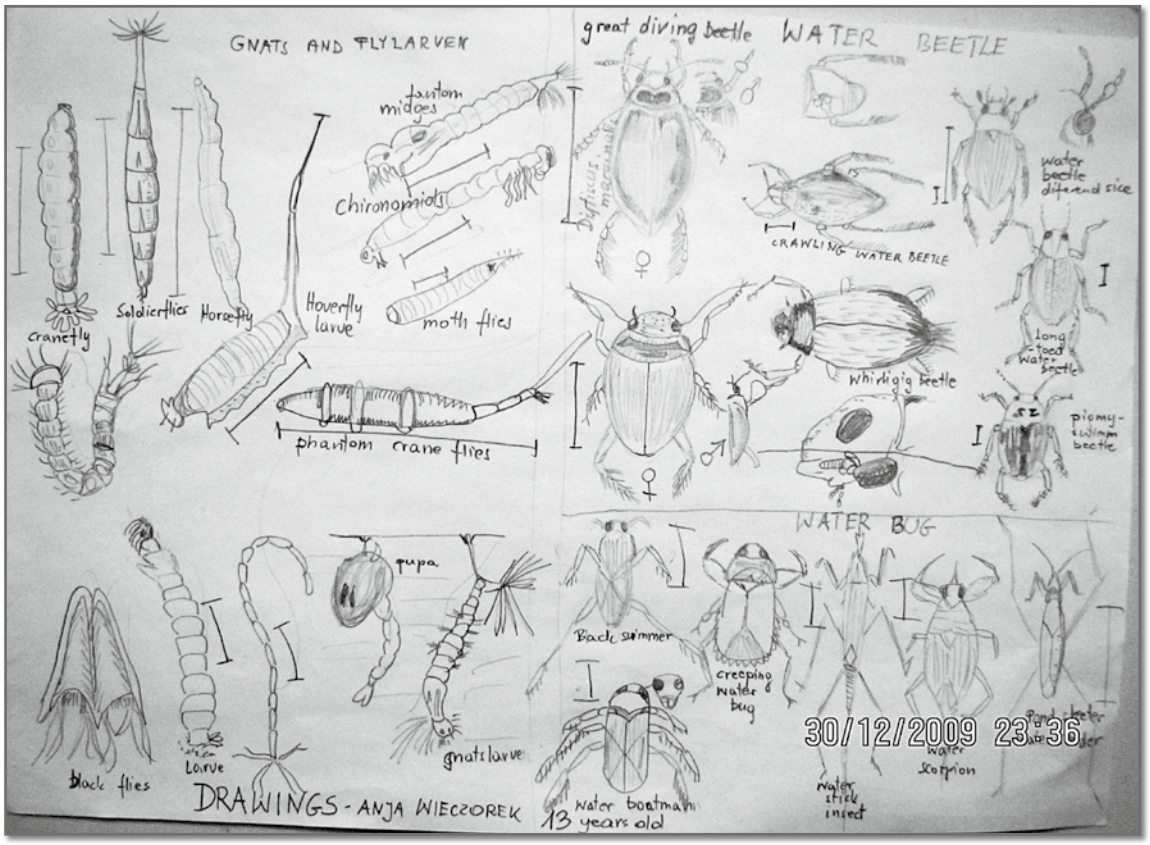


Table to evaluate common organisms and water quality

Animal groups that we found	Group	Number of different forms of each species	How to evaluate the number of different forms	Evaluation Quality class
Stonefly larvae			2 or more 1	A B
Dayfly larvae			3 or more 1-2	B C
Caddy larvae			4 or more 1-3	B C
Shrimp			1 or more	C
Hellgrammite				D
Water louse				D
Leech			4 or more	D
Mud tubular worm				D
Fresh water mussel				Not important
Snail				Not important
Flatworm				Not important
Mosquito larvae				Not important
Fly larvae				Not important
Beetle				Not important
Water bugs				Not important
Total number			Decision grade	

Legend

Table to evaluate common organisms and Water Quality

method following Xylander/Naglschmid (1984)

How to use the table:

1 column – Group – write cross if you find this group

2 column – write rate of different forms of this Group

3 column – explanation for column 4

4 column – decide: A or B or C or D

At the bottom of the table:

- After addition you get the total number of animal groups and forms of species
- Decision which water quality the water body has:

A oligotroph

B mesotroph

C eutroph

D polytroph

Links and Literature

- www.ncsu.edu/sciencejunction/depot/experiments/water/lessons/macro/
- www.pomperaug.org/get_involved.htm
- Baur 1980, Meyer 1990: Indikatorformen für die macroskopisch-biologische Wassergütebeurteilung
- Edward F. Dollan 1997: Poisoned waters. Cobblehill books
- Peter Swanson 2001: The drop of life. North world press
- Symposium on Water – Education – Future ISBN 978-3-940-785-09-1

3.4 Water ART on paper

Graduate Biologist *Heike Markus-Michalczyk*, ANU

Short description and goal
Water gives endless possibilities to be worked on.

The objective of this chapter is to connect diverse approaches to the medium of water and to explore some aspects of the creative power of water and art. The goal is to get some knowledge about paper as a base for art work, to get an awareness in paper production in a theoretical and practical way and to create one's own work of art on a hand-made paper sheet.

The extraordinary variety in the appearance of water causes impressions which can be expressed in diverse ways using the creative power of art. Therefore this module is dedicated to the representation of water and its forms of appearance in nature and art, through five working steps in five modules.

The five modules are as follows:
1. Getting in contact with a personal approach to water by looking at a selection of photos showing different appearances of water.
2. Introductory talk about water and art.
3. Forming hand-made paper sheets as the base for art work.
4. Designing one's own work of art on the self-produced paper sheet.
5. Illustrating the appearance and current of water by creating a flow pattern on paper.

Basic conditions
Target group ..... Children and youth aged 10-14 with or without parents and other adults
Location ..... both inside and outside, wherever water is available
Material ..... see worksheet
Time frame..... Approximately 3-4 hours

Background knowledge
Aspects about history of art, the relation between water, art and paper production
»The history of art refers to the history of the visual arts of painting, sculpture and architecture. It is one of the fine arts, others of which are performing arts and literature.« (source http://en.wikipedia.org/wiki/History_of_art).

The beginning of the art of painting is visible as cave painting on cave walls and ceilings. This term is used especially by those dating works of art in the prehistoric period. The view held is that these paintings aren't so much decoration but rather a way of communication for religious and ceremonial purposes.

A ceiling fresco from last centuries showing the flooding of the Markus Square in Venice can be seen in the Hamburg town hall. Sometimes Hamburg and Venice are compared as amphibic towns because of the intensive influence of water in both. And this ceiling fresco may be refer to Hamburg as a harbour town, almost 50 % of which is built on the flood plains of the river Elbe.

Classic art (BC 3000 – AD 500) of the ancient Mediterranean World is primarily made up of literature, sculpture and architecture. Some themes of the representations are listed below. This aspect is integrated into the second module, which focuses on the Macedonian location Herclea Lyncestis as an example (http://en.wikipedia.org/wiki/Heraclea_Lyncestis and concept 3.6 »Water and history«).

At this ancient site in Bitola, water is represented, for example, in:
- mosaiks and reliefs showing water animals
- artistic elements representing waves, curls and currents
- the ancient thermal spring and the thermae.

A famous oil painting with the focus on water is »Chalk Cliffs on Rügen« circa 1818 by the German Romantic artist Caspar David Friedrich. The painting shows the view from the chalk cliffs (which are built out of fossil marine coccolithen), towards the sea. The scenery happens on the on the biggest German island Rügen. The cliffs are formed through water erosion and connect the land with the sea. Other aspects are described in the link: http://en.wikipedia.org/wiki/Chalk_Cliffs_on_R%C3%Bcgen.

History of paper production
Drawings are designed and executed on several different bases. Paper is one important material. And paper is a thin material used for writing upon, printing upon or also for packaging. Nowerdays it is produced by pressing together celluslose fibers taken from wood and drying them into flexible sheets.

»The word paper derives from the Greek term for the ancient Egyptian writing material called papyrus, which was formed from beaten strips of papyrus plants. The immediate predecessor to modern paper is believed to have originated in China in approximately the 2nd century CE... The use of paper spread from China through the Islamic world, and entered production in Europe in the early 12th century. Mechanized production of paper in the early 19th century caused significant cultural changes worldwide, allowing for relatively cheap exchange of information in the form of letters, newspapers and books for the first time. In 1844, both Canadian inventor Charles Fenerty and German inventor F.G. Keller had invented the machine and process for pulping wood for the use in paper making. This would end the nearly 2000-year use of pulped rags and start a new era for the production of newsprint and paper out of pulped wood.« (source http://en.wikipedia.org/wiki/Paper).

Recent paper production

Newspaper, books, paper for writing on – every day we have it in our hand. Actually, on average, everyone in industrial countries uses 800 g of wood for paper daily. This means that, for example, in Brasil rainforest is destroyed for building up eucalyptus plantations which are used for cellulose production (www.umweltbildung-mv.de/projekte_papierkoffer.htm).

Mainly we use paper, that is made from 55% wood, 38% from recycled paper and 7% from alternative material like waste textiles. 42 % of the wood that is cut down in an industrial way is for making paper. To make one tonne of white paper, 2.000 kg of wood, 250 000 l of water and 11000 kwh of energy are needed, plus several chemicals. The wood is often cut down in rainforests in Canada, in the tropics and in old forests with an especially high value in Scandinavia (Source: Abfallfibel 2009 – Abfallwirtschaft Südholstein).

With 500 sheets of recycled paper this is what you save in comparison with virgin paper		
Virgin paper	You can save	Recycled paper
130,6l	79, 4l	51,2l
26,8hWh	16,3kWh	10,5kWh
7,5kg	7,5kg	okg
Source: IFEU Heidelber 2006		

Activities			
Time table	**Content**	**Method**	**Material**
Module 1 Personal approach to water 30 minutes	Introduction of the members in the learning group through a personal approach to the subject of water.	Sitting in a circle, everyone chooses a water-picture-card from an assortment offered in the middle, introduction to the personal approach/feeling towards water by showing the selected card	Assortment of water-picture-cards Worksheet 1
Module 2 Introductory talk about water and art 30 minutes	The moderator presents background knowledge in relation to the concept, discussion.	Presentation and working together in the plenum by looking at and discussing the pictures; each one tries to contribute to the presentation	Picture-cards or short presentation via beamer Worksheet 2
Module 3 Hand papermaking 1 hour	Creating the material for the application of colours in order to design a picture of the spirit of water.	Hand papermaking	Full equipment is described in Worksheet 3
Module 4 Creating pictures expressing the spirit of water 2 hours	All participants create pictures expressing their idea of the spirit of water.	Creating pictures expressing the spirit of water by using hand-made papersheets and self-slected tools for colours and applications.	Paper made by hand and further material like an assortment of colours and tools for the application. Worksheet 4
Module 5 Alternative: Creating a flow pattern on paper 2 hours	Design an appearance of the current movement of water on paper.	Creating a flow pattern on paper	Paper, water, paste, oil-based paint

Worksheet 1: Introduction of the participants via a personal approach to water

Information

The goal of this session is the introduction of the members in the learning group by finding a personal approach to the subject of water. During this phase the participants are working by themselves. They are choosing a picture-card which stands in relation to his/her approach to water, thinking about this and presenting their thoughts to each other, in order to get to know each other through relations to water.

Material

Assortment of 20-30 water-picture-cards (for example photos of water in ponds, rivers and oceans with different ways of movement, with water connected things)

Method

- Welcome to the participants, short presentation of the time table and the module in general.
- Arranging the group in a circle, spreading 20-30 picture-cards with water motives in the middle on a draped piece of fabric, may be with a water source in the middle.
- Everybody is requested to look at the picture-cards in order to choose the one which might be connected with their own idea of a spirit of water
- Participants get given some free time to get in contact with the picture
- Everybody should express some ideas and/or thoughts about the chosen card to promote further communication during this phase
- The contributions should not be commented on

Worksheet 2: Introductory talk about water and art

Information

In order to prepare the practical modules of this concept – the paper making by hand and creating a picture on the self-prepared paper in worksheet 3, 4 and 5 – it helps to give and discuss some basic information. This means an introductory talk about:

- Aspects about history of art
- History of paper production
- Recent paper production

With this module the background knowledge of this chapter will be illustrated.

The objective is that every participant gains an insight into the relation of water, art and paper.

Material

- Large format photos (see below) an background knowledge
- Link history of paper: http://en.wikipedia.org/wiki/History_of_paper
- Link recent paper production: www.youtube.com/watch?v=QqYgspwotcg

Method

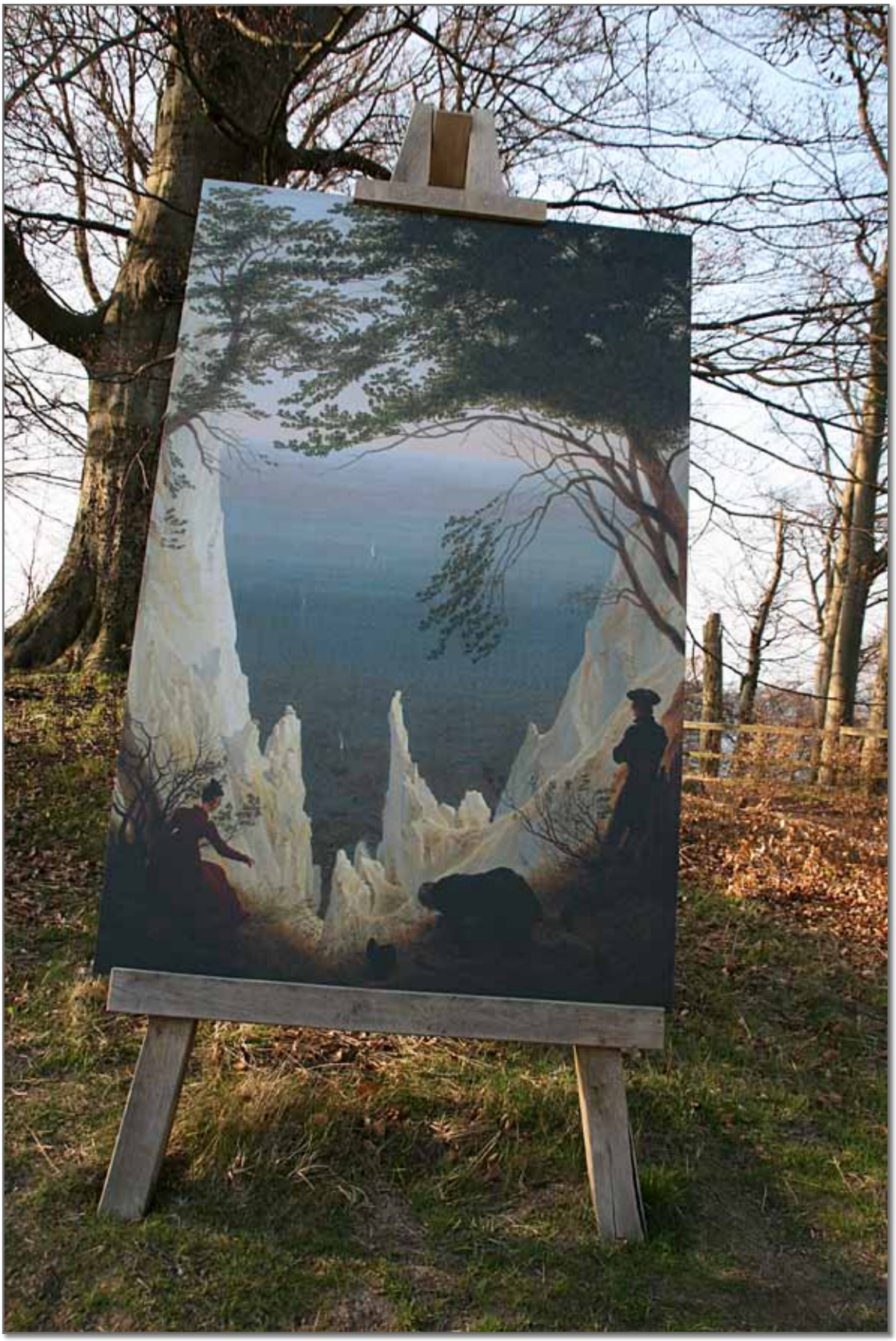
- Sit together so that everyone can look at each other
- The moderator starts the presentation of the material – bearing the background knowledge in mind
- Everybody is invited to participate, to add further background thoughts
- Discussion of the material and the relationships between water, art and paper
- When the goal of this method is reached, the practical work can be done.

Ancient fountain in Heraclea Lyncestis

➲ **Further fotos of Heraclea Lyncestis – concept 3.6, Water and history**

Ceiling fresco from Hamburg's town hall.

Another photo from Hamburg's town hall with aspects of the importance of water – here water and health – www.hamburgwiki.de/wiki/Hygieia-Brunnen



The chalk cliffs on Rügen.

Link: http://en.wikipedia.org/wiki/Chalk_Cliffs_on_R%C3%Bcgen. Painting »The chalk cliffs on Rügen«. Description, aspects how water is connected with the art work.

Worksheet 3: Hand paper making

Information

With this method every participant learns to make paper by doing themselves. Unique paper sheets will be created by this traditional method. The procedure contains several steps so it is intended to give the participants the experience of the value of this material.

Material

- Newspaper as basic material and as absorbent material
- Measuring container with water
- Mixer
- Right-angled container
- Wooden spoon to stir
- Wipes and sponge
- Frame for hand paper making (two parts: sieve and frame)
- Rolling pin

Method

- Rip 4 double pages of newspaper into small pieces, put them inside a bowl with water and let them soak for 30 minutes (this quantity of material is sufficient for a group with 4 people)
- Pureé the paper pulp with the mixer, fill it into the four-square bowl and add 10 l. of water
- Lower the hand-paper making sieve with the frame on the top slowly into the liquid
- Lift the sieve with the frame held horizontal out of the water slowly
- To extract water, hold a wipe without pressure under the sieve until no water can be extracted any more
- Remove the frame from the sieve, turn the sieve around and dry the paper mass by stroking along the sieve. If you like, you can add flat nature material to integrate into the paper sheet, before you remove the frame
- Remove the sieve carefully so that the paper mass is stuck onto the wipes
- Stretch a flat wipe over the paper layer and add several newspaper sheets
- Use the rolling pin to extract the moisture
- The result is a paper sheet which has to be dried before further use

Links

Educational material about paper in a suitcase:

- www.umweltbildung-mv.de/projekte_papierkoffer.htm

Paperproduction at school:

- www.youtube.com/watch?v=VfF-3jWwC2M&feature=related
- www.youtube.com/watch?v=aQoz1pkKmdA&feature=related

Moorbase with a peacock's feather on a selfmade papersheet

Worksheet 4: Creating pictures expressing the spirit of water

Information
The goal of this method is, that each participant tries to express an appearance of water or a personal perception in relation to the spirit of water.

In order to do this as the climax of this lesson sequence, the background knowledge and the self-made paper should be used. In addition, some options for using nature-colours will be offered and a variety of tools for application will be presented and named.

This module gives the possibility to connect different aspects of the concepts in this educational material. It does this by bearing in mind, that water is not just a chemical bond with physical properties and qualities, but also a current medium and element with its own spirit.

Material
Self-made paper, other paper, assortment of colours (moor based colours, ink from sepia, colours from fruits, colour made from chalk, sand and other soil components, tools for application like pinfeather, different caterpillars, leaves and other natural materials)

Method
Create pictures expressing the spirit of water by using selfmade papersheets and self-created colours, tools and applications – some examples of what is possible see next page.

Rainbow at the waterfall

Spray in front of the forest

Worksheet 5: Designing a flow pattern on paper

Information

The goal of this method is to fix some possibilities of the form of water-appearances in nature and landscape on paper.

The principle of water is to appear in a spherical shape. In simple words this may be described by the fact that the surface of water tends to give the waterdrop the form in which the existing volume has the smallest surface. The reason is, that the surface of water is under tension. – That's why some insects can run upon water and that's why water builds a „hill» in a full glass before it runs off. The tension makes the surface take on the smallest form possible – a spherical form (see concept 1).

As soon as there is an impact of energy, water begins to move – the form changes.

These changes can be regarded as a current in nature. To create one's own flow pattern it is recommended to research first about these currents in expanded landscapes by using Google Earth. From that you can get a feeling about how the streaming of water may look like a stream in course, and you can get a picture of the development of clouds for example.

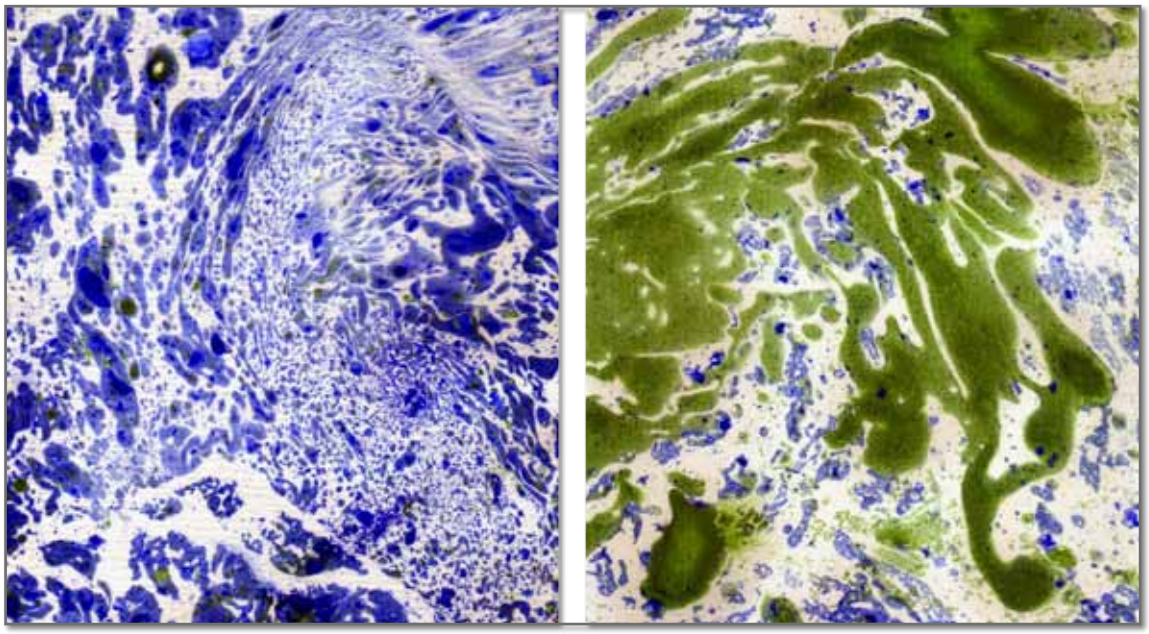
Bearing this in mind, each participant can design a flow pattern on paper on his own in order to comprehend how things function and to test the described process.

Material

Self-made paper, other paper, cups with water, paste to make the water more paste-like, thinned oil- based paint , brushes and tools for the application of colours
Internet with access to google earth

Method

- Mix the water with paste to make it more viscous and fill it in the cup
- Select thinned oil- based paint, apply it on the paste surface in the cup and observe what happens
- Make the colour move by using a wooden little rod and observe what happens
- Add further colours
- As soon as an actual state occurs which shall be fixed, the paper must be put down on the surface of the liquid carefully, to make air bubbles disappear
- As soon as the paper is soaked with liquid, take the paper off and dry it
- The flow pattern can be regarded in the group and be compared with flow patterns in nature by using Google Earth



Links about flow patterns

- www.blauesnetz.de/aktuelles/natur/
- www.dlr.de/schoollab/Portaldata/24/Resources/dokumente/go/prandtl.pdf

Examples of flow pattern in nature, Google Earth

- National Parc Hamburg Wadden Sea, Germany (53° 57‘ 11,44“ N – 8° 26‘ 17,36“ E, 3574 ft)
- National Parc Galicica, Republic of Macedonia (41 ° 00‘ 55,20“ N – 20° 53‘ 0,727“ E, 5181 ft)
- Kanada, (67° 28‘ 32,57“ N – 96° 47‘ 50,14“ W, 65 ft)
- Brasilien, (16° 39‘ 29,80“ S, 56° 27‘ 14,8“ W, 397 ft)

Film about Landart and Waterart

Rivers and Tides, Actor: Andy Goldworthy, Director: Thomas Riedelsheimer, 2000

Literature

- Schwenk, Theodor: Das sensible Chaos, Verlag Freies Geistesleben 2003

3.5 Water and climate change

Graduate Manager in the medcine *Aleksandra Stojanovska*, Biosfera

Short description on the theme

Climate change is already happening and represents one of the greatest environmental, social and economic threats facing the planet. The European Union is committed to working constructively for a global agreement to control climate change, and is leading the way by taking ambitious action of its own.

The warming of the climate system is unequivocal, as is now evident from observations of increases in average global air and ocean temperatures, widespread melting of snow and ice, and rising global mean sea level. The earth's average surface temperature has risen by 0.76° C since 1850. Most of the warming that has occurred over the last 50 years is very likely to have been caused by human activities.

Freshwater resources are highly sensitive to variations in weather and climate. The changes in global climate that are occurring as a result of the accumulation of greenhouse gases in the atmosphere will affect patterns of freshwater availability and will alter the frequencies of floods and droughts.

Goals of this unit

- to discuss the importance of water in nature through looking at the water cycle
- to discuss climate changes and water issues

Objectives

- to gain knowledge about the relationships between climate change and water in nature
- to learn about the impacts of climate change on life-forms
- learn about basic terms: evaporation, condensation, precipitation and collection.

Basic conditions

Target group ..... children and youth aged 10 – 14 and their parents
Place ..... a class room in nature
Materials needed..... photos, sheets with tables to be filled in with answers to questions, pens, several glasses of drinking water
Method ..... Open discussion
Time frame..... 45 minutes

Explanation

(5 minutes): Explain to the group the goals and objectives of the exercise

(15 minutes): How old is the water? Ask several of the participants to drink water from their glasses. Ask them: Can they say how old the water is? Explain that water on the planet earth is 4,5 billion years old and that through the water cycle it is moving in a circle. Ask the question: Can you imagine where the water was you drank: 1 day ago? 1 month ago? And 3 years ago?

(15 minutes): Distribute the sheets with tables to be filled in with answers to questions, and ask participants to answer the questions

(10 minutes): Discussion about the answers

- What do we use water for in our everyday lives?
- Can you imagine life without water?
- How will increasing temperature as a result of climate change affect water in nature?
- What can I do to protect water from climate change's negative effects and impacts?

Table 1: Questions related to the topic of WATER AND CLIMATE CHANGE		
1.	What do we use water for in our everyday lives?	
2.	Can you imagine life without water?	
3.	How will increasing temperature as a result of climate change affect water in nature?	
4.	What can I do to protect water from climate change's negative effects and impacts?	

Evaporation is when the sun heats up water in rivers, lakes or in the ocean and turns it into vapour or steam. The water vapour or steam leaves the river, lake or ocean and goes into the air.

Make your own evaporation. With an adult's help, heat some water in a kettle. Watch closely! Do you see the steam rising? That's evaporation!

Water vapour in the air gets cold and changes back into liquid, forming clouds. This is called condensation. To see condensation in action, put a large piece of cardboard in the freezer for about an hour. Now, take the boiling kettle or water and hold the cold cardboard about 30cm over the spout – right in the middle of the steam. You will have to wear oven gloves to do this. Water droplets will form on the cardboard. That's condensation!

Precipitation occurs when so much water has condensed, that the air cannot hold the water any more. The clouds get heavy and water falls back to the earth in the form of rain or snow.

If you continue the condensation experiment long enough, so much water will condense on the cardboard that it won't be able to hold it all. At that point, water will start dropping down. That is precipitation.

When water falls back to earth as precipitation, it may fall back into the oceans, lakes or rivers, or it may end up on land. When it ends up on land, it will either: soak into the earth or become part of the »ground water« that plants and animals use to drink; or it may run over the soil and collect in the oceans, lakes or rivers where the cycle starts all over again.

3.6 Water and history

Graduate biologist *Neshad Azemovski*, Biosfera

Short description on the theme

Water has played a very important role in the history of humankind. All ancient civilizations were built near big rivers, so life could be supported; all important ancient and medieval cities were also located near big rivers. Water in history was important for, among other things, personal hygiene, transport, trade and development of industry.

In this exercise we want: to take a look into the past; to see what is happening now; and to see what consequences our current civilization's use of water will have on the future. The main message is to appreciate water, to respect it, and to take action to protect and save water resources.

Goals of this unit

- Learn about how old water on planet earth is;
- Learn to appreciate water;
- Learn about how water is related to ancient civilizations;
- Make the link between ancient and modern civilization in relation to water issues;
- Reach conclusions about the importance of water.

Objectives

- Developing critical thinking in relation to history, and to the connection between ancient civilizations and water.
- To respect water and its different forms as a part of the global eco-system that is supporting life on earth.

Basic conditions

Target group ..... children and youths aged 10 – 14 and their parents
Place ..... Class room in a school, archaeological site or a classroom in nature
Materials needed..... Tables to be filled in by answering questions; photos from the archaeological site or ancient civilization which water is being connected with; and pens.

Method

- Method 1: Field visit to an archaeological site
  Group discussion about the importance of water in everyday life
  Waste water treatment in history and in modern times
- Method 2: Photos from an archaeological site or ancient civilization, which water is being connected with, are presented.
  Group discussion about the importance of water in everyday life.
  Waste water treatment in history and in modern times.

Time frame
Method 1
5 minutes: Introducing the theme, and instructions to involve all the senses in trying to experience water – and it's role in history;

20 minutes walking through the archaeological site,

20 minutes plenary session and conclusions

Method 2:
5 minutes: Introducing the theme, and instructions to involve all the senses in trying to experience water – and it's role in history;

5 minutes: Introduction of the theme and instruction to involve all senses trying to detect water and history.

20 minutes looking at the photos and talking about water in relation to history. This part can be modified by splitting the group into smaller groups, thus promoting team work.

20 minutes plenary session and conclusions.

Method 3:
If there is internet access, 20 minutes can be used for searching the internet and finding interesting data about water and history.

Explanation
Explain to the group the goals and objectives of the exercise. Distribute tables to each participant with explanation that they should fill them in within 20 minutes. Use Method 1 or Method 2 for this exercise.

At the plenary session, ask the following questions from the chart:
1. How many senses were you able to use to sense water?
2. How many different connections with water were you able to experience?
3. Was life possible without water in the past; is it possible in today's world?
4. What was the most impressive experience you had, and what did you like most?
5. What we should do to protect the water?

Table 1: Questions related to the topic of WATER AND HISTORY		
1.	How many senses were you able to use to sense water?	
2.	How many different connections with the water could you experience?	
3.	Was life possible without water in the past; is it possible in today's world?	
4.	What was the most impressive experience you had, and what did you like most?	
5.	What should we do to protect water?	

Heraclea Lynkestis was an important strategical town during the Hellenistic period, as it lay on Macedonia's border with Epirus to the west, and to the non-Greek world to the north, until the middle of the 2nd century BC, when the Romans conquered Macedonia and destroyed its political power. The Romans divided Macedonia into four regions and Heraclea was in the fourth region.

The main Roman road in the area, Via Egnatia went through Heraclea, and Heraclea was an important stop. The prosperity of the city was maintained mainly due to this road. Objects discovered from the time of Roman rule in Heraclea are: votive monuments, a portico, thermae (baths), an amphitheatre and town walls. In the early Christian period, Heraclea was an important episcopal seat. Some of its bishops are mentioned in synods in Serdica and other nearby towns. The ensembles of the small and great (large and big) basilica date from this period. The grave (funeral) basilica with a necropolis is located east of the theatre.

	Ancient public fountain
	Centre of the antique city. You are able to see blue cabins (portable toilets).
	Mosaics. Here, ducks are connected with water.
	Antique column. Artistic representation of a wave.

	Mosaic. Fish in relation to water.
	Antique water system: supply pipe.
	Antique water system: supply pipe.
	Roman thermal bath.

	Antique water system supply pipe through the centre of the city
	Early Christian baptism font
	Medieval castle at the top of the hill at the city of Ohrid, and Ohrid Lake – which dates originally from the 9th century. Clouds are also related to-water. Trees are also connected to water.

3.7 Water and energy

Graduate biotechnologist *Natasha Ginova*

Short description on the theme

Humans have used water power to supply energy for almost as long as we've used wind. Archaeologists have discovered descriptions of water wheels used for grinding grain that date back to more than 3 000 years ago.

Today, the energy of falling water is used mainly to drive electrical generators at hydroelectric dams. As long as snow and rainfall can fill the streams and rivers, moving water can be a renewable source of energy. All around planet earth, water is on the move. In rivers and creeks, water flows downhill under the force of gravity. It starts off as rain or snow falling on the highlands and mountains. Running water forms tiny rivulets and streams, which gather to form large rivers. Most rivers find their way to the edges of the continents, where they dump massive loads of fresh water and sediments into the oceans.

Evaporation from the surface of rivers, lakes, and oceans brings the water back into the atmosphere as invisible water vapour.

Under the right conditions, unseen water vapour condenses from the air to form clouds and possibly rain, snow, or hail. Seasonal rain and snowfalls bring fresh water back to the headwaters of streams, completing a very important ecological system called the »hydrologic cycle.«

By bringing fresh supplies of water to the highlands, the hydrologic cycle ensures that we always have energy available from flowing water.

Goals of this unit

- to explain the importance of water as a renewable energy source
- to discuss positive and negative aspects of the usage of water as a source for energy production

Objectives

- to learn about the production of electrical energy using the water cycle in nature
- to start to respect water as an essence of life on planet earth, and as an essential part of earth's life forms

Basic conditions

Target group ..... children and youth aged 10 – 14 and their parents
Place ..... class room in nature
Materials needed..... plastic bottles, paper boats, scissors
Methods ..... Open discussion, Problem sol-ving
Time frame..... 45 minutes

Explanation

5 minutes
Explain to the group the goals and objectives of the exercise

15 minutes
Start discussion about the ways in which human civilization uses water for electricity production.

Ask the question: How could energy production from water function, if there was either a lack of water, or no rain or snow at all in the mountains? Discuss what could cause this problem, and what effects this problem could have.

20 minutes
Split the group into three smaller groups. Hand out the materials – the plastic bottles and pieces of paper. Give the groups 5 minutes to solve the problem, by giving these instructions: Make the paper boat and try to get it to move one metre, without using your hands. www.metacafe.com/watch/879140/how_to_make_a_paper_boat/
One of the solutions is to create a channel with plastic bottles. Use the scissors to cut open the plastic bottles. Then you put the paper boat inside and fill the channel with water.

5 minutes
Discuss with the group:

1. How much water do they need to move the boat?
2. What will happen if there is no water?
3. Why is it important to use gravity to move the boat?
4. Does a hydro-electric power plant pollute the environment?
5. What is the difference between very big hydro-electric power plants and smaller ones?

3.8 Water games

University student – cinematographer *Toni Stojanovski*

Short description on the theme

Water games are especially fun during the hot summer period. They can be used to: create a positive atmosphere; help in team building; and to round off the day.

Water games express the connections between human life and water. Children, youths and adults alike can all enjoy the games.

Goal of the unit

- to create a positive atmosphere and a closer connection to water

Objectives

- to learn about: the importance of water for our everyday life; for life on planet earth; and about measures for saving water
- to have fun team building
- to use innovative approaches: using the internet as a resource for data collection relating to water and water issues; and drawing from other sources to get knowledge and information related to water

Basic conditions

Target group ..... Children and youths aged 10 – 14 and their parents
Place ..... Outside
Materials..... Paper, water colours, pens and different materials for different games

Discuss for 15 minutes about the importance of water for our every-day lives.

Ask the question: do the participants appreciate water?

Discuss the importance of water for life on planet earth.

Tell the participants to walk around for thirty minutes, discovering connections with water.

Give the participants another thirty minutes to draw / paint/ illustrate their findings with colour, or to write poetry.

Organize a small art exhibition and poetry reading.

Then have fun with the water games!

WATER GAMES: Cold Potato Game

This simple game revolves around a different kind of sprinkler. Players must have quick reflexes and be able to throw well.

WHAT YOU NEED: Balloons, safety pin, water

HOW TO PLAY:
1. Using a pin, poke a hole in a balloon. Then fill it with water, so that it becomes a time bomb with a slow leak.

2. Players stand in a circle and toss the balloon around. The idea is not to be the one holding the balloon when it runs out of water.

3. The focus really isn't on winning or losing – it's on how cool you become – and how cool you can stay – while playing the game.

WATER GAMES: Got You Back

The name of this wild game of water tig says it all: players aim at their opponents' backs, trying to squirt off their paper tails.

WHAT YOU NEED: Tape, white crepe paper, one water spray bottle per player

HOW TO PLAY:
1. To prepare, use tape to attach three 6-inch strips of white crepe paper to the back of each player's shirt.

2. Give each kid a spray bottle, and then let the squirting begin.

3. Whoever has the most remaining paper once the water runs out is the winner.

WATER GAMES: Water Balloon Catch

This wet and wacky game is as refreshing as a dip in the pool. On a hot day, even if you drop the ball, you can still stay cool.

WHAT YOU NEED: 4 litre milk cartons (one for each player), tape, ribbons, water balloons

HOW TO PLAY:
1. Create the catchers by cutting the bottom off the milk carton (one for each player), taping the cut edges, and decorating with ribbon.
2. Fill a number of water balloons to the size of a grapefruit.

3. See how many times you can toss the balloons without breaking them, and how far you can throw them – while still being able to catch them!

WATER GAMES: Splash Tig

Sopping sponges hit the spot in this hot-weather variation of classic tig.

WHAT YOU NEED: Big, soft sponges buckets of water

HOW TO PLAY:

1. Choose one player to be »It«. Players run away from the player who is »It«, who tries to tig them by throwing a wet sponge at them.
2. Once tigged, that person becomes the new »It«. The great thing about this game is that there's no bickering about whether or not someone got tigged. The splatter on his or her back says it all.

WATER GAMES: Water Volley Balloon

The biggest problem with beach volleyball is that you get so terribly hot playing it. To the rescue comes this cool twist on the game. And unlike regular volleyball, which requires no small degree of skill, this game lets even the athletically impaired succeed.

COOL-OFF QUOTIENT: 2 ice cubes (hey, it still beats the usual version)

WHAT YOU NEED: A volleyball or badminton net, two old sheets and water balloons

HOW TO PLAY: Divide your guests into two teams of four and have them stand on opposite sides of the net. Each team holds one sheet – with one person standing at each corner. Place a water balloon in the center of one team's sheet. The idea is to toss the balloon over the net, into the other team's sheet. It helps to do a countdown to the toss: »One, two, three...Up!« Depending on how much you want to cool off, winners can be the first team to make 10 catches or to make 10 misses.

NOTE TO PARENTS: This game is a hit with older kids, who run with the sheet, trying to guess where the balloon will land, but little kids may just get yanked around by each other. Broken balloons should be removed immediately so that toddlers aren't tempted to see how they taste.

Source
www.youtube.com/watch?v=f8b62SiirXY&feature=related

WATER GAMES: Sponge Toss Contest

WHAT YOU NEED: Large car sponges, large containers of water, buckets, warm weather

PLAYERS: small to large groups

HOW TO PLAY: Divide up into teams. You can have as many teams as you have equipment. Each team forms a line, with team-mates a little more than an arms length away from each other. At one end of the line is a large container of water with large sponges in it. The other end has a small bucket, which you could mark with a fill line where you want the finish point of the game to be. Or, alternatively, just fill to the top. When signaled to start, teams are to race. The person standing at the large container throws a sponge to the next team-mate, and that person to the next, until it reaches the end of the line. The last person squeezes the sponge out, and then runs to the start of the line, dips the sponge in the large container and passes to the next person. If the sponge is dropped while being passed, it has to be thrown back to the start of the line, and you have to start again.

After everyone has had a turn at taking the sponge out of the large container and passing, the team which has collected the most water is the winner.

WATER GAMES: Pass the Water Balloon

This is sort of like the game, »Pass the Orange«: but with water balloons.

It's also best suited to a hot day.

Style: Competitive

Type: Water Balloon Games

WHAT YOU NEED:
Water balloons (small thin balloons, not regular balloons) and a place to fill them up, something to mark the beginning and end of the course (e.g.: rope, soda bottles, etc.)

HOW TO PLAY:

1. Divide the kids into teams of two.

2. Mark the beginning and the end of the course.

3. On the word, »Go!«, the first player in each team puts a water balloon under his chin, and races to the end of the course and back.

4. When he gets back to his team, he has to pass the water balloon to the next player without using his hands.

5. If the balloon breaks, the player has to get a new balloon and start again.

6. If the balloon falls but doesn't break, the player has to pick it up and put it back under his chin without using his hands – and then keep going.

The first team to finish wins.

Source
www.youtube.com/watch?v=mKHICMNb01g&feature=related

WATER GAMES: Back to Back Water Balloon Relay Race

It's hilarious watching the kids as they try to gently hold a water balloon between their bodies without breaking it, while racing to the finish line. It's also a lot of good wet fun for the kids.

Style: Competitive

Type: Water Balloon Games

WHAT YOU NEED: Water balloons (small thin balloons, not regular balloons) and a place to fill them up. A container to hold the filled water balloons.

HOW TO PLAY:

1. Divide the kids into two teams, and have each kid pair up with another kid from their own team.

2. Have the first pair of kids from each team stand back to back, with their arms locked together, at the start line. Place a water balloon between their backs.

3. On the word, »Go!«, they must transport the balloon between their backs to the finish line - about 20 feet away. Then they have to manoeuvre themselves, so that they can deposit the balloon into the empty bucket.

4. If any pair breaks their balloon, before they cam deposit it in their team's bucket, then they have to sit out, and the next pair goes.

5. The game continues like this until each pair has had a turn.

6. The team with the most unbroken balloons in their bucket wins.

WATER GAMES: Water Balloon »Clean Up«

This is ingenuity at its best (a parent probably thought this one up)!
Make this the final game of the day and you'll have lots of enthusiastic helpers.

Style: Competitive

Type: Water Balloon Games

WHAT YOU NEED: Plastic buckets (one for each kid), an enticing final prize.

HOW TO PLAY:

1. Give each kid a bucket (this can be a party souvenir that each kid gets to take home).

2. Have each kid picks up as many popped balloon pieces from the yard as he can.

3. The kid who picks up the most pieces gets the last and final prize of the party.

Source:
www.awesome-kid-birthday-parties.com/kid-party-game.html

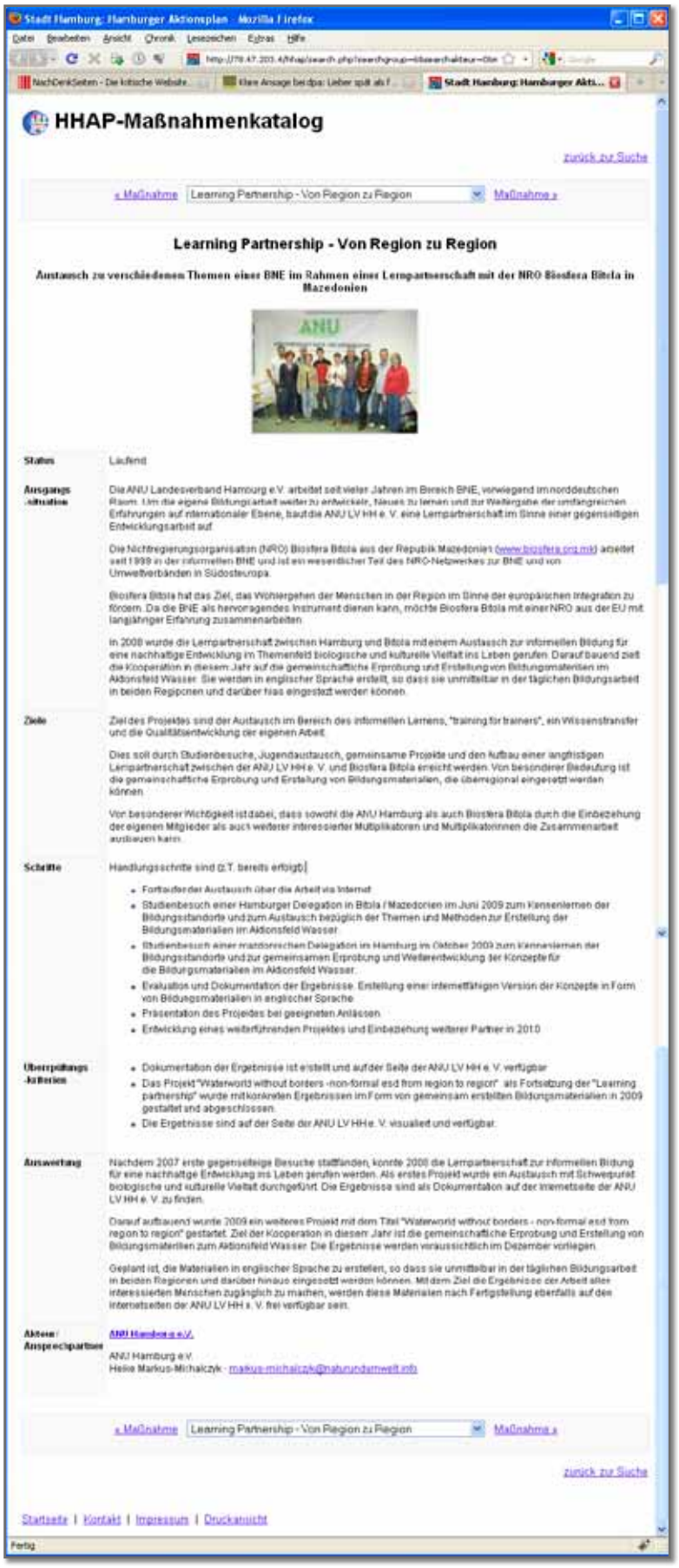
The games are downloaded from internet sites:

- http://familyfun.go.com/parties/holiday/feature/famf68cooloff/famf68cooloff2.html
- www.funattic.com/game_water.htm#anchor8

Other useful links:

- www.youtube.com/watch?v=GejGvb-Vpiq
- www.youtube.com/watch?v=JyJr5ZqHPqE&feature=related

4 Attachment



HHAP-Maßnahmenkatalog

zurück zur Suche

« Maßnahme | Learning Partnership - Von Region zu Region | Maßnahme »

Learning Partnership - Von Region zu Region

Austausch zu verschiedenen Themen einer BNE im Rahmen einer Lernpartnerschaft mit der NRO Biosfera Bitola in Mazedonien

Status

Laufend

Ausgangs-situation

Die ANU Landesverband Hamburg e.V. arbeitet seit vieler Jahren im Bereich BNE, vorwiegend im norddeutschen Raum. Um die eigene Bildungsarbeit weiter zu entwickeln, Neues zu lernen und zur Weitergabe der umfangreichen Erfahrungen auf internationaler Ebene, baut die ANU LV HH e. V. eine Lernpartnerschaft im Sinne einer gegenseitigen Entwicklungsarbeit auf.

Die Nichtregierungsorganisation (NRO) Biosfera Bitola aus der Republik Mazedonien (www.biosfera.org.mk) arbeitet seit 1999 in der informellen BNE und ist ein wesentlicher Teil des NRO-Netzwerkes zur BNE und von Umweltverbänden in Südosteuropa.

Biosfera Bitola hat das Ziel, das Wohlergehen der Menschen in der Region im Sinne der europäischen Integration zu fördern. Da die BNE als hervorragendes Instrument dienen kann, möchte Biosfera Bitola mit einer NRO aus der EU mit langjähriger Erfahrung zusammenarbeiten.

In 2008 wurde die Lernpartnerschaft zwischen Hamburg und Bitola mit einem Austausch zur informellen Bildung für eine nachhaltige Entwicklung im Themenfeld biologische und kulturelle Vielfalt ins Leben gerufen. Darauf bauend zielt die Kooperation in diesem Jahr auf die gemeinschaftliche Erprobung und Erstellung von Bildungsmaterialien im Aktionsfeld Wasser. Sie werden in englischer Sprache erstellt, so dass sie unmittelbar in der täglichen Bildungsarbeit in beiden Regionen und darüber hinaus eingesetzt werden können.

Ziele

Ziel des Projektes sind der Austausch im Bereich des informellen Lernens, "training for trainers", ein Wissenstransfer und die Qualitätsentwicklung der eigenen Arbeit.

Dies soll durch Studienbesuche, Jugendaustausch, gemeinsame Projekte und den Aufbau einer langfristigen Lernpartnerschaft zwischen der ANU LV HH e. V. und Biosfera Bitola erreicht werden. Von besonderer Bedeutung ist die gemeinschaftliche Erprobung und Erstellung von Bildungsmaterialien, die überregional eingesetzt werden können.

Von besonderer Wichtigkeit ist dabei, dass sowohl die ANU Hamburg als auch Biosfera Bitola durch die Einbeziehung der eigenen Mitglieder als auch weiterer interessierter Multiplikatoren und Multiplikatorinnen die Zusammenarbeit ausbauen kann.

Schritte

Handlungsschritte sind (z.T. bereits erfolgt):

- Fortlaufender Austausch über die Arbeit via Internet
- Studienbesuch einer Hamburger Delegation in Bitola / Mazedonien im Juni 2009 zum Kennenlernen der Bildungsstandorte und zum Austausch bezüglich der Themen und Methoden zur Erstellung der Bildungsmaterialien im Aktionsfeld Wasser
- Studienbesuch einer mazedonischen Delegation in Hamburg im Oktober 2009 zum Kennenlernen der Bildungsstandorte und zur gemeinsamen Erprobung und Weiterentwicklung der Konzepte für die Bildungsmaterialien im Aktionsfeld Wasser
- Evaluation und Dokumentation der Ergebnisse. Erstellung einer internetfähigen Version der Konzepte in Form von Bildungsmaterialien in englischer Sprache
- Präsentation des Projektes bei geeigneten Anlässen
- Entwicklung eines weiterführenden Projektes und Einbeziehung weiterer Partner in 2010

Überprüfungs-kriterien

- Dokumentation der Ergebnisse ist erstellt und auf der Seite der ANU LV HH e. V. verfügbar
- Das Projekt "Waterworld without borders -non-formal esd from region to region" als Fortsetzung der "Learning partnership" wurde mit konkreten Ergebnissen in Form von gemeinsam erstellten Bildungsmaterialien in 2009 gestaltet und abgeschlossen.
- Die Ergebnisse sind auf der Seite der ANU LV HH e. V. visualisiert und verfügbar.

Auswertung

Nachdem 2007 erste gegenseitige Besuche stattfanden, konnte 2008 die Lernpartnerschaft zur informellen Bildung für eine nachhaltige Entwicklung ins Leben gerufen werden. Als erstes Projekt wurde ein Austausch mit Schwerpunkt biologische und kulturelle Vielfalt durchgeführt. Die Ergebnisse sind als Dokumentation auf der Internetseite der ANU LV HH e. V. zu finden.

Darauf aufbauend wurde 2009 ein weiteres Projekt mit dem Titel "Waterworld without borders - non-formal esd from region to region" gestartet. Ziel der Kooperation in diesem Jahr ist die gemeinschaftliche Erprobung und Erstellung von Bildungsmaterialien zum Aktionsfeld Wasser. Die Ergebnisse werden voraussichtlich im Dezember vorliegen.

Geplant ist, die Materialien in englischer Sprache zu erstellen, so dass sie unmittelbar in der täglichen Bildungsarbeit in beiden Regionen und darüber hinaus eingesetzt werden können. Mit dem Ziel die Ergebnisse der Arbeit allen interessierten Menschen zugänglich zu machen, werden diese Materialien nach Fertigstellung ebenfalls auf den Internetseiten der ANU LV HH e. V. frei verfügbar sein.

Akteure / Ansprechpartner

ANU Hamburg e.V.
ANU Hamburg e.V.
Heike Markus-Michalczyk · markus-michalczyk@naturundumwelt.info

« Maßnahme | Learning Partnership - Von Region zu Region | Maßnahme »

zurück zur Suche

Startseite | Kontakt | Impressum | Druckansicht

Fertig

The project takes part in the Hamburg Action Plan for ESD: http://78.47.203.4/hhap/search.php?searchgroup=6&searchakteur=0&measure=398