

Title: Water from the Other Side

Topic: water, liquid, containers for storing water, water hill, water moustache, experiment, investigation, protocol	Time: three 45-minute lessons; not necessarily consecutive	Age: 5 years
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Differentiation

Some children can be more concentrated on the activity.
 Some children can be disturbed by side not crucial actions (eating jelly candies).
 Some children are very skilled at drawing accurate pictures of experiments and also at using appropriate “scientific” vocabulary and words for explanations of their investigations.

Guidelines, ICT support etc.

Two teachers are recommended to guide children in their activities.

Equipment needed for this activity

Bowls, plastic cups, water-resistant plastic boxes (e.g. from photography films), strings, different filling material (sugar, coins, balls, etc.), 2cl glass

Jelly candies (bears) – different sizes, graduated cylinders, bowl

Required knowledge

No previous knowledge is required.

Health and Safety

No special requirement.

Learning outcomes for this activity

Pupils get the key information that when they put something into water, the water level increases. They are able to interpret most of the presented experiments. They know that the volume of water is measured in graduated cylinders and things are put into them slowly – not thrown – in order not to splash the water.

Pupils understand that the heavier the solid is, the more the water level it increases. They can perform and interpret the presented experiments. They know that the increase of the water level is measured with graduated cylinders.

Pupils are able to understand and perform the whole sequence, i.e. to fill the graduated cylinder with water and record the amount of water. After putting the solid into the graduated cylinder, they are able to record the increased level of water. They can present and explain some of the performed experiments.

Lessons description

Starter Activity

It is necessary to catch the children's interest for inquiry and experimenting before the activity itself. Several experiments (maximum 5) when the lector acts as a magician are recommended. After the experiments s/he explains to children that these are not magic and can be explained. S/he performs experiments: turned container filled with water, lighting a candle without touching its wick, experiments with plasma lamp and light bulbs, pouring gasses.

Main Activity

First Lesson

During the first lesson we discuss the topic of water with children. The activity starts with drawing pictures. Children draw anything related to water. After drawing, each child describes their own picture and the teacher puts together different words (via pictures) which children relate with water. We expect that at the end of the activity they find out that water is transparent; it can be fresh or salty; the water is in rivers, lakes, seas and oceans; we can have a bath in water; we drink water, make tea and soup, etc. Children will have a great amount of suggestions and views on water.

In the end we summarise those characteristics of water which are the most important for further activities:

- **Water is a liquid** – we can pour it from glass to glass. Demonstration of pouring the water from one glass to another – this experiment can be performed by each child individually.
- **Water has the shape of the container which we put it in** – it can be in any glass or container shape, depending only on the amount of water which can be contained in the glass or vessel. Demonstration on variously squeezed plastic bottles. Children pour the water into different shaped plastic bottles and can see that not all the bottles are the same and the volume of water is also not the same.
- **Water can be divided** – we show that water can be divided in several glasses as far as to drops.

Second Lesson

The second lesson should follow after some time break (several days). During the second lesson about experimenting with water we conduct four experiments. Children themselves perform some experiments.

- **Moustache in water** (diffusion) – dyeing the water by drops of ink or food colouring (children work on their own, individually).
- **Flowers in water** (chromatography) – children are given a flower made from a blotting paper. They will partially paint the flowers, fold it and let float on water. The flower will “blossom”; colours will blur and form interesting shapes (children work on their own, individually).
- **Hill from water** (surface tension) – a small group of children is given a cup filled with water to the brim. The children can put different objects to the cup (coins, office pins, etc.) in the way that water will form a ‘water hill’ over the edge of the glass observable from the side view (small

group work).

- **Surprise eggs in water** - the task is to fill plastic surprise eggs in the way that some will float on water surface and some will sink (the teacher in the end shows also the egg floating *in* water).

Third lesson

In the third lesson children independently perform the physical measurements ‘lab-work’.

1. **Explanation** of what the children are going to do and why.

Task 1: We want to find out what objects will displace more water from the glass.

2. **Preparation of samples** for measuring.

Task 2: Each group will choose four objects for further investigations, e.g. coins, dry beans, sawdust, small stones. After the choice is made, we put each material in water-proof plastic box (e.g. photography film).

3. **Preparation of measuring instrument.**

Task 3: Each group will prepare a ‘water hill’; from the side view we can observe the water level in shape of a hill. The glass with the *hill* should be put in the bowl for safety reasons and also for investigating the amount of displaced water.

4. Task 4: The ‘**Measurement Protocol**’ creation. The protocol will inform about the process and also about the results of the activity. We encourage children to take notes about the equipment; task and conducted steps just after the samples and measurement tools are prepared.

5. Task 5: Children put the sample in the plastic box into the glass with water. It is advantageous to bind a spring to the plastic box. This will allow disrupting the ‘water hill’ slowly without splashing additional water out of the glass.

6. Task 6: The spring bound to the plastic box allows also careful putting out of the box. After that we prepare a small glass (beaker, graduated cylinder) on which the children will mark the water level increase.

7. Discussion about the experiment results. Filling (painting) in the Measurement Protocol.

Plenary

Discussion with children about the day, whether all of them participated in activities and feelings and emotions sharing.

Extension

1. Each of the listed activities can be extended by further experiments. Now we describe an activity to extend the third lesson. We extend the activity by soaking candies, jelly-bears are the most common. When measuring candies children are motivated by the possibility of eating the samples.
2. Preparation of jelly-bears. The teacher prepares two kinds of bears (small and big). S/he prepares

two groups of bears with equal weight (of course, the number of bears will be different).

3. Further process will be the same as in the main activity – children prepare the ‘water hill’ where they slowly put the jelly-bears from the first group and find out the volume of the group. The same sequence of steps is done for the second group. The volume will be measured in the graduated cylinder.
4. This activity is very interesting for children. Partially because they can use the knowledge from the first activity and in connection with volume they can attain the notion of density.

Illustration photos