

RAINWATER MAPPING

WHAT HAPPENS TO RAINWATER? HOW MANY PLACES OR WAYS ARE THERE TO COLLECT RAINWATER? WHERE DOES IT SOAK INTO THE GROUND AND WHERE DOES IT RUN AWAY INTO STORM DRAIN?



GOAL The student does practical work outside in the field. The student can map simple terrains. The student can learn to recognise impermeable and semi-permeable surfaces and knows their importance for water management in the city

TIME 2 x 45 min.

AGE 6–9th grades of elementary school and high school

WHERE School grounds, the entire village, district, larger square etc.

WHEN All year round

YOU NEED Village map or aerial photograph, mat, paper, crayons, band, ruler, you can make a pedometer or plot steps after determining step length

LESSON AUTHOR Ing. Martin Kříž (SŠ Polná High School, Chaloupky Ecocentre)

INTRODUCTION

A big problem in our cities is the management of rainwater. All those parking lots, roofs, concrete surfaces, playgrounds... drain the water into the sewer system. This is why during a storm the sewers fill up with water very quickly which then rushes into the nearest rivers. This causes water treatment plants to be overwhelmed and presents a very real threat of flash flooding.

In addition, because of climate change, we can expect a more varied distribution of precipitation. So while we can expect the total rainfall to remain the same, there will be longer periods of drought and more instances of increasingly heavier rainfall. It is therefore necessary to increase water retention in the cities as well as in the countryside. Cities need more grassy areas, semi-permeable paving and more mature trees that will literally drink up water.

1 MARK YOUR TERRITORY

According to the existing map, mark out the territory you will study and create a new map. It should be an accessible place, not surrounded by fences. School grounds or a public space such as a park or square are best. Copy the area you have chosen into your new map or plan, buildings included.

2 MAP THE SURFACES

Distinguish areas where:

- 1) you collect water for further use (for example, in barrels and underground reservoirs);
- 2) water seeps into the ground (areas that end up in drains and seepage points, green areas, areas with trees, semi-permeable parking lots or paved sidewalks, sand and gravel surfaces...);
- 3) the rainwater drains into the sewers (surfaces of roads, asphalt parking lots...).



3 TOTAL AREA

Find the total area of the individual plots of type 1–3.

4 PROPOSE A SOLUTION

Try to suggest how to turn the places marked with the number 3 into permeable or semi-permeable surfaces, or how to collect rainwater.

5 REFLECTION

Final questions:

1. How did you work? What were the challenges? What worked for you?
2. What happens to water on your land? Try to think over how the infrastructure of cities needs to be changed. Why is it called “blue-green infrastructure”?
3. How much water drains from the roof (parking lot, playground...) of your school per year? You can find out the amount of precipitation in your municipality at a climate monitoring website in your area.
4. Find out where rainwater goes after draining from your property. Go to your local municipal office to get maps or study results and map the path of the rainwater to the nearest river or body of water.



EVALUATION OF THE ACTIVITY'S GOAL (EVIDENCE OF LEARNING)

- The student creates a map of their surveyed area
- The student calculates the size of the individual types of areas by himself or in a group
- Photography (and work with tape measures, pedometers...)
- Worked outside in the field
- The student proposed measures to capture more rainwater

MORE OPTIONS

- What volume of water will fall on one square metre of area if it rains 1 mm? Find out experimentally or do the maths.
- Find out how much water falls under the trees as compared with how much in open spaces when it rains. How much precipitation does a tree retain?
- During heavy rain, try to measure the intensity of the rainfall by measuring the amount of precipitation (mm) per hour. Note how long it rains; after the rain, measure the amount of precipitation. Divide by the number of hours of rain to get the hourly rainfall. The brave researchers can go out into the rain and watch the change in rainfall every ten minutes and multiply by six to get the current hourly intensity.
- Forecasts for such heavy rainfalls should be found at your national weather office. Precipitation at specific meteorological stations can be found in some applications which you can download.
- Compare the actual amount of precipitation with the Aladin forecast models used by such sites as wunderground.com and YR.no.

! TIP

Calculate the amount of water that will run off the roof of your school in a year.

