**Topic: WATER**

**Experiment: Polluted water in the ground**

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**Scandal of Environmental Pollution at … School!**

**Environmental detective dog Sherlock on the right track**



On Wednesday morning Sherlock found something very mysterious. On his way through the school compound of … School he suddenly smelled a strange and very sharp smell. It came from some bushes near the footpath. Of course it was no problem for Sherlock to find the cause of this biting scent. Just a few dog noses down the hill he discovered a strange plastic canister. The lid was open and the contents had already run out. The police later found out that a greenish liquid had leaked into the soil on the place. But what kind of a liquid this had been nobody could tell yet. And nobody knew either if the liquid was toxic and harmful to the environment. Furthermore there was a danger that the unknown liquid would contaminate the ground water. This really would be a big environmental scandal in the small town! So many questions were to be solved: How does the liquid seep into the ground? Is it dangerous for the ground water? Would the unknown substances be harmful to plants?

We need your help to solve all these questions! There will be a reward for any help in clearing up this incident!

**Experiment: Polluted water in the ground**

Your task:

In the beaker in front of you there is some polluted water. How does this liquid behave in the soil? You will do the experiment “The soil as a filter” now. And you will write an experimental protocol for this. You have to deal with the following questions: What do I want to show with this experiment? What do I expect how the substance will react? In your group of students you have five different types of “soil” for the experiment.

Experiment - materials

* two empty 1,5 l PET bottles
* waterproof pen
* two different “soils”
* scissors
* filter paper
* pins
* beaker
* unknown substance



Experiment – steps

1. You have to make the containers for the experiment first. You cut the PET-bottles in halves. With the help of the pin you prick two holes into the screw top of the bottle. You need to test whether the holes are big enough: the water must drip out from the screw top slowly. After the testing you put a filter paper into the top, so that the holes will not close themselves. Then you put the bottle tops headfirst into the bottle bottoms.
2. The filter (i.e. the headfirst bottle tops) will be filled with the experimental soil for 2/3 and the surface of the soil will be made a little wet.
3. Now you need 100 ml of the polluted water per filter plus a sample for comparison.
4. At this point you definitely need to read the points under “Experiment – evaluation”
5. Then you pour your liquid very slowly and cautiously into the soil of your filter.
6. The experiment is finished if all the substance has seeped through the soil in your filter and the liquid has been caught in the bottom half of the bottle. Make sure that it has completely finished dripping. You now should note two values: the colour and the volume of the liquid that has been caught. You assess the colour according to this: The original liquid will get 0 points. The cleanest filtrate will get 5 points. You sort out the others in between these two poles. Include all the values of the students of our group into your assessment.
7. Then you can dispose of the soil and the filtrate. You clean up the filters you made and put them aside for future experiments. Clean up your workplace with a wet cloth.

 Experiment – assessment

Work on these questions **before** you start the experiment:

* What do I want to show with this experiment?
* What do I expect to happen?
* What do I have to look at when I watch my experiment?

Work on these questions **after** finishing the experiment:

* What did I observe?
* Has my expectation been confirmed (born out)?
* Which sort of soil has had the best effect as a filter? Try to explain it.

Your chart could look like this:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| soil | colour (points 0-5)1. test
 | filtrate[ml] | colour (points 0-5)1. test
 | filtrate [ml] |
| soil 1 |  |  |  |  |
| soil 2 |  |  |  |  |
| soil 3 |  |  |  |  |
| soil 4 |  |  |  |  |
| soil 5 |  |  |  |  |
| made up filter |  |  |  |  |
| original substance | 0 | 100 ml | 0 | 100 ml |

In the graph the individual filters should be noted on the x-axis and the assessment points on the y-axis.