POTABLE OR NON-POTABLE WATER?

If the water is cloudy, discoloured and undrinkable, we can see it at a glance. But what if it is clean, clear, even odourless? Could it be poisonous? On the other hand, if it is visibly polluted, can it be fit to drink? What are the causes of water pollution? Can we prevent it or in some way avoid it?

Objectives: to identify the water pollutants and the ways how to prevent water pollution

Cross-curricular relations: Biology, Geography, Chemistry

Procedure

1. Pupils work in groups of 3-4.
2. The teacher gives each group 4 water samples:
    - cloudy water - water from the river or water with a mixture of earth,
    - macro pollution - water with small pieces of waste (e.g. lids from PET bottles, foil, rusty screws),
    - water with edible oil on the surface,
    - clear, clean water with added vinegar or citric acid.
3. Pupils examine the water samples and look for answers to the following questions:
    - What is contaminating the water sample?
    - What causes this contamination?
    - What environmental impact might it have on life in and near the water?
    - How can we help the water with such pollution?

4. Pupils choose appropriate items to clean the water in their samples and justify their choice.
5. Pupils select and sort the waste that pollutes their samples and justify the separation.
6. Pupils analyse the 4th water sample using litmus paper and based on the findings they determine the water pollutant.
7. The teacher provides feedback to pupils on the selection of the items and the correctness of their procedure and results.
8. The teacher and pupils discuss water pollution and the ways to prevent it.

Aids: 4 different water samples for each group, filter paper, funnel, litmus paper, glass jar, cotton wool, strainer, disinfectant, tweezers

‘MY CUBIC METER OF SOIL’

The Food and Agriculture Organization of the United Nations (FAO) has published information that 30 cm of the world's topsoil contains about twice as much carbon as the entire atmosphere. After the oceans, soil acts as the second largest natural sink that captures more carbon dioxide from the air than forests and other vegetation.

Objectives: to learn about soil, its basic properties, functions and potential to combat climate change

Cross-curricular relations: Environmental Education, Geography, Biology, Physics, Chemistry

Procedure:

- Pupils work in groups of 2 – 3 and fulfil the activity in 4 phases.

Phase 1 - How much is cubic metre of soil?

- Pupils choose a specific piece of land affected by humans (grassless land from the school grounds, a piece of land within an urban green area with partially exposed soil, the edge of a field, etc.).

Phase 2 - What do we know about soil? What is the importance of soil and what do we use it for?

- Each group obtains a chemistry experiment box.
- Pupils investigate the basic chemical properties of soil (e.g. soil moisture, soil granularity), identify soil types with help of soil maps.
- Under the guidance of the teacher, they search for information, carry out various measurements, observations and experiments in order to obtain as much information as possible about their 'cubic metre of soil'.

- Pupils put down all their findings.

Phase 3 - What are the problems of soil?

- Pupils identify problems and their impact on the properties of soil (mind map method).

Phase 4 - How can we prevent the soil pollution?

- Pupils look for solutions to the problems of negative impacts of climate and a man on the soil (brainstorming method).
- At the end of the lesson pupils present their findings to other groups.

Aids: soil samples from the local area, chemistry experiment box

NATURAL VALUES OF OUR VILLAGE

We don't have to travel to rainforests or dive to coral reefs to find valuable and important ecosystems for humans. There are certainly ecosystems in close proximity to our village that are important and significant not only for humans, but also for other organisms. Their beauty and value is often hidden behind human indifference and ignorance. Let us come together and reveal the beauty and importance of our natural ecosystems.

Objectives: to deepen the knowledge of different types of ecosystems and highlight their importance for humans and other living organisms through project-based learning

Cross-curricular relations: Environmental Education, Geography, Biology, Informatics

Procedure:

Phase 1 - What ecosystem are we going to tackle?

Pupils work in groups of three.

The teacher informs pupils about the contents of the presentation:

- description of the ecosystem - type, name, location, size, accessibility,
- flora and fauna of the selected ecosystem (photos, feathers, shells, nests etc.),
- threats to the ecosystem (illegal dumping, deforestation etc.),
- functions of the selected ecosystem.

Each group chooses one type of ecosystem (forest, aquatic, field, grassland, mountain).

Phase 2 - What do we know about our ecosystem?

Groups work independently without a teacher (field work, observation, literature study, result documenting, data processing).

Phase 3 - What functions does our ecosystem fulfil?

The teacher hands out a worksheet with the ecosystem functions, which will be a part of the presentation.

Pupils discuss and complete the worksheet in groups.

Phase 4 - What do we tell others about our ecosystem?

The teacher explains the formal aspects of the presentation (background, graphics, introduction page, text and time limit for the presentation - max. 10 min.).

Pupils decide on the form of the presentation (PowerPoint presentation or A2, A1, A0 drawing).

Pupils create presentations based on the information and materials collected.

The teacher organises a conference with the participation of invited guests (school management, peers, parents, professionals).

Pupils present their findings and results.

Phase 5 - How did we work and what have we learned?

After the conference, the teacher and the groups provide feedback to each other.

The results of the projects can be further developed into a video document, an article and a post on the school website.

Aids: literature on the different types of ecosystems, computers with internet access and software for preparing presentations, camera, drawing paper (large sizes e.g. A2, A1, A0), markers, water colours, tempera paints, glue

PRODUCT LIFE CYCLE

We all have one, some of us even two non-functional, outdated mobile phones resting in a drawer. We can't even imagine life without them anymore. Advertisements and mobile operators force us to change the mobile phone every two years. How many mobile phones have we owned in our lives? How is the use of mobile phones related to the climate change?

Objectives: to look up information, describe the life cycle of a mobile phone and create an educational poster, to identify the mobile phone impact on the environment and the climate change

Cross-curricular relations: Environmental Education, Geography, Informatics

Procedure:

Pupils present their ideas (brainstorming) at the beginning of the lesson and discuss their experience with the use of mobile phones.

Phase 1 - Where did my mobile phone come from?

Pupils work in groups of 3-4.

Pupils look up information to the main points given by the teacher:

- the production of the mobile phone (processing of raw materials, production of mobile phones, selling the mobile phones etc.),
- the use of mobile phones (calling, texting, data transfer, charging),
- the mobile phone as waste and its impact on the environment.

Pupils look for information on the Internet or in the available literature and on a map they mark the countries which are raw material processors, manufacturers, exporters and importers of mobile phones.

The teacher explains the concept of carbon footprint and how to calculate it.

Pupils calculate the carbon footprint on the basis of their own use of a mobile phone.

The teacher informs about the e-waste separation, recycling.

Pupils present their findings and compare them among groups.

Phase 2 - What to tell others about the life cycle of a mobile phone?

Pupils use their findings to create an educational poster to display in the school.

Aids: the Internet, flipchart paper, markers, stationery supplies

PLASTIC BAGS ALL AROUND US ...

Plastic disposable shopping bags (plastic bags) became a rare novelty in Slovakia in the late 1970s (abroad in the 1960s). In recent years, however, they have become a global problem because they are found all around us, from the deepest parts of the seas and oceans to the highest peaks of mountains. It takes hundreds of years for a single-use plastic bag to decompose (10 - 1000 years, depending on the type of plastic and its thickness). In 2010, 98.6 billion plastic bags were put on the EU market, and on average there were 198 plastic bags per EU citizen (only 7% were recycled). There are differences in consumption figures among EU countries ranging from 4 bags in Denmark and Finland to 466 bags in Poland, Portugal and Slovakia per citizen a year. Ireland is one country that has already reduced its annual consumption of plastic bags from 328 to 18 per citizen (95% less) in 2002. EU Member States must reduce plastic bag consumption of plastic bags to 40 per citizen by 2025. In Slovakia, the sale of plastic bags has been charged since 1 January 2018.

Objectives: to identify ways to reduce the amount of plastic bags in our daily lives and their negative impact on the environment due to the long decomposition time of plastics, to make an eco-bag

Cross - curricular relations: Ethics Education, Geography, Biology, Technology

Procedure:

The teacher and pupils discuss the occurrence of plastics in human life (production, consumption, separation, recycling of plastics, accumulation of plastics in the oceans, impact of plastics on the environment, decomposition of plastics) and look for answers to the following questions:

- Can plastics be a problem for the environment?
- If plastics are a problem for the environment, is the problem global, regional or local?
- In which specific environmental components might we encounter a lot of slowly degrading plastics?
- Which types of plastic waste are the biggest problems for the environment?
- How long do plastics take to decompose in the nature?
- How are "micro plastics" related to plastic waste?
- Can we replace single-use plastic products with sustainable, multi -purpose products?

The teacher hands out eco-bag making instructions for pupils to follow.

Aids: instructions for making a shopping bag, old unused T-shirt, scissors, textile marker