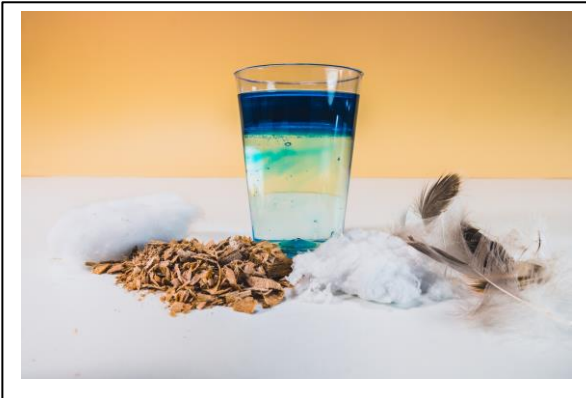




Cleaning an oil-spill



Key words

- oil
- ocean pollution
- environmental engineering
- oil-spill

The science behind

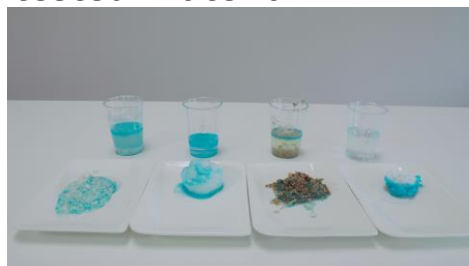
Introduction

In the experiment, you have tested different materials to explore how well these materials can remove oil from water.

Now, you have to become an environmental engineer. Your job is to find the best way to remove oil from the sea as quickly as possible. When an oil spill happens, the time is crucial to prevent even bigger damage.

Explanation

You learned the oil floats on the surface of water due to its lower density. How can the oil be removed from the water most efficiently? When the testing is finished check if there is any coloured oil left on the water surface. The clearer the water is more efficient is the tested material.





First, environmental engineers tried to extract oil from the sea using barriers. The oil was collected in one place and then pumped out of the sea with large pipes. In the experiment you tried to separate oil from the water with the spoon. It was not efficient as some oil was left in the water; in the ocean it will cause massive damage.

In the experiment you tried to halve as much oil and as little water as you could with:

- Cotton wool – it absorbed mostly water and collected a small amount of oil on the surface,
- Wood chips – which made a disaster, as wood chips sank to the bottom and are very difficult to remove from the water. Therefore, the water is even dirtier than before.
- Flour – oil and the water stick to it, but it is not easy to pick it out from the water and it is not much efficient in removing oil.
- The professional foam absorbent – Absorbents are substances that absorb oil in our case. The professional absorbent foam picks up all the oil, doesn't sink, floats on the surface and is easily removed from the water. Engineers discover that it is best option to remove oil from water in oil spills. Therefore, absorbent foam is nowadays commonly used option.

The engineers also tried to remove the oil also with the addition of emulsifiers. These are substances that break down the oil into small droplets. In the experiment you used dishwasher soap. With its addition, the oil disperses in the water, it no longer floats on the surface. But we do not want that, because oil still stays in the water and causes pollution, and there are now additional chemicals in the water that harm fish and other animals in the sea. So, the engineers do not do that anymore.

Everyday life

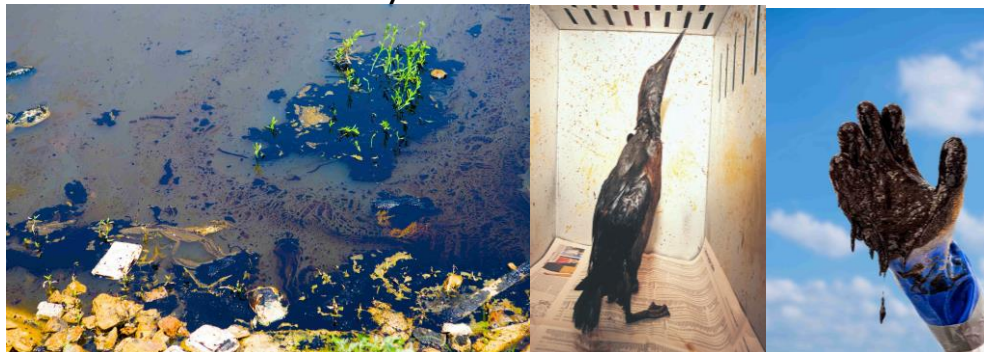
Oil is a thick, dark brown or greenish low-flammability liquid located in the upper layers of some parts of the Earth's crust.

Today, it is important source of energy and raw materials. Plastics for plastic bottles, soles on sneakers, polyester for clothing, waxes in tetra packs, fertilizers and many other things are made out of oil.



Oil spills are the release into the environment due to human activity and are a form of pollution. Cleaning up an oil spill can take months or even years.

Oil is harmful to animals and plants. When such accidents happen, many animals and the plants die. Oil penetrates the structure of bird feathers, birds usually also ingest the oil, which in turn causes damage. Most birds affected by an oil spill often die without human intervention. Marine mammals are exposed to oil spills, which affect them in a similar way.





Because the oil floats on top of the water, less sunlight penetrates the water, which limits the photosynthesis of marine plants and phytoplankton, which in turn affects the food chains in the ecosystem. Sulphate-reducing bacteria and acid-producing bacteria naturally interact with each other and remove oil from the ecosystem so their biomass replaces other populations in the food chain.

That foam we used is the first choice of environmental engineers, used in real oil spills. An interesting fact - 1 kg of foam can absorb 6 litres of oil. It is used precisely because of its properties - it does not sink and sucks all the oil from the water surface.

The composition of this foam is a carefully guarded patented secret. When the foam is taken out of the water, it is discarded or burned. It can also be centrifuged to squeeze the oil out of the foam, the foam is then dried and reused.

