



Learning about the dangers that threaten the sea

The Oil spill Case

Unit 1st: Oil + Spill= Oil spill, What possibly is this?

Did you know that...

Oil spill is the release of liquid petroleum into the environment, mainly in the marine ecosystem due to human activity. Most oil spills at sea occur when petroleum is transferred from the oil fields to refineries through pipelines or by oil tankers due to accidents. **However**, quantities of petroleum flow into the sea naturally and slowly, without the slightest human intervention. This inflow is expected and harmless.



Linguistics

Physics



1 teaching hour



Oil spill,
Sea pollution

Goals

Get to know the concept of oil spill

Understand the ways through which an oil spill can be created at sea.

Materials

Images from the Annex, Buckets or bowls,
Petroleum, Gasoline, Oil, Camera

Suggested Activities

Activity 1st:

“What and How?”

Children look at photos of oil spills formed in marine areas around the world and observe them (See annex). We discuss this phenomenon, focusing on its causes and on human contribution to it.

Activity 2nd:

Then, either in the classroom or in a lab, we try to create our own "oil spill". In three large bowls with water, we pour in the first petroleum, in the second gasoline and in the third oil. We observe and comment on what we see forming and then



we take pictures of the spills. After the end of the activity, we do not throw the liquids out of the bowls, we put them in a safe place instead. The goal is to leave the liquids in the bowls for a few days and then come back to study their shape and how they have been distributed in the water, especially the oil spill in which we will focus.

The Oil spill Case

Unit 2nd: When something is wrong ...

Did you know that...

The rising of sea temperature facilitates the rapid spread of petroleum and the formation of a thinner film. The air, **while moving**, splits the oil spill into parallel zones, according to its direction. Thus, marine currents affect oil spill's "journey".



Linguistics

Physics



1 teaching hour



Oil spill,
spreading,
human
intervention

Goals

Name the causes of marine pollution by oil spillage.

Understand the ways in which an oil spill can be created at sea.

Understand the role of weather conditions in oil spill spreading.

Materials

Images from the Annex and materials used in the first unit, fan, hair dryer, kettle and water cooler

Suggested Activities

Activity 1st:

We bring the bowls we used in the first unit into the classroom. We print or project on a slide projector the photos from the bowls. What do we observe? Has petroleum and gasoline spread? Are these liquids visible? We record our thoughts and observations. Then we discuss about the weather and the conditions that favor the spread of an oil spill, **that is, air, sea currents, water temperature**.

To help children better understand the phenomenon, we fill the three bowls with water and pour some petroleum. The children are divided into three groups and they will perform the same activity circular. The first team will try to



“spread” the oil spill with the help of the fan. The second group will use the hair dryer to move it and the third group will use hot and cold water to observe the petroleum's "reaction" to temperature.

We ask from the representatives of the groups to record and communicate their observations. After the end of the experiments we examine, if it is fully understood the fact that the actual oil spill “behaves” the same way.

The Oil spill Case

Unit 3rd: Seagulls are not black!

Did you know that...

Petroleum affects the reproduction, the development and organisms' behavior. Seagulls are the most negatively affected organism than any other. When a bird's plumage is covered with petroleum, it ceases to repel water. Then the water penetrates the plumage and displaces the air trapped between the wings and the skin of the birds. So, the bird sinks into the water and drowns. Even if the bird does not drown, the loss of thermal insulation results in the rapid depletion of energy stocks, which intend to keep its body temperature stable. Then comes hypothermia and death. In addition, the birds try to clear their plumage from the petroleum with their beak, so they swallow it. Depending on its toxicity, petroleum causes multiple damages.



Theatre Arts,
Physics



1 teaching hour



Oil spill,

Goals

To realize the consequences of an oil spill that appear on the sea, both on the organisms and on the entire marine environment.

To realize that the ultimate recipient of pollution is man himself.

Materials

Images from the Annex, black fabrics, computer – speakers, musical instruments, big cardboard box

Suggested Activities

Activity 1st:

Pupils learn through the images about the impact of the oil spill on living organisms in the marine environment. We discuss what happens to living organisms when they swallow petroleum and other harmful substances as well as when they have skin contact with them. Seabirds are the organisms most harmed since their home is

completely destroyed. In order to better understand the phenomenon we play the following game: in a large room (e.g. in the school's multipurpose classroom) we ask from the children to become birds of the sea. At first they fly free and healthy above the sea at a pace we can give either with a musical instrument or with orchestral music that we have chosen to help create the mood we want to have everytime. A big ship (the cardboard box that a pupil drives) transferring petroleum appears on the horizon as the weather continues to deteriorate. The ship fights the big waves and finally is defeated. The birds are watching the phenomenon. The sea is filled with black liquid (we place the black fabrics) and then the birds, as they attempt to reach the water, they get black as well. The pupils cover themselves with fabrics. Some people help with the cleaning of the sea and they also help the birds. The music harmonizes with the emotion of the story and the theatrical play.

Extension of activity:

To emphasize the "harmful" black that covers and ultimately kills seabirds, pupils can use of the "frozen image" technique, before the dramatization of the sea cleansing effort begins.

With a suitable background music, the scene in which the black fabrics cover the birds freezes. Then, every "bird" is asked to say a phrase about the situation it is experiencing, under conditions of pollution.



The Oil spill Case

Unit 4th: The solution will be found ... find out what you can do as well!

Did you know that...

There are several methods to deal with an oil spill that pollutes the sea which depend on the composition and the prevailing conditions. Some of them are: waterway barricades (booms) and pumping devices, chemical dispersants, on-site combustion, depollution (bioremediation), adsorbent materials (sorbents). It is also necessary to clean the coasts according to their morphology and their ecological importance so as not to cause further damage.



Linguistics

Physics



1 teaching hour



Goals

- Define what means to effectively deal with oil spill pollution and name their scientifically acceptable countermeasures.
- Be aware of potential ways to deal with oil spill pollution in the sea, such as: the use of floating dams (booms), absorbent materials (sorbents), pumps etc. and become familiar with their application in a virtual reality environment.

Materials

Images from the Annex and materials used in the first and second units, plastic straws, thin cords, scissors, disposable gloves.

Suggested Activities

Activity 1st:



We discuss with the children the possible ways to deal with the oil spill. We ask from them first to make assumptions about whether its spread could be restricted and how could that happen. After having recorded the pupils' ideas, we show the photos of the annex to them and we try to explain how the oil spills can be cleaned.

Alternatively we could use online videos that show methods of cleaning an oil spill. It is also suggested to use relevant game scripts and in particular their introductory texts to raise pupils' awareness and motivate them to participate.

Then, after filling the bowls with water, we pour petroleum for one more time. We try to make floating dams (booms) using the straws, which we cut into pieces and pass the rope through their gap. Pupils wearing gloves try to place "floating dams" in order to restrict oil spill. If the conditions are favorable (e.g. large laboratory) we can also try the method of burning the petroleum. Pupils photograph and record all stages of oil spill creation and its handling.



Review-Evaluation

Questions for reflection:

- Are you aware of maritime accidents that caused major oil spills and a huge environmental disaster?
- Browse ports and seas on world maps for oil spill marine accidents.
- Can you draw the black spots where oil spills appeared?

Activity:

Pupils work in groups according to the topic that it was of great interest to them. They present the knowledge they have gained as they wish: with a poster creation, painting, theatrical play. It is suggested to them to write a related article and publish it in a local newspaper.

Possible Extensions

Sea4all online game is especially helpful throughout the activities as the creation and the spreading of an oil spill are events unrelated to a child's day-to-day life.

Links - Bibliography

<https://tinanantsou.blogspot.com/2012/09/k.html>



Photo Annex





Enhancing critical thinking in schools for marine pollution using innovative ICT technologies (Sea4All)





Amoco Cadiz was a very large crude carrier (VLCC) owned by Amoco Transport Corp and transporting crude oil for Shell Oil. Operating under the Liberian flag of convenience, she ran aground on 16 March 1978 on Portsall Rocks, 5 km (3 mi) from the coast of Brittany, France. Ultimately she split in three and sank, resulting in the largest oil spill of its kind in history to that date.

Mfield (talk). This image is in the public domain because it contains materials that originally came from the U.S. National Oceanic and Atmospheric Administration, taken or made as part of an employee's official duties.



Gulf of Mexico: Tackle Deepwater Horizon oil spill with dams and collectors.

Booms and skimmers

The oil in this spill is contained by a boom while a skimming barge sucks up the mess.





U.S. Coast Guard photo - As a work of the U.S. federal government, the image or file is in the public domain.



Army soldiers cleaning Papamoa Beach after oil from the grounded ship Rena reached shore. (Source: New Zealand Defence Force, https://commons.wikimedia.org/wiki/File:Rena_oil_spill_cleanup.jpg. This work is authorized under the terms of the license Creative Commons Attribution 2.0 Generic license).



US Air Force C-130 sprays dispersant over Deepwater Horizon oil spill.



Controlled combustion of petroleum spilling into the Gulf of Mexico, following the Deepwater Horizon accident (May 6, 2010).



Enhancing critical thinking in schools for marine pollution using innovative ICT technologies (Sea4All)

