MELTING ICE
AND RISING SEA LEVEL

Geography |Chemistry| Physics | Geology

MED EDUC

Erasmus+

CLIMATE CHANGE

PEDAGOGIC CONTENT:

- Different state of water, density, ph and chemical reactions
- Global warming
- Continental glaciers / ice floes
- Melting glaciers and rising sea levels
- Immersed soil, non- immersed soil
- Fragility of coastal regions, Loss of habitat
- Migration (climate refuge)

PRE-REQUISITES:

- Notions on global warming

NEW COMPETENCIES TARGETED/LEARNING OUTCOMES:

STUDENTS WILL BE ABLE TO:

- Know the different state of water
- Be aware of human activities impacts on the environment
- Be aware of global warming and its consequences (loss of habitat, rising of sea levels, migration etc.)

DESCRIPTION:

PREPARATION

#1: It is better to carry out the experiment shortly before lunch break, as the ice takes time to melt. You can also use a hair dryer to shorten the melt wait time.

Prepare the room and group the students

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DESCRIPTION:

IMPLEMENTATION

#1: Ask the question: what impact can global warming have on oceans?

In general, pupils spontaneously think of rising sea levels. The teacher then surveys the reasons, in the children's view, for the rise in sea levels. Most pupils think it is the melting ice, without making a distinction between the melting of polar ice floe (or ice floes, as there is also an Antarctic ice floe, which is less familiar to pupils) and continental ice.

The teacher can then ask where ice is found in large quantities on Earth, and point out that there are two different possibilities: ice can be situated on land (continental glaciers, Antarctica, Greenland, etc.) or float on the ocean (Arctic and Antarctic ice floes). It can then be asked whether these two types of ice will have the same effect on rising sea levels.

#2: In order to raise the interest of students, the teacher can introduce this activity through linking it to the loss of habitat for species like polar bears.

Polar bears are the largest land carnivores in the arctic habitat and spend most of their time traveling on sea ice in search of preys such as seals. The arctic sea ice cap in a large area of frozen floating on top of the Arctic ocean.

Watch the video (link provided in the end of this sheet): Arctic polar bears "face near-extinction within decades warn scientists".

Why? Carry out this experience to answer.

#3: Split the class into 2 groups :

- Ice floes
- Continental glaciers

Put the same quantity of water in the 2 containers (the water represents the oceans).

In one of the 2 containers, put 10 ice cubes into the water (for the ice floes group).

In the other container, put stones or a heavy object that represents a continent. On this continent, place the 10 ice cubes (for the continental glaciers group).

#4: Ask the question: How will you know that the water level has risen or not?

Students can suggest different solutions: draw a line with an indelible marker, paste a paper, paste a ruler... to see the height of the water before the ice melts.

DESCRIPTION:

#5: The ice placed in water melts very fast (in a few minutes), whereas the one placed on the “continent” melts much more slowly (in a few hours). This first observation should help understand the fragility of the ice floe, which melts more quickly than the continental glaciers. The ice changed it state, it became l liquid.

#6: After leaving enough time (after lunch, for example), the pupils, by groups, should write down exactly what they have observed and draw their experiment. This is an opportunity to work on drawing of experiments: title, date, legend, use of pencil, ruler, etc.

They should write down the results of their experiment and their conclusion, which is an interpretation of the results in the light of the context of the experiment: What did we want to find out? Does the result provide the answers to the question? etc.

Each group designates a representative to explain its work to the class. The results are discussed as a group, and a common conclusion is produced.

For example: Climate change causes melting of ice. The melting of continental ice causes sea levels to rise, whereas the melting of ice floes has no immediate effect on sea levels.

The melting of the continental glaciers accounts for 65% of the rise in sea levels, half of which comes from the glaciers of Greenland and Antarctica. The other 35% is from thermal expansion of the oceans.

The various scenarios predict a rise in sea levels from 50 cm to 1 meter by the end of the 21st century.

#7:

- What will happen if the sea rises? Millions of people will be displaced: they are called "climate refugees".
- Address the concepts of emerged and submerged lands.
- Address cases of climate refugees (e.g. Tuvalu Islands).

Type of activity	Experimental activity
Target audience	From 11 years old
Place	Classroom or ICT laboratory
Material needed	Water 2 containers (with a flat bottom) 20 ice cubes Some little rocks (if not possible, a box with weight in it in order to support the ice cubes)
Duration of activity	Preparation: 10 minutes Implementation: 1 hour Step 1: 10 minutes Step 2: 5 minutes Step 3: 10 minutes Step 4: 10 minutes Step 5: 5 minutes Step 6: 10 minutes Step 7: 10 minutes
Authorship	La Main à la Pâte Foundation (French) No authorization required
Links	Activity : https://www.fondation-lamap.org/en/page/33358/ocean-session-i6-melting-ice-and-rising-sea-level Polar bear video: https://www.youtube.com/watch?v=inlSRFxWlPY Other activities (refugees and medias): https://amnestyfr.cdn.prismic.io/amnestyfr%2F69bbd929-833d-4bc1-8e22-afca88b8fab5_activite-pedagogique-accueil-refugies-presse-medias.pdf
Note by author	None

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