THE OCEAN SENSES ACTIVITIES BOOK

TOUCH

ARCTIC OCEAN TEMPERATURES

Focus:

To understand what water temperature is, and why it is important for life in the ocean. What factors influence water temperature (e.g., sunlight, solar radiation, heat transfer)?

Learning objectives:

In this activity, pupils will learn that temperature is an important factor influencing water, water quality, and altering the physical and chemical properties of water.

Key words:

Temperature, solar radiation, heat transfer, changes & drivers, consequences.

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IN SHORT (FOR THE TEACHER):

In this lesson, the pupils will feel how temperature changes in water. This feeling can frame discussions on temperature, heat transfer, and possibly also large-scale changes like climate change. You can extend the activity with the pupils finding ways to change the temperature (both warmer and colder) quicker.

Materials:

Each pair of pupils will have the following:

- A basin or bucket to pour water into
- A container of cold water
- A container of water at room temperature
- A container with hot water
- Possibly also some ice cubes to add so they can further change the temperature of the water in the bucket or basin.

Teaching Time:

30-45 minutes.

Classroom organization:

Pupils will ideally work in pairs.

Example image of a glacier calving, which will happen more rapidly as seas temperatures rise (Image: @stc2121a via Unsplash.com)

BACKGROUND STORY:

Water temperature and salinity in the Arctic Ocean are the most variable of any ocean. Water enters from the Atlantic and Pacific Oceans and ice from the surrounding continents.

Temperature ranges from –0.7°C to 3°C (30.8°F to 37.4°F).

All the world's oceans are warming due to climate change, but the Arctic Ocean, the smallest and shallowest of the world's oceans, is warming fastest of all. As the Arctic Ocean gets warmer, it causes the ice in the polar region to melt. As the ice melts, it exposes more of the ocean's surface to the sun, releasing heat and raising air temperatures.

As the Arctic continues to warm, it will melt the permafrost, which stores huge amounts of methane, a far more damaging greenhouse gas than carbon dioxide.

Learning procedure:

This water experiment will help pupils explore and feel the concept of water temperature and how it changes with different factors (sunlight, solar radiation, heat transfer). Get the pupils to pour the cold water into the bucket/basin and ask them to immerse their hands in it. Then leave the basin under the sun for ten minutes and ask the pupils to immerse their hands. Ask them what they feel and if they feel a different temperature.

Finally add some hot water and this time ask them to tell you why it is better not to immerse your hands in the water anymore. The pupils can use the ice to reduce the temperature again. Maybe they can feel that the temperature is different at the top of the bucket compared with the bottom.

A container of cold water with ice cubes. Illustration image. Maybe consider using ice in the water basin and experiment with melting and how this also impacts the temperature that the pupils feel (Image: Engin Akyurt via Unsplash.com)

More information:

https://arctic.noaa.gov/Report-Card/Report-Card- 2019/ArtMID/7916/ArticleID/840/Sea-Surface-Temperature

https://seatemperature.info/arctic-ocean-water-temperature.html

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