Inspiring Greatness
ISD
INDEPENDENCE SCHOOL DISTRICT

High School Science Virtual Learning

Earth Science

Composition of Seawater and the Ocean Zones

May 11, 2020

High School Earth Science
Lesson: May 11, 2020

Objective/Learning Target:

Students will be able to identify the layers (zones) of the oceans, their properties, and the composition of seawater.

Let's Get Started:

Watch this video: National Geographic: Exploring Oceans

Link to Video

Questions:

1. List three ways the Earth's oceans help make life on Earth possible.
2. How have humans threatened the Earth's oceans and their ability to sustain life on Earth?

Let's Get Started: Answer Key

1. Question 1- Ocean life generates about 70% of Earth's oxygen, absorbs much of the carbon dioxide produced, drives climate and weather, regulates and stabilizes Earth's temperature.
2. Question 2 - Overfishing and harmful fishing techniques, dumping toxic waste and sewage into the oceans, dumping of plastic wastes into the ocean, generation of excessive amounts of carbon dioxide through use of fossil fuels.

Lesson Activity: **Introduction to the Oceans**

Directions: Read - *"Introduction"* from the National Weather Service "JetStream"

Link to page

Complete the guided reading questions on the following slide.

1. Identify three reasons we should study the oceans from a meteorological impact.
2. Name the five oceans in order by size (largest to smallest).

Lesson Activity: Layers of the Ocean

Directions: Read "Layers of the Ocean" from the National Weather Service "JetStream"

Link to Page

Complete the guided reading questions on the following slide.

1. To what depth does the Epipelagic zone extend?
2. Why is the temperature of the Epipelagic zone fairly consistent throughout its depth?
3. To what depth does the Mesopelagic zone extend?
4. How much sunlight reaches the Mesopelagic zone?
5. How do temperatures vary in the Mesopelagic zone?
6. To what depth does the Bathypelagic zone extend?
7. Where does light in the Bathypelagic zone come from?
8. What is the average temperature in the Bathypelagic zone?
9. To what depth does the Abyssopelagic zone extend?
10. To what depth does the Hadalpelagic zone extend?
11. Has any living creature been found in the Hadalpelagic zone?

Lesson Activity: Sea Water

Directions: Read "Sea Water" from the National Weather Service "JetStream"

Link to Page

Complete the guided reading questions on the following slide.

1. What is the most common type of salt in ocean water?
2. How many grams of salt on average are in a liter of seawater?
3. Where is the surface salinity of the oceans lowest?

Answers

1. Identify three reasons we should study the oceans from a meteorological impact.

- More than one-half of the world's population lives within 60 miles (100 km) of the ocean.
- Its ability to absorb, store, and release heat into the atmosphere is huge and often directly affects us.
- Major climate events, such as El Niño, result from ocean temperature changes.

2. Name the five oceans in order by size (largest to smallest).

Pacific, Atlantic, Indian, Southern, Arctic

1. To what depth does the Epipelagic zone extend? Surface to 200 meters
2. Why is the temperature of the Epipelagic zone fairly consistent throughout its depth? Surface winds keep this layer mixed allowing even heating.
3. To what depth does the Mesopelagic zone extend? 200 to 1000 meters
4. How much sunlight reaches the Mesopelagic zone? sunlight is very faint
5. How do temperatures vary in the Mesopelagic zone? Decline to near freezing
6. To what depth does the Bathypelagic zone extend? 1000 to 4000 meters
7. Where does light in the Bathypelagic zone come from? bioluminescence of the animals
8. What is the average temperature in the Bathypelagic zone? 39°F (4°C)
9. To what depth does the Abyssopelagic zone extend? 4000 to 6000 meters
10. To what depth does the Hadalpelagic zone extend? 6000 to 10994 meters
11. Has any living creature been found in the Hadalpelagic zone? yes

1. What is the most common type of salt in ocean water? Sodium chloride (table salt)
2. How many grams of salt on average are in a liter of seawater? about 35 grams
3. Where is the surface salinity of the oceans lowest? Near the equator where rainfall is highest and near the poles where ice is melting.

Extensions:

1. **Read "A Funny Bath - The Dead Sea"** Link to page

   Why is the Dead Sea "dead"?

   Why is the Dead Sea so salty?

2. **Activity "Salt n' Lighter"** Link to Activity

   (one teaspoon of salt is about 6 grams)

3. **Video "NASA | The Ocean: A Driving Force for Weather and Climate"**

   Link to Video

4. **Video "PBS:The Deep Ocean"** Link to Video

Extension Answers

Why is the Dead Sea “dead”? No living organisms can survive in the high salt content

Why is the Dead Sea so salty? Water containing dissolved salts flows into the Dead Sea, with no outlet and high evaporation rates, the salt concentration continues to increase over time.