K-2 Grade Band

EDUCATION
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Walking into the Deep

Georgia Standards of Excellence:

- S1P1. Obtain, evaluate, and communicate information to investigate light and sound.

  a. Use observations to construct an explanation of how light is required to make objects visible.

Next Generation Science Standards:

- 1-PS4-2 Make observations to construct an evidence-based account that objects in darkness can be seen only when illuminated.

Learning Objective:

- Students will extend light visibility to the ocean zones.
- Students will relate animals to their home zone in the ocean.

Essential Question:

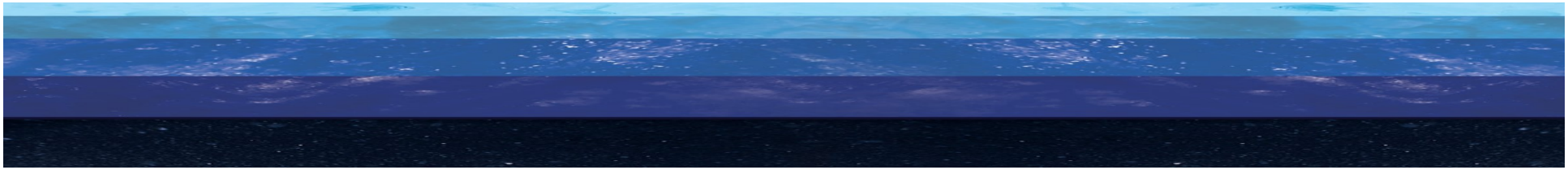
- Why do animals live in one ocean zone and not another one?

Key Vocabulary:

- Sunlight
- Twilight
- Midnight
- Abyssal

Materials:

- Tape
- Flashlight
- Paper
- Zone Labels
- Animal pictures



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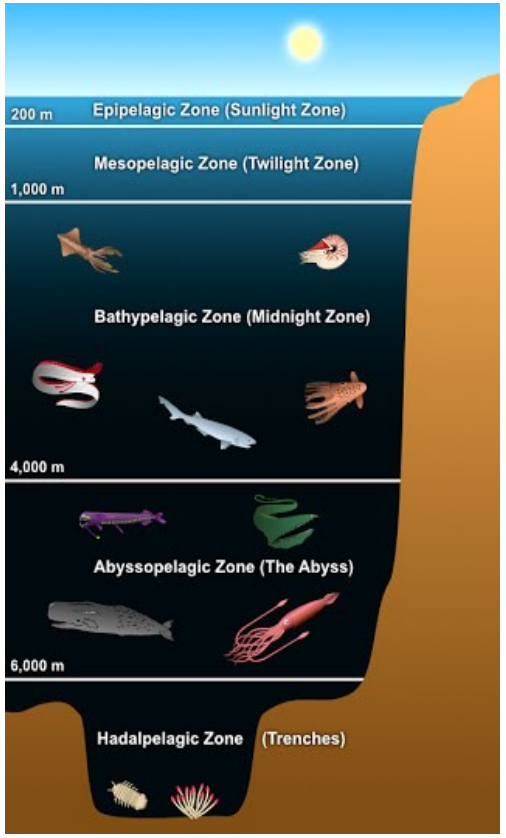
Background Information:



There are five zones of the ocean ranging from zero meters to deepest known point over eleven thousand meters. The focus for this lesson are the top four zones: sunlight zone (epipelagic), twilight zone (mesopelagic), midnight zone (bathypelagic) and abyssal zone (abyssopelagic). The main differences between these zones are changes in temperature, depth, amount of sunlight and pressure present.

Sunlight Zone: This zone extends from the surface to 200 meters (660 feet). It has the most amount that can be seen in the ocean. It is also the warmest layer because of the sunlight. It is the smallest zone. All the microscopic plants live in this layer and do not receive enough sunlight in any of the other layers.

Twilight Zone: This zone extends from 200 meters (660 feet) to 1,000 meters (3,300 feet). Some sunlight penetrates this layer, but it is very faint. This zone has the widest range of temperature.

Midnight Zone: This zone extends from 1,000 meters (3,300 feet) to 4,000 meters (13,100 feet). No sunlight reaches this layer and the temperature is a constant 39°F (4°C).

Abyssal Zone: This zone extends from 4,000 meters (13,100 feet) to 6,000 meters (19,700 feet). No light reaches this zone either, but the temperature remains at just above 32°F (0°C). This zone includes the ocean floor. The fifth zone (Trench zone) includes only one region of the ocean known as the Marianna trench. Little to nothing is known about the ocean life in this zone.

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Activity Instructions:

Before the class begins: tape the zone labels to the wall at desired locations. Print animal cards and fold where the lines meet. If desired punch hole and tie string to make into a lanyard.

1. Explain to students that the ocean is made up of layers like a cake. Each layer is divided by how much sunlight reaches it.
2. Turn off lights in the room and use the flashlight for demonstration.
3. The flashlight is the sun hitting the top layer of the Ocean known as the sunlight layer, explain the sunlight zone information from the background section.
4. Place a piece of paper over the flashlight and explain as light travels deeper in the ocean, it gets darker. One layer of paper is the twilight zone, explain twilight zone information from the background section.
5. Add more layers until it's completely dark, this is the midnight zone. Explain the midnight zone information from the background section to students. Explain there is another layer with no light, but even colder called the abyssal zone. Use the abyssal zone information from the background section.
6. Turn classroom lights back on and hand out the plant or animal card to students.
7. Have students take their plant or animal card and stand in the correct zone using the hints on the back.

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Evaluate:

Review with the class the zones each animal should be in. Confirm if students went to the correct zone.

Discuss the lack of fish in the abyssal zone. Explain the temperatures can make it very difficult for them to survive.

Ask the students if they were surprised by the different types of animals living in darkness.

Answer Key:

Sunlight Zone: coral, sea grass, kelp, blacktip reef shark, mandarinfish and weedy sea dragon

Twilight Zone: oarfish, blobfish and helmet jelly

Midnight Zone: giant squid, Deepsea anglerfish and whalefish

Abyssal Zone: giant tube worm, yeti crab and sea pig

References and Extensions:

Flip through some images of deep sea invertebrates through the Smithsonian's website at Deep Ocean Diversity Slide Show https://ocean.si.edu/ocean-life/invertebrates/deep-ocean-diversity-slideshow.

Pick out videos and clips on different depths and regions recorded by NOAA Ocean Explorer Gov https://www.youtube.com/c/oceanexplorergov/featured.

Zone Labels

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Sunlight Zone

Twilight Zone

Midnight Zone

Abyssal Zone

Coral Reef

I am a bunch of animals living together. I can be found all over the world. I like warm, bright waters.

Monterey Bay Aquarium Research Institute

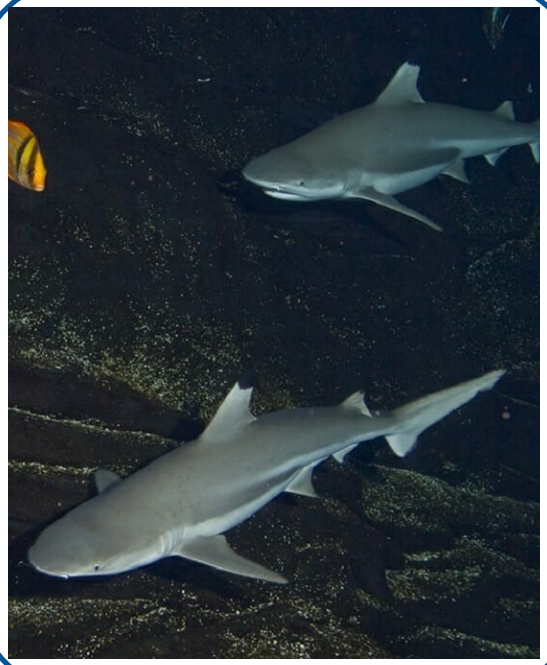
Smithsonian Ocean

Sea Grass

I am a plant. I can make giant meadows underwater. I slow the water down and help clean it.

Kelp

I am an algae, cousins to plants. I make up underwater forest that many animals live in, including sea lions!



Blacktip Reef Shark

I live in warm, coastal waters with lots of sun. I find most of my food in coral reefs.

Mandarin Fish

I am colorful and can been easily seen in the day. My bright color tells others they'll get sick if they eat me!

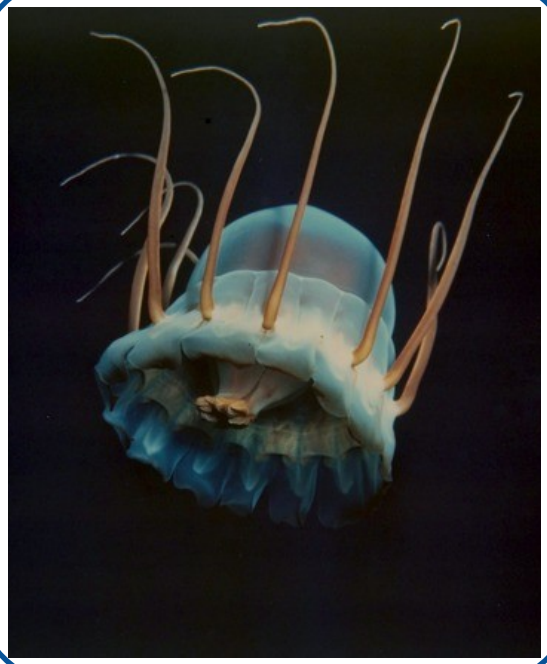
Weedy Sea Dragon

I am not very good at swimming so I hide in kelp forests and sea grass. Sea horses are my cousins!

NBC News

Oarfish

I may look like a gi-ant snake, but I am fish! I spend most of my time in dark waters, but not too dark!



UCSD Library

Monterey Bay Aquarium Research Institute

Blobfish

I like a wide range of temperatures with just a little bit of light. I look total-ly different when out of water.

Helmet Jelly

I am an animal. I like dark waters, but during the night travel higher up in the water. I eat tiny food.

NOAA

Giant Squid

I am very big, have giant eyes and stay in the dark. I like cold waters, but not almost freez-ing.

Fishes of Australia. net

Bluegreen Pictures Alamy

Deepsea Anglerfish

I have never seen the sun and I like it that way. I use the light on my head to lure food to me for a yummy snack.

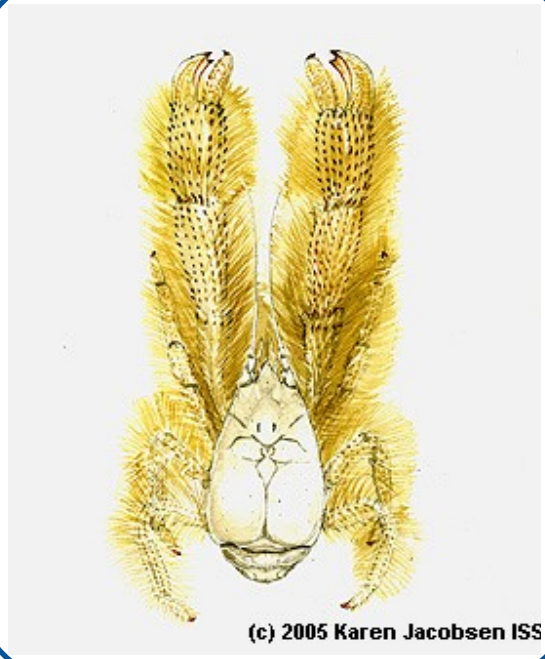
Whalefish

I look sort of like a whale, but I'm a fish, much smaller and don't know what sunlight looks like.

National Geographics

Giant Tube Worm

I am an animal. I like to live around underwater vents. The nearby water is almost very, very cold and dark.



Monterey Bay Aquarium Research Institute

Sea Pig

I am an animal. I live on the ocean floor and dig in the ground to find my food. It is com-pletely dark.

Yeti Crab

I have very hairy legs, but watch out I still pinch! I live near freezing water and total darkness. I call the ocean floor home.