

Exploring the Deep Ocean: The Twilight and Midnight Zones



Fun Facts:

- There is almost no light in the twilight zone, and none at all in the midnight zone of the ocean!
- There are no plants that live in these areas because there's not enough sunlight for them to survive.
- Some of the fish that live in the twilight zone migrate every day to the sunlight zone to feed, then swim back down!

What kind of special adaptations would you need to live in the twilight and midnight zones?

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Links:

Journey Into Midnight: Light and Life Beyond the Twilight Zone-

<https://oceanexplorer.noaa.gov/explorations/19biolum/welcome.html>

Welcome to the Midnight Zone: A deep-sea learning experience at the Two Oceans Aquarium-

<https://www.aquarium.co.za/blog/entry/welcome-to-the-midnight-zone-a-deep-sea-learning-experience>

Creatures of the Deep: Atolla Jellyfish-

<https://www.scuba.com/blog/explore-the-blue/creatures-deep-atolla-jellyfish/>

Exploring the ocean's midnight zone with MBARI-

<https://thekidshouldseethis.com/post/ocean-midnight-zone-mbari-video>

The Ocean Twilight zone: Earth's Final Frontier Video-

<https://www.youtube.com/watch?v=Fma6MM359Z0>

Life in the Twilight Zone



What is the twilight zone?

The twilight zone is the layer of water in the ocean that stretches from about 650-3,300 ft deep, just beyond the reach of sunlight. It is cold and dim here.

What lives in the twilight zone?

Animals in the twilight zone range anywhere from microscopic to among the biggest on the planet! Some of these include bacteria, zooplankton, fish, squid, and jellyfish. Some animals travel between the twilight and sunlight zone, like some sharks and whales.

There is a rich diversity of life in the twilight zone. Many creatures have developed special adaptations to live here where it is cold and dark. One of these adaptations is known as bioluminescence, where creatures produce their own light from their bodies! This glowing creature is called a ctenophore.



Photo Credit: Woods Hole Oceanographic Institute

Why is the twilight zone important?

Due to its sheer size, low light and diverse ecosystem, the twilight zone is very difficult to study. There's a lot that we don't know about it. However, we do know that it helps regulate our climate and supports important ocean food webs. Fun fact, the twilight zone contains 10x more fish than the rest of the ocean! Color in the twilight zone on your Ocean Zones worksheet from last week.

The Midnight Zone



Did you know that 90% of the ocean has never been explored? We don't know much about what lurks in its deep, dark corners. Yet, we do know that within these deep zones, some fascinating creatures exist. Animals have had to develop some pretty bizarre adaptations in order to survive in these frigid, dark waters.



What is the midnight zone?

The midnight zone is the zone of the ocean that runs from about 3,300-13,100 ft below the surface. Sunlight does not reach this zone of the ocean, so it is completely dark and extremely cold.

What lives in the midnight zone?

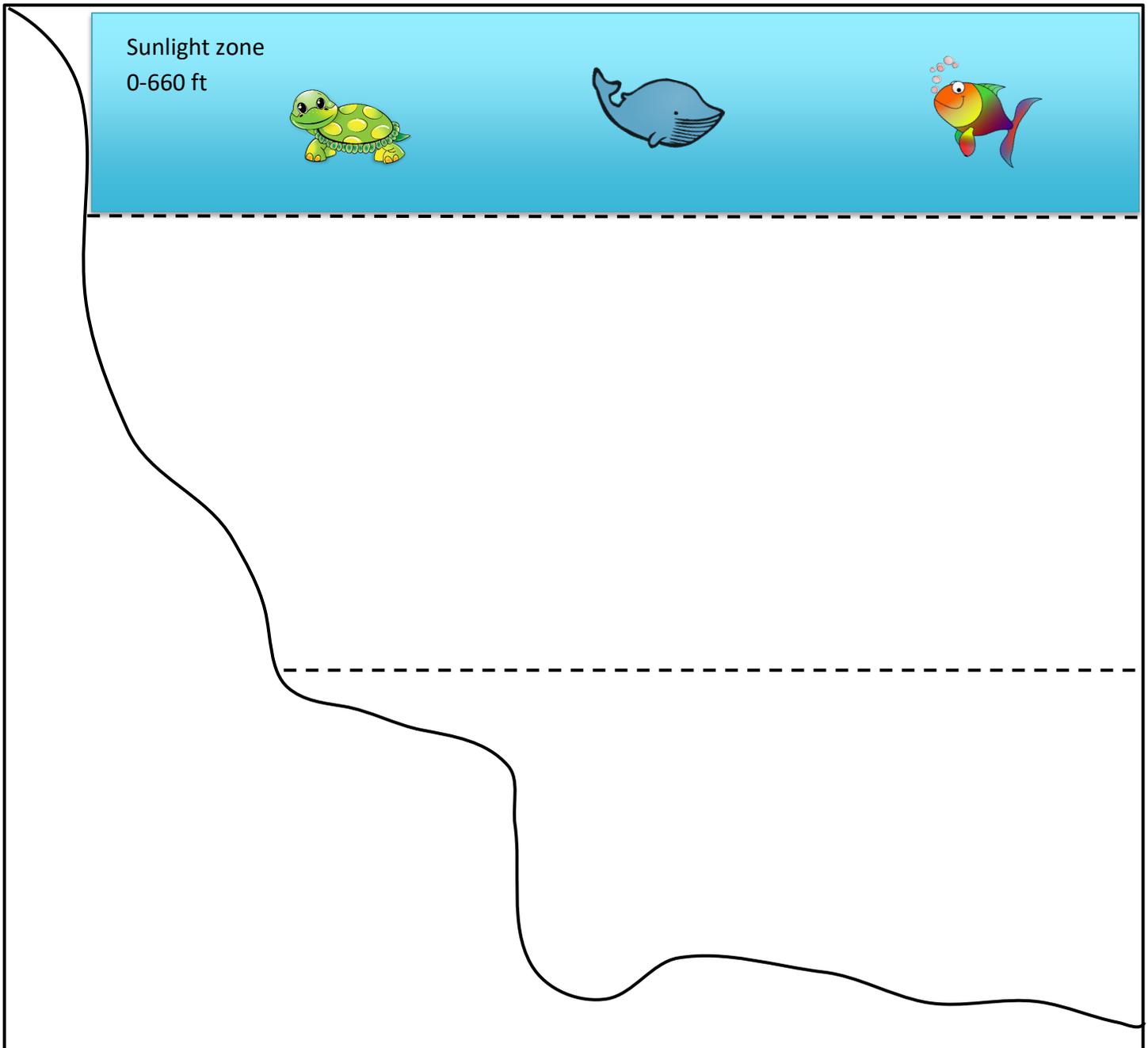
Because there is no sunlight, plants don't grow here. This means that only predators and scavengers live in the midnight zone. Also, because there's no light, animals do not need large eyes. Many are completely blind and use a variety of other senses to survive! Some species that call the midnight zone their home include crustaceans, eels, deep sea corals, and anglerfish. Check out these photos to see what some of these creatures look like. Can you see what kind of special adaptations they have?



Ocean Zones



Last week, you learned about the sunlight zone and colored in the top portion of this worksheet. It should look something like the picture below. Now, color in the twilight and midnight zones, and draw a few of the critters that live there. Label each ocean zone with the correct name and depth that it reaches. Use the Fact Sheets and video links from this unit to guide you.



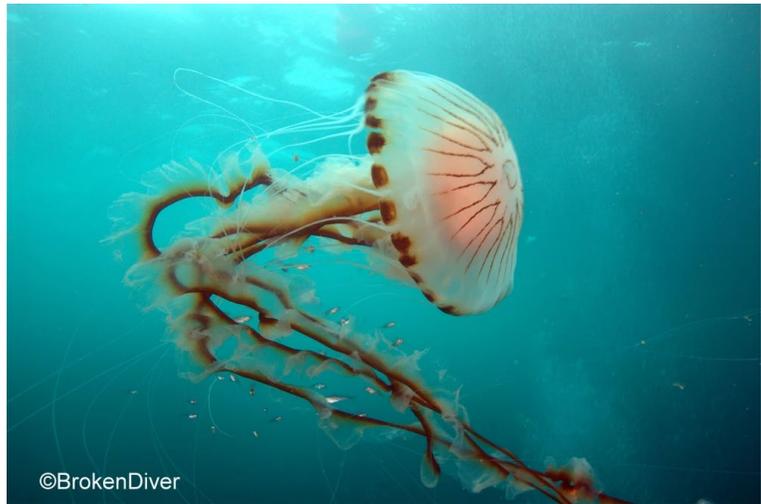
Make Your Own Jellyfish!



Jellyfish are one of the many creatures that exist in the twilight zone.

In this vast expanse of water, jellyfish float freely and eat small crustaceans.

In this activity, you will make your own jellyfish inside a bottle to see how they float in the water column.



To make your jellyfish, you'll need:

- Plastic grocery bag
- Old water bottle
- Thread or string
- Blue Food coloring
- Scissors

1. Flatten the bag onto a table and cut off the handles and bottom.
2. Cut along both sides of the bag to split it into 2 sheets. You will only need one sheet, so make sure you recycle the plastic you're not using!
3. Pinch the center of the plastic sheet and pull upwards. Bundle the center of the sheet to form a tiny balloon shape, which will be the jellyfish's head. Make sure to leave plenty of extra plastic below this balloon head.
4. Tie the bottom of the balloon shape off with a little piece of thread. Make sure not to tie it too tight, leave a small opening to pour some water into the head shortly.
5. Cut from the bottom edge of the plastic up to the thread to make strips. Make some thicker strips and some thin ones, and cut some strips to make different lengths. These are the jellyfish's tentacles.
6. Fill the top balloon shape (the head) with water and tie the thread tight.
7. Fill up your water bottle with water and add the jellyfish.

Make Your Own Jellyfish!



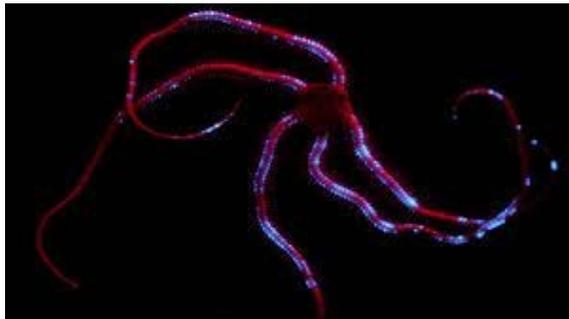
8. Add a few drops of blue food coloring to the bottle and gently shake.
9. Done! Now you have a jellyfish floating in the ocean.



Make your Own Bioluminescent Fish



We know that the twilight and midnight zones are home to some bizarre creatures with unique adaptations. Many species light up through a process called bioluminescence. Others have teeth that point inwards to make it hard for prey to escape their mouths. Many do not have eyes, and instead rely on their other senses to live and find food. In this activity, you'll create your own bioluminescent fish, fit to live in the twilight or midnight zone!



What you'll need:

- 1 empty water or soda bottle
- Tissue Paper
- Glow sticks
- String or twine
- Scissors
- Extras: markers, googly eyes, pipe cleaners, pieces of egg cartons, toothpicks, etc.

Make your Own Bioluminescent Fish



Instructions:

1. Take the cap off of your water or soda bottle. The bottle is the body of your fish, the opening in the bottle is its mouth.
2. Select a few colors of tissue paper and tear it up into long strips.
3. Fill your water bottle fish with the pieces of tissue paper until it is full.
4. Crack your glow sticks and insert them into the water bottle. This is the bioluminescent part of your fish. You can add one or two glow sticks, or as many as you want! Make different glowing shapes or stripes throughout the bottle.
5. Optional: use the markers or googly eyes to give your fish eyes up close to the mouth. Remember that this is optional, as some fish in the deep sea don't even have eyes!
6. Use the other extra materials to give your fish some special adaptations to life in the deep sea. Maybe it has extra sensory organs to make up for its lack of eyesight. Maybe it has sharp teeth (toothpicks) to hold on tight to its prey. Get creative!
7. Once your fish is done, grab your scissors. Carefully poke 2 small holes right next to each other on the side of the water bottle where the fish's dorsal fin would be.
8. Thread your twine through these 2 small holes and tie a knot to secure it. Now your fish should be attached to a long line of twine so that you can hang it from the ceiling! It will glow for several days.

