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# Deep in the Ocean



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Written by Natalie Rompella

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## Focus Question

How would you describe the deep ocean and what lives there?

## Words to Know

adaptable  
data  
expeditions  
Jurassic  
marine

predict  
processes  
species  
submersible

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Front cover: The deep ocean fangfish has a bony, hard body. This strong body works like a shell to help protect it from both the freezing temperatures and heavy water pressure found at depths of about 4,876 meters (16,000 ft).

Title page: The tunicate attaches itself to the walls of deep ocean canyons. It waits for small sea life to swim past its wide-open mouth.

Page 3: The deep ocean anglerfish uses the bright end of a spine like a fishing pole to attract prey.

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### Correlation

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The small, deep ocean sea pig roams the ocean floor, often in herds, eating tiny sea animals and microbes that live in the mud.

## Deep Underwater

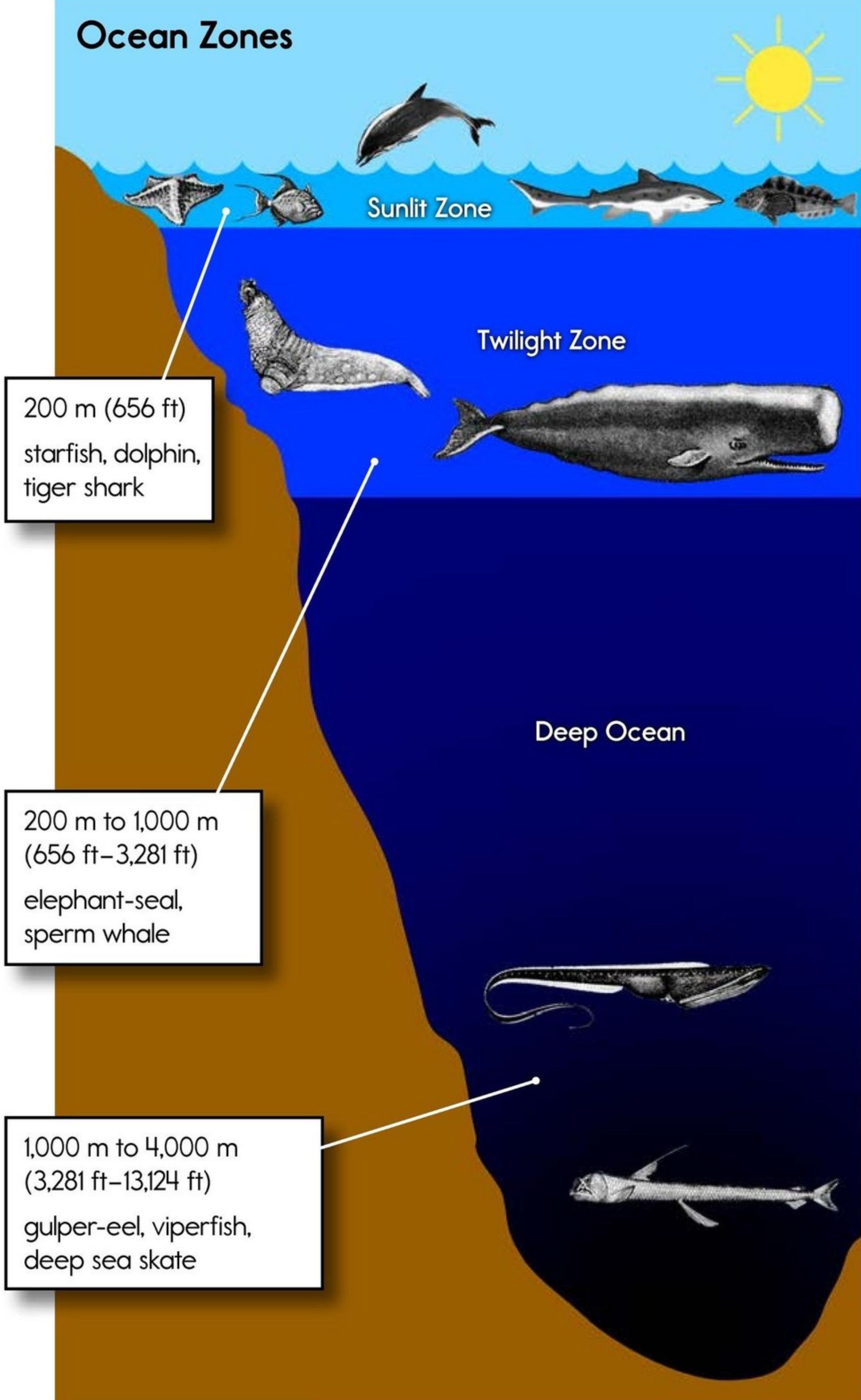
Imagine taking a voyage to the deepest part of the ocean. What types of things would you expect to see? Would it be dark or light? Would you see clearly or would the water be cloudy? Would it be warm or cold? Would you see familiar animals and plants or find strange and new ones?

Sunlight warms the shallow parts of the ocean down to 200 meters (656 ft) below the surface. Plants and animals that need sunlight and warm water live there, such as tiger sharks and many **species** of common dolphins. Deep in the ocean, other animals, including vampire squid, fangtooth fish, and viperfish, live in water that is cold and dark.



The warm, shallow waters of tide pools are home to species of starfish, anemones, mussels, and tiny crabs.

## Ocean Zones



## Diving Deep in the Ocean

The deep ocean, below 1,000 meters (3,281 ft), is freezing cold. The water pressure below 39.6 meters (130 ft) can harm you if you don't have the right protective gear. Sport divers wear air tanks filled with a mixture of gases for safety. They also wear special dive computers that help them know how far down they are and how much air they have. Deep divers wear special hard diving suits to protect them from the water pressure. For really deep dives, groups of two or three scientists ride in a small submarine called a **submersible**. Some of these submersibles have robot arms that can collect samples of water, soil, and small animals underwater.





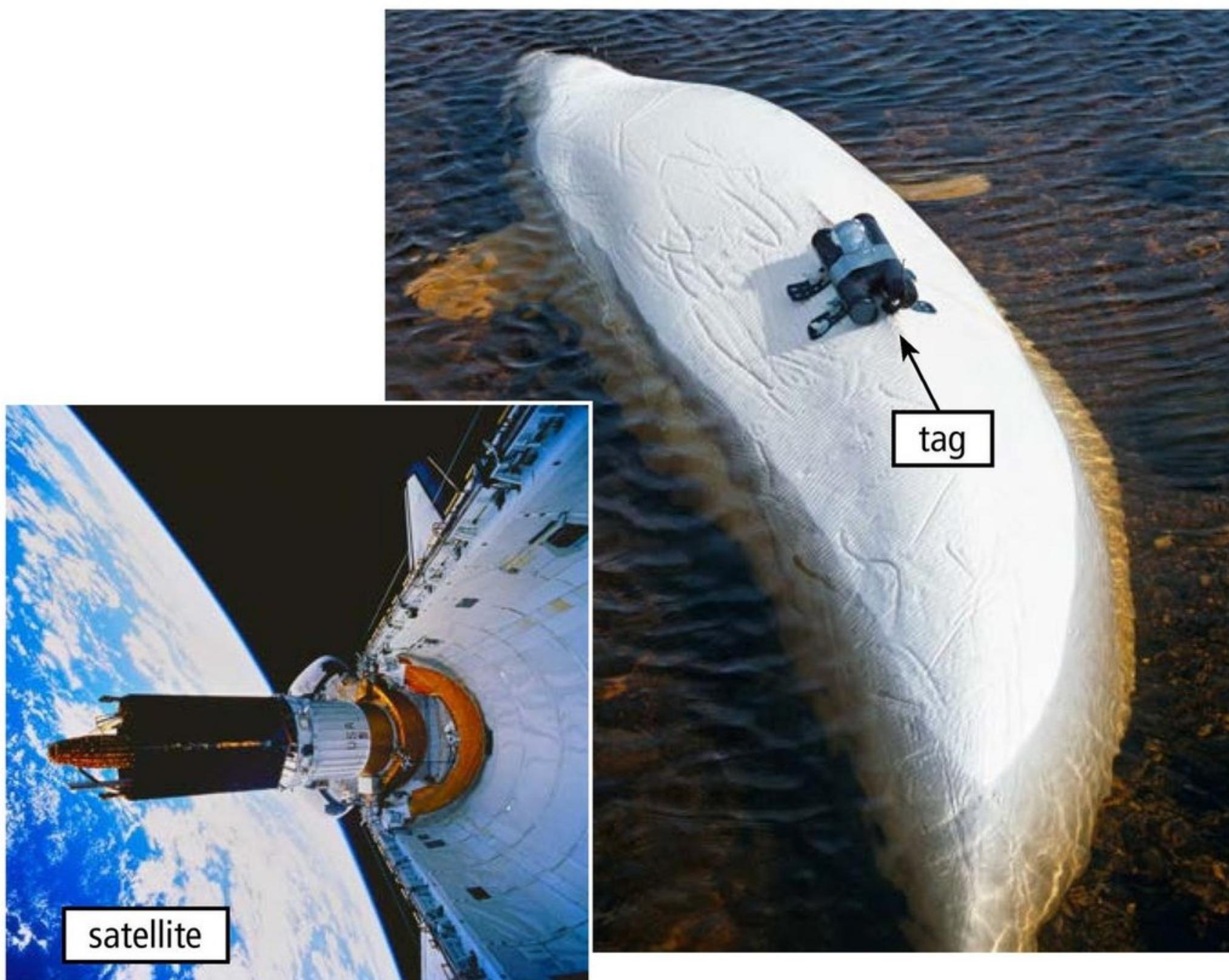
## Oceanographers

Scientists who study the ocean are called *oceanographers* (oh-shuh-NOG-ruh-furs). They often live for months on a ship, working seven days a week, and also teach at colleges and universities. Some of them study what sea animals eat and where they live. Others study the ocean water itself. All of them have to understand biology, chemistry, geology, and physics.

Biology is the study of living things. Chemistry is the study of what things are made of and how they react and change when they come into contact with other things. Geology is the study of rocks and soil and the **processes** that shape and change the Earth. Physics is the study of the natural laws, such as energy, force, and motion, that govern how things work.

## Using Satellites for Tracking

Satellites up in space can help to track sea animals' travels in Earth's oceans. Scientists tag some animals with electronic sensors to study them. A satellite can track the signal from the tag attached to the animal's fin or back. The signal shows when, where, and how the animal travels. These tags have been used to track some fish that have traveled up to 75,000 kilometers (46,602 mi). Scientists can use this information to **predict** the animal's future movements.



## Counting the Sea Animals

What types of animals live in the ocean? Where do they live? How many are there? Oceanographers studied and counted animals for ten years to discover the answers. They looked at all the world's oceans from the North Pole to the South Pole. They counted everything they could find from the largest whales to the smallest organisms. The surprising report is called the **Census of Marine Life**. Released in 2010, it contains **data** from more than 540 different **expeditions** that began in more than eighty countries.



Lionfish, or turkeyfish, swim among coral sea fans off the Solomon Islands. Their long, feathery spines can sting any predator that comes too close. Native to the South Pacific, lionfish were first spotted in United States' waters in 2000.



The leafy sea dragon blends in with the plants of its surroundings. Its eyes move independently of each other so it can look in two directions at once. The male sea dragon carries the eggs for the female and gives birth.

## The Census of Marine Life

The study revealed new information and several surprises about extreme habitats. One surprise from the study was where things lived: *everywhere*—in all water levels and temperatures! Marine species lived in the hottest and coldest places. More than seventeen thousand species lived in deep places without light and some without oxygen.

Another surprise was how many new species were discovered. More than twelve hundred new marine species have been described, and more than five thousand species are still waiting to be described. Scientists found one species of **Jurassic** shrimp that was thought to have gone extinct more than fifty million years ago.

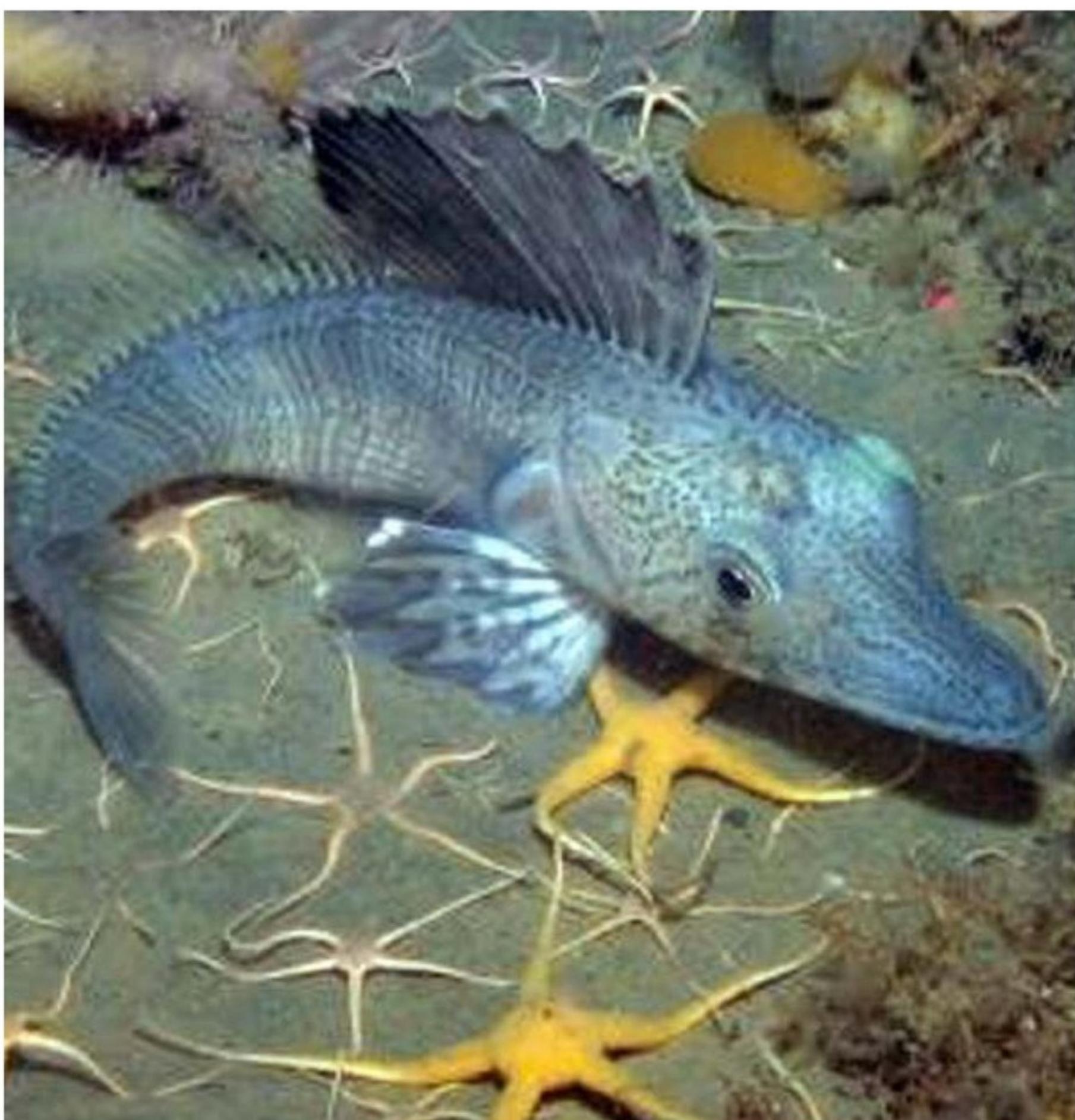


Over 2 kilometers (1.3 mi) deep in the ocean, giant tube worms live in the hot water that bubbles up from a lava pillar.

## Living in Hot and Cold Water

The very cold Deep Ocean Zone has more than one million *hot volcanoes* in it. The water temperature at a volcano can be 400°C (752°F), which is hot enough to melt lead. Species such as eyeless shrimp, white crabs, giant tube worms, and many bacteria live in this very hot water. These animals use sulfur rather than sunlight to live.

Huge groups of Arctic and Antarctic animals were also found living in water that is close to or below freezing. Giant squid, Antarctic cod, and the lion's mane jellyfish are some species that live under solid ice that is 700 meters (2,296 ft) thick. Many of these species slow down their movements to save energy so they don't freeze.



The Antarctic ice fish has no red blood cells. Its thinner blood contains a type of antifreeze that allows it to survive in the frigid waters beneath ice that would freeze the blood of most fish.

## What Did We Learn?

Scientists learned that life is even more **adaptable** than they originally thought. Animals living in the deep ocean have found ways to survive in harsh environments that would be impossible for most other species to live in.



The big-eyed Atlantic gonate squid lives in the cold, deep waters of the northern Atlantic Ocean.

The marine census counted more than 230,000 species in more than 30 million records. More than 6,000 new species had never been seen before! Some animals were see-through, or translucent. Some had warning lights that turn on and off so that they can see in the darkness. Others had long feelers instead of eyes to attract prey and learn what was around them. Some had teeth so long that they overlapped their jaws. Others made their own antifreeze to stay warm.

What else lives in the deep ocean? Scientists keep discovering new species and new facts. The more they look, the more they find. They think that only one quarter of all marine life has been counted. Not all the animals that have been discovered have been documented and described. There are many more surprises to come!

## Explore More

To learn more about the Census of Marine Life, A Decade of Discovery, go to its website at: [www.coml.org](http://www.coml.org)

Each week, new discoveries are added to the marine census project using a map on Google Earth: [www.comlmaps.org/census-on-google-earth](http://www.comlmaps.org/census-on-google-earth)

On the Internet, search terms such as: *deep sea species, nudibranch, blind lobster, or NASA oceanography*

## Glossary

|                                  |  |
|----------------------------------|--|
| <b>adaptable</b> ( <i>adj.</i> ) | able to change to fit a new or specific situation or environment (p. 14)   |
| <b>data</b> ( <i>n.</i> )        | facts and information, such as measurements or statistics, used to analyze or plan (p. 10)                             |
| <b>expeditions</b> ( <i>n.</i> ) | journeys or voyages; groups of people who go on journeys or voyages (p. 10)  |
| <b>Jurassic</b> ( <i>adj.</i> )  | of or relating to a period of the Mesozoic era when many dinosaurs lived and birds and mammals began to evolve (p. 11) |
| <b>marine</b> ( <i>adj.</i> )    | of or relating to the sea (p. 10)  |
| <b>predict</b> ( <i>v.</i> )     | to say what is going to happen in the future, often using observation or experience (p. 9)                             |
| <b>processes</b> ( <i>n.</i> )   | series of actions that may be natural or that are designed as steps to a goal (p. 8)                                   |
| <b>species</b> ( <i>n.</i> )     | groups of living things that are physically similar and can reproduce (p. 5)   |
| <b>submersible</b> ( <i>n.</i> ) | a small vessel that can operate under water, especially at deep levels (p. 7)  |

# Deep in the Ocean

A Reading A-Z Level R Leveled Book

Word Count: 913

## Connections

### Writing

Would you want to be an oceanographer when you grow up? Why or why not? Write a paragraph using details from the text to support your answer.

### Science

Choose and research an animal that lives in the deep ocean. Create a poster. Include a picture and at least five interesting facts about the animal and its habitat.

The logo for Reading A-Z features the word "Reading" in a large, bold, red sans-serif font. The letter "R" is stylized with a small sun-like icon above it, having rays extending upwards and outwards. To the right of "Reading" is the letters "A-Z" in a smaller, red, bold, sans-serif font.

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