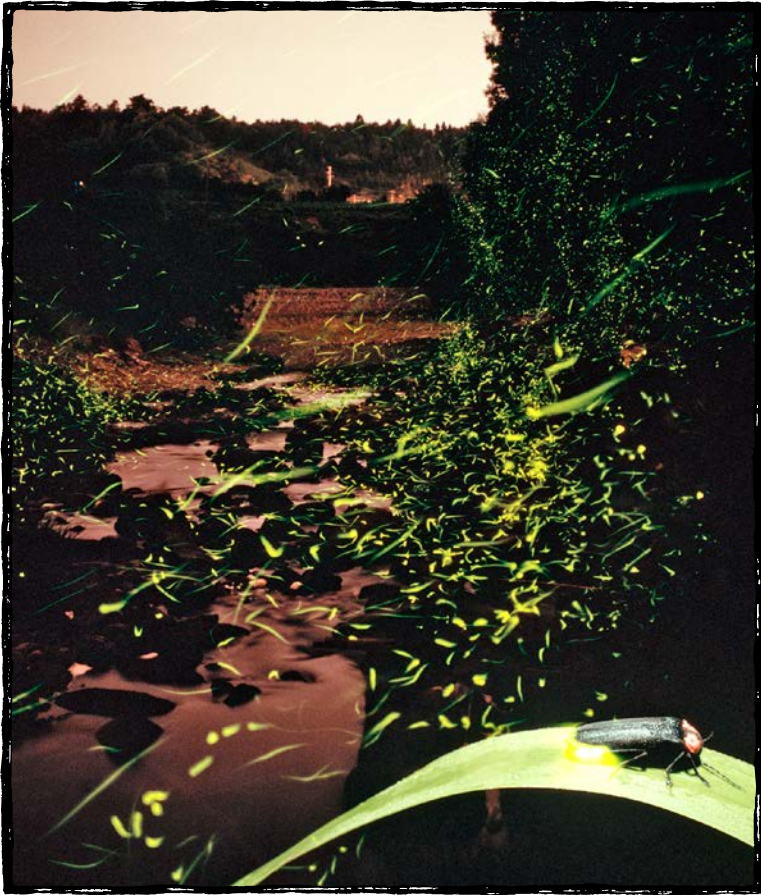


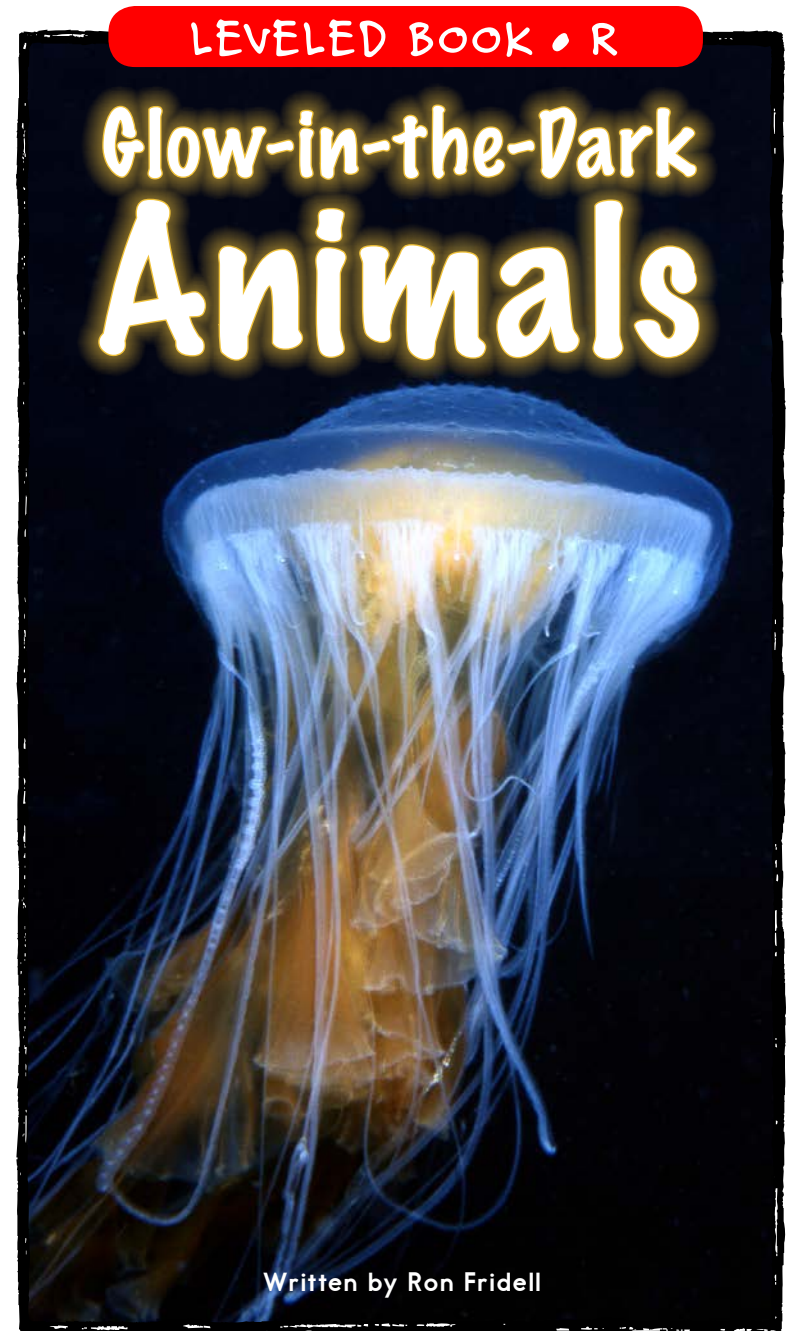
Glow-in-the-Dark Animals

A Reading A-Z Level R Leveled Book
Word Count: 1,164



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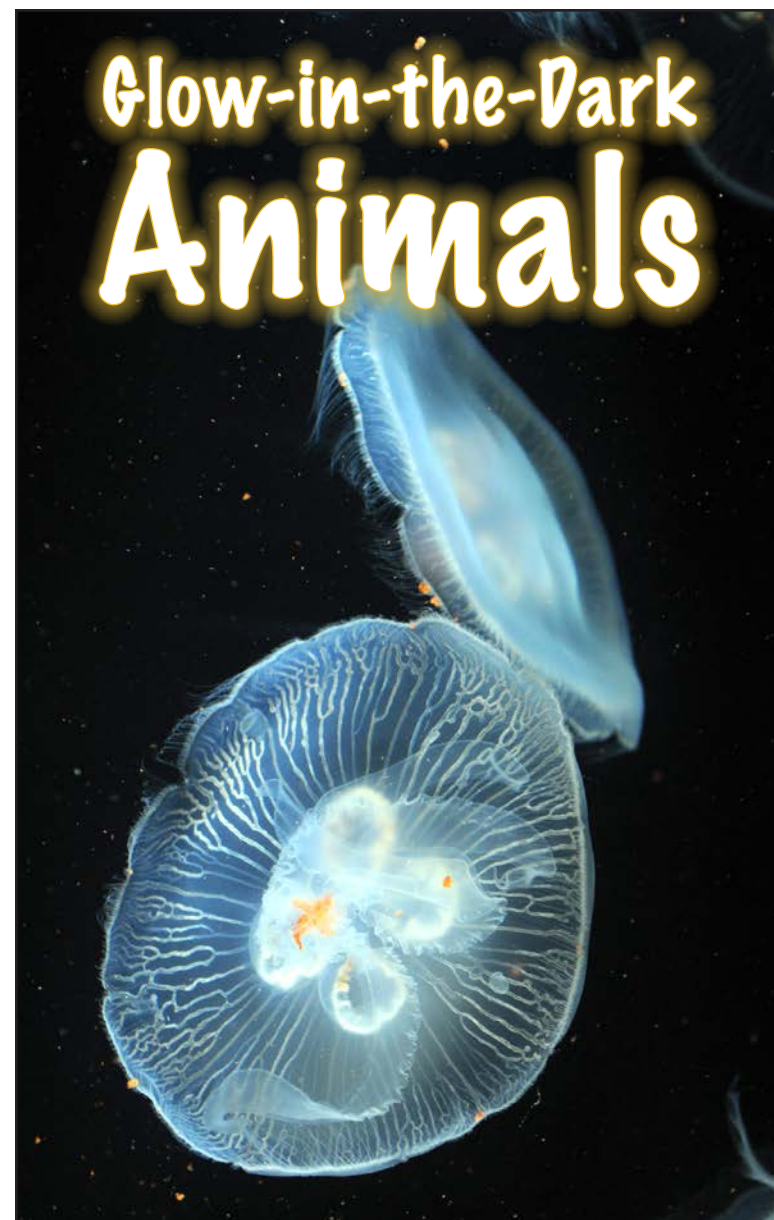
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Glossary

bacteria (<i>n.</i>)	small one-celled organisms that sometimes cause infections and disease (p. 15)
bioluminescent (<i>adj.</i>)	glowing with light from chemical reactions made by living things (p. 4)
camouflages (<i>v.</i>)	blends into the background; hides (p. 9)
luciferase (<i>n.</i>)	a chemical that helps create light in bioluminescent animals (p. 10)
luciferin (<i>n.</i>)	a chemical that helps create light in bioluminescent animals (p. 10)
molecule (<i>n.</i>)	the smallest part of a substance that can exist by itself, made of two or more atoms (p. 11)
oxygen (<i>n.</i>)	a gas that has no color, taste, or smell and that people need to live (p. 10)
predators (<i>n.</i>)	animals that hunt and eat other animals to survive (p. 7)
prey (<i>n.</i>)	an animal that is hunted and eaten by a predator (p. 8)
twilight zone (<i>n.</i>)	the area of the ocean from about 200 meters (656 ft) to about 1,000 meters (3,281 ft) deep (p. 16)



Written by Ron Fridell

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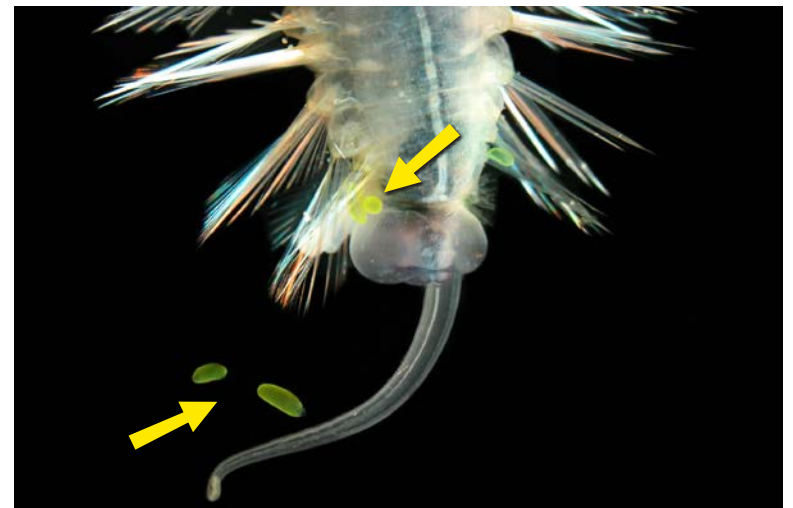
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Correlation

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Oceans cover about seventy percent of Earth's surface. As a result, oceans are the largest habitat on Earth. When scientists explore new parts of oceans, they discover new kinds of animals. In 2009, scientists found a new kind of glowing animal, a swimming worm. They call it a *green bomber*.

To escape from enemies, green bombers release little balloons of skin filled with a fluid that glows green. The glowing skin confuses enemies, which allows the green bombers to swim away. As scientists explore more parts of Earth's oceans, they hope to discover more strange new animals that glow in the dark.



A green bomber releases glowing skin sacs to confuse predators.



A scientist studies tiny jellyfish in a tank.

More to Know and Explore

Scientists use glowing animals to learn more about nature. They study the way that small glowing animals move through water. Watching these tiny animals helps them learn how larger animals move through water. Scientists also use animal bioluminescence to learn more about diseases, such as cancer.



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Flashing fireflies are beetles that are active at night.

Living Light

Some animals carry their own light—insects on land flash in the night, and fish and other sea creatures glow. These glowing animals make their own light. They are **bioluminescent** (BY-oh-loo-mih-NEH-sent).

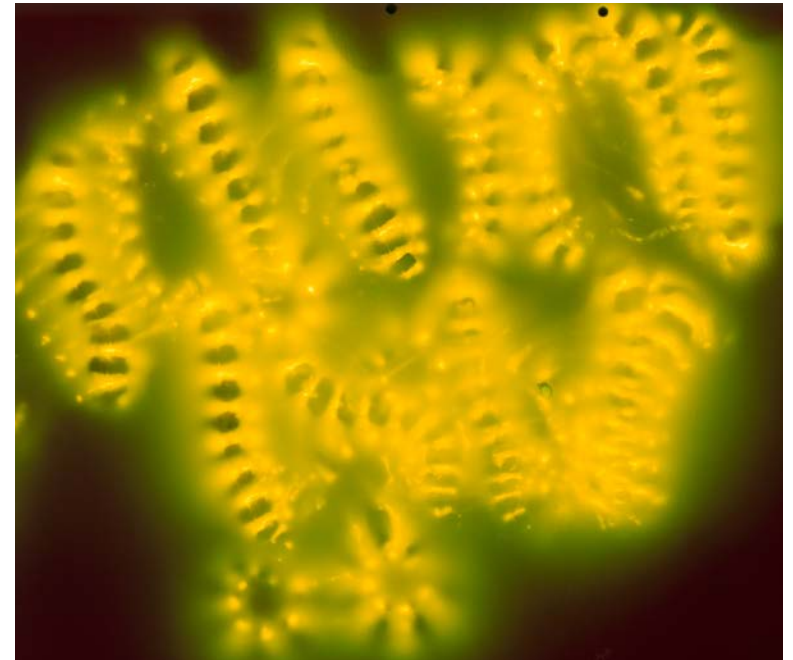
This long word means “life glowing.” The first part, *bio*, comes from a Greek word that means “life.” The second part, *luminescent*, comes from a Latin word that means “glowing.”

Other glowing sea animals live even deeper down, at the very bottom of the ocean. No sunlight reaches this deep. All the animals that live at this depth are bioluminescent, and they provide the only light in this part of the salty ocean.

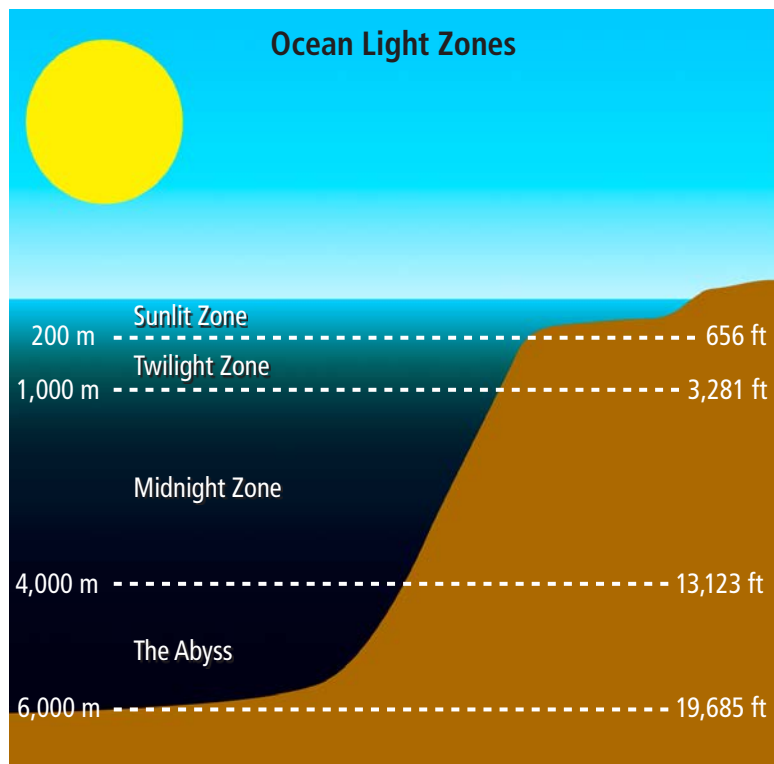
Only a few kinds of glowing animals make their home on land. Among them are fireflies, glowworms, and the two-colored railroad worm.



glowworm



Banded glowworms give off a yellow-green light.



Habitats of Glowing Animals

Bioluminescent sea animals live in all of Earth's oceans. Some live near the surface. But most glowing animals live deeper down, from about 200 meters (656 ft) to about 1,000 meters (3,281 ft). Scientists call this area the **twilight zone**. Sunlight in this middle part of the ocean is a dim blue-green color. Most of the glowing animals in the twilight zone produce a matching blue-green light.

Reasons to Glow

Animals flash and glow to help them survive on land and in the sea. Their lights can be red, yellow, green, or blue. They use their lights to signal, hunt, and hide. They also use them to call for help and to fool their enemies. Glowing helps them survive.

Most kinds of glowing animals live in the sea—very few live on land. You may have seen one of these glowing land animals on a warm summer evening. It's the firefly, a kind of beetle. Fireflies produce the glow in their abdomen, the hind part of their bodies. The light is like a tiny flashlight switching on and off. This flashing is a signal that helps these beetles communicate and find each other.



Some glowing sea animals use their light to hunt. The anglerfish has a stalk on its head that acts like a fishing rod. The tip of the stalk has a glowing white light that attracts small ocean fish. As the anglerfish moves its “lure” back and forth in water, the small fish come close to investigate. Then the anglerfish swallows them whole in one big gulp.



The anglerfish uses the glow on the tip of its stalk to “fish” for food.

A few glowing animals do not make their own light—they borrow it. They use the glow of tiny animals called **bacteria**. The flashlight fish stores about a billion glowing bacteria inside a pouch beneath each eye. Sometimes the flashlight fish looks as if it’s blinking. That’s when the fish rolls the pouches up and down to turn the light on and off. Now you see it, now you don’t.

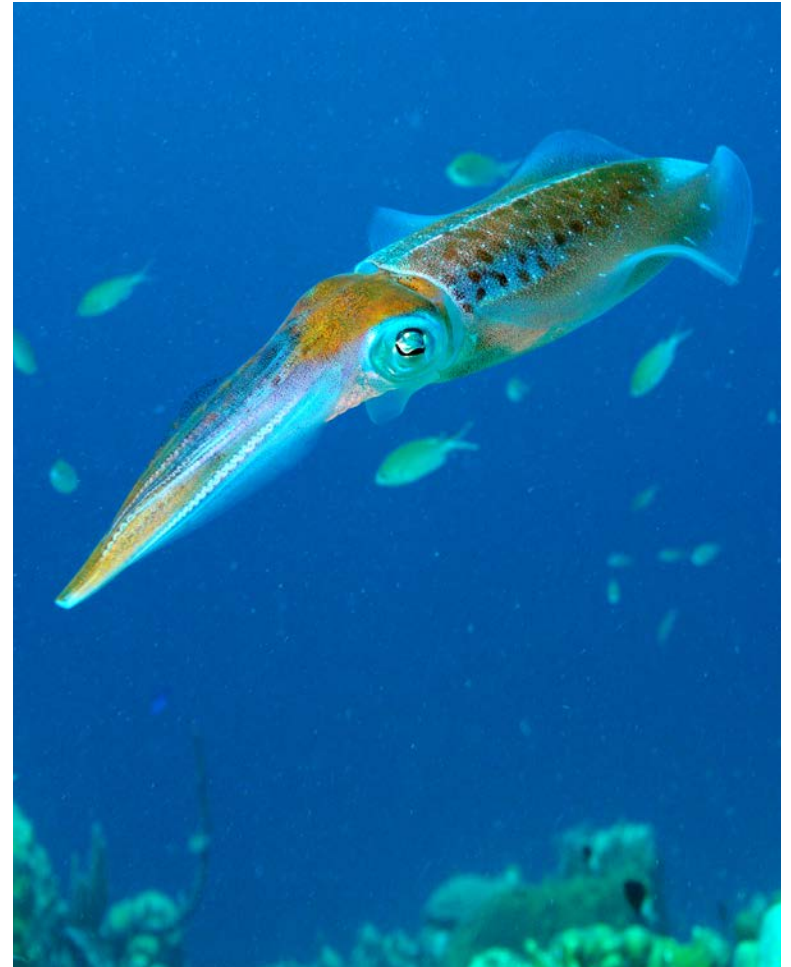


The flashlight fish has a glowing pouch beneath each eye.



A nylon shrimp spits out a glowing blue cloud when frightened.

Other animals produce their glow outside their bodies. They squirt the chemicals into the seawater. Then the chemicals mix with the oxygen in the water. That's how some shrimp can spit out a glowing cloud. The shining blue cloud scares predators, and the shrimp swims away.



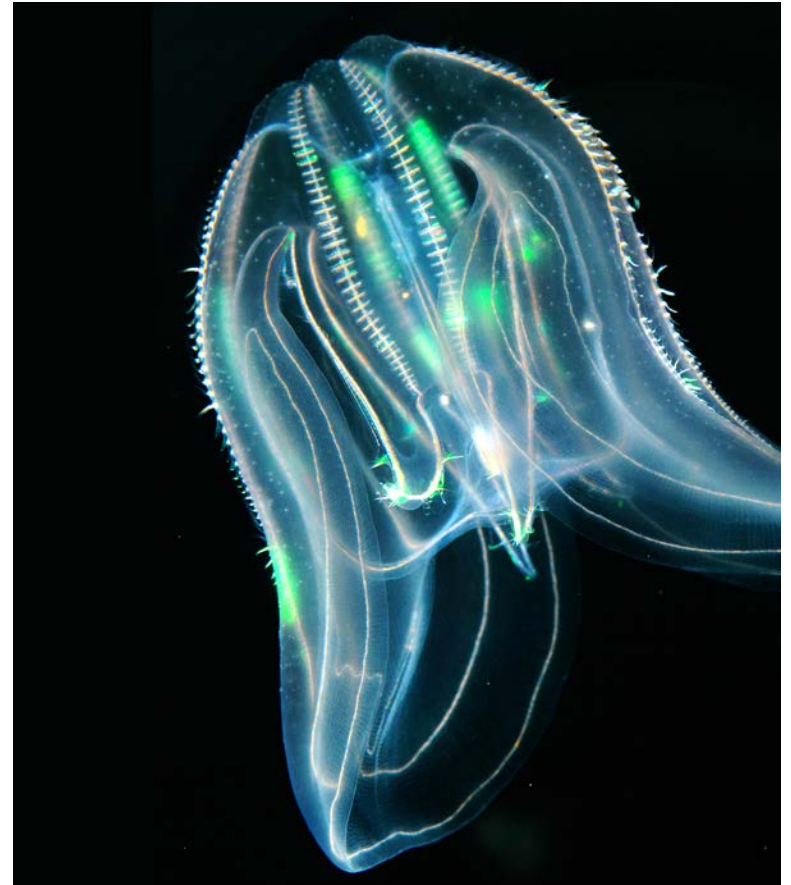
A glowing squid glides through the water.

Other animals use their glow to hide from **predators**—animals that want to eat them. Some squid squirt chemicals into the ocean water to make a glowing cloud. This glow hides the squid so the predator can't find it. Then the squid escapes.



Krill are an important food for many ocean animals.

Krill are glowing sea animals that look like tiny shrimp. They use their glow to keep from becoming the **prey** of fish and other ocean animals that want to eat them. Millions of krill use their lights to signal each other. The signals help them gather together in huge groups. These glowing, swirling swarms confuse the whales, sea lions, and fish that all rely on krill for food.



This jellyfish lights up its whole body.

Three Ways to Glow

Some bioluminescent animals make their light inside their body—the chemicals and oxygen are mixed inside them. Some jellyfish produce enough light to make their whole body glow from the inside. Others make only parts of their body glow.

Blink your eye. That's how quickly some animals flash. Now take your time and count to ten. That's how slowly some animals flash. And some animals glow for a long, long time without stopping.

The glow from ocean animals comes in several different colors. Animals in the oceans glow mostly blue or green, but some glow red. Glowing land animals most often give off a green or yellow light.



Jellyfish glow in different colors.

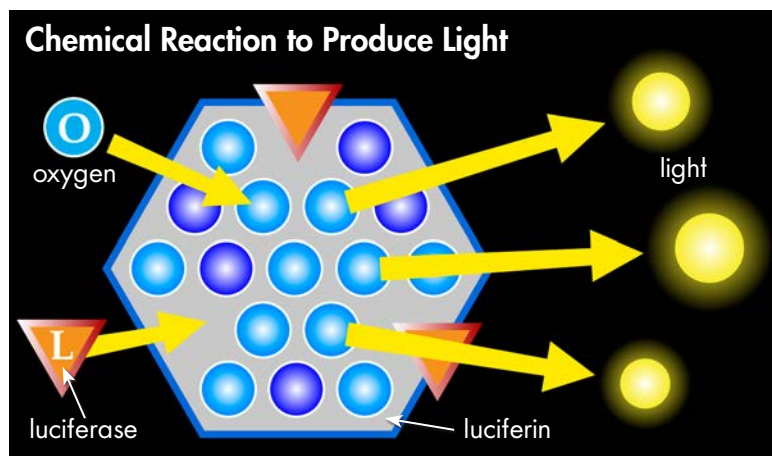
Some sea animals use their glow to fool predators that are swimming around below them. Their glowing light looks similar to the moonlight or sunlight that shines down into the ocean. The glow allows these animals to blend in against the bright surface of the water and makes it hard for predators to see them from below.

The belly of the cookie-cutter shark glows with a pale blue-green color. This glow matches the sunlit water above the swimming shark. The blue-green glow **camouflages**, or hides, the shark. The shark also has a small, dark patch on its belly that does not glow. This dark



Hatchetfish use their glow to hide from fish below them.

patch tricks other fish because it looks like the shadow of a small fish. When a bigger fish comes near to catch it, the cookie-cutter shark attacks and eats the fish.



Luciferin + Luciferase + Oxygen = Light

The Science Behind the Glow

What makes these animals glow?

Bioluminescent animals have two special chemicals in their bodies: **luciferin** and **luciferase**. When these chemicals mix with **oxygen**, they produce light.

This chemically created light is different from the light that lightbulbs make. You would not touch a lightbulb that's switched on—you might burn yourself. That's because an electric lightbulb generates lots of heat as well as light. But the glow that animals make would not hurt you because it's a cool glow. A glowing animal gives off very little heat.

How do glowing animals turn their glow on and off? Some scientists believe the secret is oxygen. They think that oxygen fuels the glow, and they believe that animals can turn their glow on or off by turning the supply of oxygen up or down. Other scientists have a different idea. They think that a tiny **molecule** in the animal's body acts like a switch to turn the lights on and off. No one knows for sure.



A bioluminescent shrimp