Lesson 1: Enter the Deep Ocean

UNIT: Bioluminescence

TRANSCRIPT

HOOK 1

Hi, writers. It's Anne.

My friend Jaden is a student volunteer at an aquarium. As a volunteer, he helps keep the fish tanks clean, feeds the animals, and talks to the visitors who come to the aquarium.

Each exhibit at the aquarium has a poster nearby the visitors can read to learn all about the ocean animals. Jaden has learned so much from his work at the aquarium and is quite the ocean animal expert.

Recently, a section of the aquarium went under construction. That means the aquarium is getting a brand-new exhibit. Since Jaden is a volunteer, he got to go inside to help out before it's open to visitors. The name of the new exhibit is Deep Ocean. When he went inside, he saw this.

These amazing light shows are called bioluminescence. It's when an organism—or living thing—creates its own light. Jaden doesn't know a lot about bioluminescence, and has a lot of questions.

You might have some questions, too.

DISCUSSION 1

Discuss: What questions do you have about bioluminescence?

HOOK 2

I don't know what you said, but Jaden wondered:

- What kind of animals make light?

- Why do animals make light?

- Where can bioluminescence be found?

You may have had other questions, and that's great.

Jaden doesn't know the answer to these questions yet, and he's curious to find out. He went to look for the poster that is usually next to each exhibit to learn more. But since this exhibit isn't quite ready yet, there's no poster.

The aquarium needs your help to make an informative poster that will teach visitors all about bioluminescence in the new exhibit. The aquarium has some videos and articles with lots of information, but they need your help putting it together into a fun and interesting poster that can teach visitors about bioluminescence.

Before you work on planning and designing your poster, you'll use the sources the aquarium has to gather lots of information about bioluminescence.

Today, you'll read and take notes on two sources. By learning all about the creatures in this exhibit, you can use your writing to teach others about the spectacular animals that use bioluminescence.

I'll get you started, step by step.

STEP 1

Get your supplies.

STEP 2

Before you start your research, you can think about the questions you have about bioluminescence.

Here are some questions Jaden wondered about:

- What is bioluminescence?
- Where can we find bioluminescent organisms?
- What are some examples of bioluminescent organisms?
- Why do some organisms glow?
- Do humans use bioluminescence?
- What do scientists still not know about bioluminescence?

Choose at least three of these questions that you are curious about. When you have picked your questions, show a silent thumbs up.

STEP 3

Get your Notes worksheet.

Copy the questions you want to know more about into the question section of your notes. If you want, you can add your own questions too.

STEP 4

Get your research packet. Let's review what's in the packet together. Follow along with me.

On the front of your packet is a Glossary. It has definitions for some of the words that you might find in the sources. As we look through the sources, you might notice that some of the words are in bold. These are the words in the Glossary.

Turn to the next page. This is the first source that Jaden received from the exhibit director—It's called Light in the Deep.

Source 2 is called Bioluminescence.

Source 3 is an infographic.

Source 4 is called Deep Sea Dialogues: Bioluminescence.

This is your Bibliography where you'll keep track of where you got your information from.

Turn the pages in your research packet so that you are looking at Source 1, Light in the Deep.

STEP 5

The first source that Jaden found about bioluminescence is a video of Dr. Edie Widder. Watch this video to learn more about bioluminescence.

> Hi, I'm doctor Edie Witter. I'm a deep-sea explorer. I'm also the CEO and senior scientist of the Ocean Research and Conservation Association, and I am absolutely passionate about bioluminescence, which is what we're going to be talking about today.

> Bioluminescence is cold light made by animals, and most people are familiar with fireflies, and there are a few other land animals that can make light. But in general, it's pretty rare on land. What most people don't realize is that it's the rule rather than the exception in the ocean.
>
> So, all of the things that animals have to do on land, animals in the ocean have to do. They have to be able to find food. They have to be able to find mates, and they have to be able to defend themselves against predators. Well, bioluminescence plays key roles in all of those things.
>
> So, they can use the luminescence to attract food to them—and they do it in a bunch of really interesting ways—or they can use it to be able to see their food. So, a lot of them have built-in flashlights under their eyes that they can see with. So, it gets used for finding food, for finding and attracting mates, and then it gets used a lot for defense—and they'll release particles or just luminescent slime into the face of a predator. There's some that use it as a way to communicate the fact that they taste bad. I'm poisonous, don't touch me or you'll be sorry.

If you'd like to watch this video again, replay this step. Otherwise, move on to the next step.

STEP 6

Here's a few of Jaden's notes about this source. Notice how he used just a few words to remember the important information and didn't copy any sentences from the source.

When Jaden takes notes on more than one source, he makes sections in his notes, like this. He could have organized them like this, or like this.

When you take notes, you can organize them in whatever way works best for you. Source 1 in your research packet is a transcript of the video you just watched. Read the

transcript and take notes on the information about bioluminescence. Your teacher will tell you how long you have to take notes on Source 1.

STEP 7

Nice job, writers! You've taken notes on one source. This source may have answered some of your questions about bioluminescence, or maybe you thought of more questions.

Review the questions section of your notes. If you know the answer to any of your questions, you can put a check next to that question. If you have more questions, you can add them to the box.

STEP 8

Flip your research packet to the next page, Source 2.

This is an article all about bioluminescence. For now, let's just read the Source. You'll take notes later on. If you'd like to read the source on your own, pause the video now or keep playing to hear me read the source aloud.

> **Bioluminescence** *by Tasha Rose, published by Discovery Education, March 2025.*
>
> On land, there are very few organisms that produce light. There are some species of mushroom, bacteria, and worms that produce light, but it is a very small percentage of land organisms. In the ocean, however, bioluminescence is very common. Scientists have found bioluminescent creatures from the ocean surface to the deep-sea floor. In fact, scientists estimate that more than 75% of the animals that live in the open ocean produce their own light!
>
> **Diving Deep**

Most bioluminescent organisms live deep in the ocean where sunlight does not reach. They live in complete darkness deep below the surface. This makes observing these creatures very difficult for scientists. Scientists can only observe those deep-sea organisms using special submarines or underwater robots that are specially designed to withstand the enormous pressure of the deep ocean. Scientists also need to use special cameras and lights to be able to see bioluminescence without disturbing or harming the animals. Some organisms in the deep have super sensitive eyes, so regular lights would blind them instantly!

All of these challenges in research means that scientists still have many unanswered questions about bioluminescence. Scientists can only estimate how many organisms create bioluminescence since more are being discovered all the time. While scientists have learned some reasons why organisms glow, such as to help them survive or communicate, there may be more reasons for bioluminescence that have not been discovered yet. This deep-sea robot named Little Hercules can explore up to 4,000 meters below the surface of the ocean. This picture shows the robot being lowered into the ocean for a test drive near Hawaii.

Why Research Bioluminescence?

Scientists continue to research bioluminescent creatures to learn more about the amazing life on planet Earth. However, research on bioluminescence has also led to some discoveries that can help humans too.

Bioluminescent bacteria may only be visible under a microscope, but it can be really helpful for scientists. One way it can be used is for testing water. Some bioluminescent bacteria glows when it is in clean water. If the water is polluted, the bacteria can't produce the light as well and will glow less. Scientists can quickly test to see if a body of water is polluted by adding some of the water to

the bacteria. If it glows less, it means the water is toxic and may be harming other plants and animals.

Another way scientists use bioluminescence is to help find germs that could spread disease. Some bioluminescent bacteria glows when it comes into contact with germs. In a hospital, scientists can test to see how clean something is. They swab a surface and put the swab into a tube with the bacteria. If the bacteria glows, it means the surface has germs on it and needs to be cleaned again. Testing methods like this can help hospitals prevent the spread of disease.

Bioluminescence has also been used to help screen and detect cancer, test how effective medications are, and create electricity free lamps. Who knows what inventions bioluminescence will lead to next?

If you'd like to hear me read this source aloud again, replay this step. Otherwise, move on to the next step.

STEP 9

When you take notes, you can add to the notes you already have or draw a new section of your notes if you want. Read and take notes on Source 2. You can use your glossary to find definitions for the words in bold.

STEP 10

Now that you know even more about bioluminescence, check off any questions you found the answer to and add more questions if you want.

STEP 11

Amazing work, writers! You have taken notes on two sources about bioluminescence. It's okay if some of your questions don't have answers yet. In the next lesson, you can gather more information.

Flip to the very last page of your research packet. This is your Bibliography where you record where you got your information. The key at the top shows you what information you need from each source and where to write it in each of the boxes below.

We use the Source 1 and 2 worksheets to fill in the missing information in boxes one and two.

STEP 12

Here's how Jaden filled in these parts of his Bibliography.

Check to see if your Bibliography matches. If it doesn't, you can make changes.

STEP 13

The papers shown on the screen are V.I.P.s—very important papers. Your teacher will tell you where to put them so you will have them for the next lesson.

WRAP UP

Fantastic job, writers! You generated questions and took notes from two different sources. You may have answered some of your questions and not others, but that's okay. Taking notes and generating questions are all part of the writing process.

Right now, you're here gathering information. In later lessons, you'll make a plan, draft, revise, and edit, and share your poster.

Who knows what amazing creatures we'll discover as we learn more about bioluminescence?

I'll see you next time.