

ScienceNews

EDUCATOR GUIDE



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April 10, 2021
**No Body Is No Problem
for Detached Sea Slug Heads**



About this Guide

In this Guide, based on the online *Science News* "[A sea slug's detached head can crawl around and grow a whole new body](#)," students will explore animal regeneration, discuss why scientists are interested in the process and use what they've learned to narrate a *Science News* video about regenerating sea slugs.

This Guide includes:

Article-based Comprehension Q&A — Students will answer questions about the online *Science News* article "[A sea slug's detached head can crawl around and grow a whole new body](#)," which explores how some sea slugs regenerate. A version of the story, "No body is no problem for detached sea slug heads," appears in the April 10, 2021 issue of *Science News*. Related standards include NGSS-DCI: HS-PS3; HS-LS1.

Student Comprehension Worksheet — These questions are formatted so it's easy to print them out as a worksheet.

Cross-curricular Discussion Q&A — Students will investigate animals that regenerate, discuss how energy plays a role in the process and think about why scientists might be interested in studying animal regeneration. Students will use what they've learned to write a script and narrate a *Science News* video of regenerating sea slugs. Related standards include NGSS-DCI: HS-PS3; HS-LS1.

Student Discussion Worksheet — These questions are formatted so it's easy to print them out as a worksheet.

Article-based Comprehension, Q&A

Directions for teachers: Ask your students to read the online *Science News* article "[A sea slug's detached head can crawl around and grow a whole new body](#)," which explores how some sea slugs regenerate, and answer the following questions. A version of the story, "No body is no problem for detached sea slug heads," appears in the April 10, 2021 issue of *Science News*.

1. What makes some *Elysia* sea slugs special?

At least two species of *Elysia* slugs can regrow their entire bodies from just their head — a first for any sea slug.

2. How might the sea slugs detach their heads from their bodies?

The slugs seem to have a groove on the back of the head region that scientists think is where the break occurs.

3. Describe the sea slug regeneration process.

Sea slugs detach their heads from their bodies over several hours. The heads crawl around, snacking on algae, and regenerate their bodies over about 20 days.

4. What happens to the sea slugs' abandoned bodies?

The detached bodies don't regrow heads the way their former heads regrow bodies. Instead, the rejected bodies move around for days or months until they eventually die.

5. Why do scientists think the sea slugs regenerate? What evidence supports the scientists' hypothesis?

Scientists suspect the slugs use regeneration to rid themselves of parasites. It takes hours for the heads to detach from the bodies, so that mechanism probably isn't useful for escaping predators. Meanwhile, the abandoned bodies of regenerating wild sea slugs were covered in copepods.

6. What role might algae play in sea slug regeneration?

The sea slugs feed on algae and can keep the plant's energy-producing chloroplasts alive inside their bodies for weeks. Scientists debate what the chloroplasts do for their sea slug hosts. But biologist Yoichi Yusa suspects the organelle gives the slugs an energy boost as they regenerate.

7. Identify a literary device used in the article and explain how the device relates to the story.

The author uses a pun, or a play on words. The pun is a play on the word “ahead” and phrase “a head.” The sea slugs may need extra energy to get ahead as well as more than a head, meaning a new body.

Student Comprehension Worksheet

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- 1. What makes some *Elysia* sea slugs special?**
- 2. How might the sea slugs detach their heads from their bodies?**
- 3. Describe the sea slug regeneration process.**
- 4. What happens to the sea slugs' abandoned bodies?**
- 5. Why do scientists think the sea slugs regenerate? What evidence supports the scientists' hypothesis?**
- 6. What role might algae play in sea slug regeneration?**
- 7. Identify a literary device used in the article and explain how the device relates to the story.**

Cross-curricular Discussion, Q&A

Directions for teachers:

Before this discussion, students should read the online *Science News* article "[A sea slug's detached head can crawl around and grow a whole new body](#)" and answer the guide's comprehension questions. A version of the story, "No body is no problem for detached sea slug heads," appears in the April 10, 2021 issue of *Science News*.

Students should then discuss the following prompts with a partner, using outside resources as needed. Based on their comprehension of the article and their answers to the discussion prompts, student pairs will create a script for the *Science News* video "[See a detached sea slug head regrow a new body](#)." The script should include a 10-second introduction to the video before it begins and 10-second conclusion after the video ends. Once the script is complete, students can record themselves reading the script and submit the audio file to you. The total length of the audio file should be around one minute.

Want to make it a virtual lesson? Post the online *Science News* article to your virtual classroom. Discuss the article and questions with your class on your virtual platform.

Introducing regeneration

Answer the following questions and use the information in your script's introduction.

1. What is regeneration in animals? Can you think of an example of regeneration that happens in humans?

Regeneration is the process of recreating lost or damaged cells, tissues and organs. Some animals can regenerate full body parts. Some examples of body parts that humans can regenerate include skin, intestinal lining and liver.

2. The article focuses on a particular species of sea slug regeneration. What other animals regenerate? What is unique about this sea slug's ability to regenerate?

The article mentions that planarian flatworms, ascidians and salamanders can also regenerate. Of the animals mentioned, only planarians, ascidians and the sea slugs can regenerate their whole bodies. The sea slug is unique among this group because it has a more complex body plan.

3. Explain what happens to matter and energy throughout the generation process. What do scientists think could possibly cause the boost of energy that allows this species of sea slug to undergo such impressive regeneration?

As you can see in the video, the sea slug's body size increases throughout the regeneration process. This means that the slug is creating many new cells, and consequently body mass, out of the food it consumes. The ability to break down food and generate new cells requires energy. Scientists suspect that the ability of the sea slug to store chloroplasts inside its body could give it an advantage in regeneration. The chloroplasts

could be used to convert solar energy to energy-rich molecules for regeneration, as chloroplasts normally convert sunlight to ATP and NADPH during photosynthesis.

Summarizing the importance

Answer the following questions and use the information in your script's conclusion.

1. Why is the ability to regenerate important to the sea slug? What about the other animals you mentioned?

The sea slug's ability to separate its head from its body and grow a new body may be how the slug rids itself of pesky parasites. Other animals regenerate after being wounded, nearly consumed by predators or after encountering other environmental hazards.

2. Why should people care about regeneration? How could studying regeneration benefit humans?

Student answers will vary. Determining the necessary factors for regenerative processes in animals could potentially inform medical treatments of injuries and diseases. Scientists may also be able to learn more about the aging process for humans through regeneration studies.

Creating your script

Create a one-minute script for the *Science News* video "[See a detached sea slug head regrow a new body](#)," which shows the regeneration of a sea slug's body. Using your answers from the "Introducing regeneration" questions above, write a 10-second introduction for your video script. Using your answers from the comprehension questions, create a 40-second script for the video that explains to the viewer what is happening in the video and why it is happening. Finally, using your answers from the "Summarizing the importance" section, write a 10-second conclusion to describe the importance of regeneration. Record yourself reading the entire script, including the introduction and conclusion, and submit the audio file to your teacher.

Student Discussion Worksheet

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Answer the following questions and use the information in your script's conclusion.

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