

# Science & Literacy Activity

## ACTIVITY OVERVIEW

This activity, which is aligned to the Common Core State Standards (CCSS) for English Language Arts, introduces students to scientific knowledge and language related to animal body parts.

### This activity has three components:

- 1. Before your visit**, students will read a content-rich article about the spiny pufferfish and the adaptations that protect it from predators. This article will provide context for the visit, and also help them complete the post-visit writing task.
- 2. At the Museum**, students will read and engage with additional texts (including printed text, digital and physical/hands-on interactives, videos, and models). This information will help them complete the post-visit writing task.
- 3. Back in the classroom**, students will draw on the first two components of the activity to complete a CCSS-aligned explanatory writing task about animal body parts.

### Materials in this packet include:

#### For Teachers

- Activity Overview (p. 1-2)
- Article (teacher version): "Who Wants a Spiny Snack?" (p. 3-5)
- Answers to the student worksheets (p. 6-7)
- Essay scoring rubric (teacher version) (p. 8)

#### For Students

- Article (student version): "Who Wants a Spiny Snack?" (p. 9-11)
- Student worksheets (p. 12-13)
- Student writing task (p. 14)
- Essay scoring rubric (student version) (p. 15)

## 1. BEFORE YOUR VISIT

Students will read a content-rich article about the spiny pufferfish and the adaptations that protect it from predators. This article will provide context for the visit, and help them complete the post-visit writing task.

### Preparation

- Familiarize yourself with the student writing task and rubric (p. 8, 14-15).
- Familiarize yourself with the teacher version of the article (p. 3-5), and plan how to facilitate the students' reading of the article.

### Instructions

- Explain the goal: to complete a writing task about animal body parts.
- Tell students that they will need to read an article before visiting the Museum, and read additional texts during the visit (including printed text, digital and physical/hands-on interactives, videos, and models).
- Distribute the article, student writing task, and rubric to students.

### Common Core State Standards

- RI.2.1 Ask and answer such questions as who, what, where, when, why, and how to demonstrate understanding of key details in a text.
- RI.2.2 Identify the main topic of a multi-paragraph text as well as the focus of specific paragraphs within the text.
- W.2.2 Write informative/explanatory texts in which they introduce a topic, use facts and definitions to develop points, and provide a concluding statement or section.

### New York State Science Core Curriculum

LE3.1a

### Next Generation Science Standards

#### DCI: LS1.A: Structure and Function

All organisms have external parts. Different animals use their body parts in different ways to see, hear, grasp objects, protect themselves, move from place to place, and seek, find, and take in food, water and air. Plants also have different parts (roots, stems, leaves, flowers, fruits) that help them survive and grow.

#### SEP 8: Obtaining, Evaluating and Communicating Information

- Obtain information using various texts, text features, and other media that will be useful in answering a scientific question.
- Communicate information in written forms using drawings and writing that provide details about scientific ideas.

- Review the rubric with students and tell them that it will be used to grade their writing.
- Read and discuss the article, using the teacher notes to facilitate.
- Distribute the student worksheets (p. 12-13). Have students fill in the “spiny pufferfish” section based on what they’ve learned from the article. Tell them that at the Museum, they will complete the second worksheet about two other animals and their body parts.

## 2. DURING YOUR VISIT

At the Museum, students will read and engage with additional texts (including printed text, digital and physical/hands-on interactives, videos, and models). The information they’ll gather from these multiple sources will help them complete the post-visit writing task.

### Preparation

- Review the educator’s guide to see how themes in the exhibition connect to your curriculum and to get an advance look at what your students will encounter. (Guide is downloadable at [amnh.org/lal/educators](http://amnh.org/lal/educators))
- Familiarize yourself with the student worksheets (p. 12-13) and the map of the exhibition.

### Instructions

- Explain the goal of the Museum visit: to read and engage with texts (including printed text, digital and physical/hands-on interactives, videos, and models), and to gather information to help them complete the post-visit writing task.
- Review the worksheet. Clarify what information students should collect.

### Suggestions for Facilitating the Museum Visit

- Have students explore the exhibition in pairs, with each student completing his or her own student worksheet.
- Encourage student pairs to ask you or their peers for help locating information. Tell students they may not share answers with other pairs, but may point each other to places where answers can be found.
- Teachers and chaperones may use the worksheets to transcribe the observations of any students who have trouble taking notes. Teachers and chaperones may also take photos for reference back in the classroom.

## 3. BACK IN THE CLASSROOM

Students will use what they have learned from the pre-visit article and information gathered during the Museum visit to complete a CCSS-aligned explanatory writing task about animal body parts.

### Preparation

- Plan how you will explain the student writing task and rubric (p. 14-15) to students.

### Instructions

- Review the writing task and rubric with students. Explain that they will use it while composing, and also to evaluate and revise what they have written.

### Suggestions for Facilitating Writing Task

- Before they begin to write, have students use the writing task to frame a discussion around the information that they gathered at the Museum. They can work in pairs, small groups, or as a class, and can compare their findings.
- Referring to the writing task, have students underline or highlight all relevant passages and information from the article and from the notes taken at the Museum. Instruct each student to write down any useful information gathered by their peers.
- Students should write their essays individually.

### Supports for Diverse Learners

This resource has been designed to engage all learners with the principles of Universal Design for Learning in mind. It represents information in multiple ways and offers multiple ways for your students to engage with content as they read about, discuss, view, and write about scientific concepts. Different parts of the experience (e.g. reading texts, or locating information in the Museum) may challenge individual students. However, the arc of learning is designed to offer varied opportunities to learn. We suggest that all learners experience each activity, even if challenging. If any students have an Individualized Education Program (IEP), consult it for additional accommodations or modifications.

### Alternate Version of Article

Another version of the same article with a lower lexile level is available for download at [amnh.org/lal/educators](http://amnh.org/lal/educators). You can use this same activity with that article.

**ARTICLE: TEACHER VERSION**

**About this Article**

- **Lexile:** 580
- **Wordcount:** 444
- **Text Complexity:** There is no Lexile level specified by the Common Core State Standards for grades K and 1. Although this text falls within the 2-3 grade level band (450-790 Lexile), since shared reading/interactive read aloud is suggested, it is appropriate for use by kindergarten and first-grade teachers. Second-grade teachers may opt to assign part or all of the text as independent reading, but this should be based on the teacher’s professional judgment and assessment of students’ independent reading levels.
- **Note:** Assign partners prior to reading this text aloud with students and have them assign a “partner A” and “partner B.”

**Key for Teacher Notes**

- **Green text**  
specific strategies
- Regular text  
instructions for teachers
- *Italicized text*  
teacher’s instructions to students
- Underlined text  
important domain-specific words

**Who wants a spiny snack?**

Not many animals! How the spiny puffer stays safe in the ocean

A hungry shark looks for its next meal. It spots a small fish.



© iStock Photo/GlobbalP

But as the shark gets close, PUFF-PUFF-PUFF! The fish puffs out into a big ball. And it’s covered with sharp spines! Ouch! The shark swims away. The small puffer fish is safe for now.



© iStock Photo/FLaudGirl

For a small fish, the ocean is full of danger. Bigger fish, sharks, and even birds eat small fish. Animals that hunt other animals are called predators. Puffer fish have their own way to stay safe from predators.

All animals have special ways to stay alive. These are called adaptations. An adaptation is a body part or action

Prompt to **think/pair/share**: *What do you think this text will teach us about?*

Listen in to student pairs. Repeat some of the good ideas that you heard, or pre-select one or two students to share out to the whole group.

**Before reading this paragraph**, assign each partner a role: Partner A is the “hungry shark” and Partner B is the “spiny puffer” (“small fish”).

Instruct students to listen very carefully because they will act out their assigned “character” after you read this section.

Select one partnership to act out the “scene” in front of the class, and as they do so, you can narrate what each animal is doing. (Have the text available on a projector or as hardcopies for students to refer to as needed).

**Turn and talk** to your partner: *What is a predator?* Listen in and select a student to share out.

Write on chart paper or sentence strip: “predator = animal that hunts other animals.”

*What did we learn from acting out the text with our partners just now? How does the puffer fish protect itself? Turn and talk.* Listen in to students’ conversations. Share out an exemplary response.

that helps an animal live. Predators have adaptations that help them hunt. Imagine a shark's sharp teeth. This adaptation helps a shark catch and eat fish.



A shark uses its sharp teeth to catch and eat fish.

Look at the picture of the shark. Give me a "thumbs up" if you can see its teeth. Its teeth are an adaptation - a body part that helps the shark live.

How do you think the shark's teeth help it live? **Turn and talk.** Listen in to partners' conversations.

Write on chart paper or sentence strip: "adaptation = a body part or action that helps an animal live". You may want to put a copy of the photo of the shark with its teeth labeled next to this definition as a reminder. You may want to add other examples of types of adaptations that you encounter throughout the rest of the text.

Fish have adaptations too. These adaptations help keep them safe from predators. Some fish might be fast enough to escape a predator. Others might be able to blend in and hide on the ocean floor.



Can you find the flounder?



Porcupines have long sharp spines that protect them.

This part is telling us about other adaptations - adaptations that fish have to keep themselves safe from predators. What are the two kinds of adaptations that fish can have to protect themselves? **Turn and talk.** Listen in and select student to share out.

The two types of adaptations students should be aware of are: (a) moving fast enough to escape a predator and (b) blending in and hiding on the ocean floor. Prompt students to notice the photo of the fish that is blending in to the ocean floor.

But some animals don't run or hide. They have bodies that are hard to eat. Porcupines have long sharp spines. So do sea urchins in the ocean. Spines protect these animals. Predators don't like spiny food!



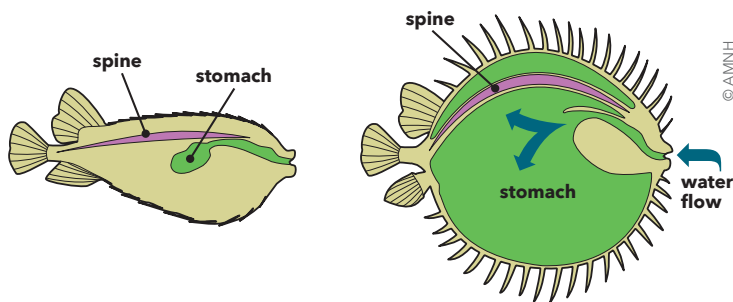
A pufferfish's skin is hard and covered with sharp spines.

Ooh! This is a different type of adaptation... having bodies that are hard to eat. Give me a **thumbs up** if you see the photo of the porcupine above... **Turn and talk:** Why do you think the porcupine would be hard for a predator to eat?

Some toads and snakes have another way to scare away a predator. They puff up to look bigger. Puffer fish do both of these things. They puff up AND they have spines.

Swimming along, a puffer fish looks like any other fish. When a predator gets close, the puffer swells up like a big balloon. Some people call it a balloon fish. But this fish is not soft and smooth like a balloon. Its skin is hard and covered with sharp spines. These spines usually lie flat on the side of the fish. When the fish puffs up, the spines stick out in all directions.

How does the puffer “puff” up? It’s not filled with air like a balloon. It’s full of water. The fish gulps lots of water into its stomach. Filled with water, its stomach becomes almost one hundred times bigger. Other body parts



inside the puffer are pushed to the side to make room.

A puffer can turn into a spiny ball in a few seconds. Then only the biggest animals can eat it. The ocean may be full of dangers, but the puffer is ready. Adaptations like sharp spines and puffing up help keep the puffer safe.

Article adapted from “A Fish Story” by Adam Summers, *Natural History* magazine, October 2001.

Prompt students to look at the two pictures of the puffer fish and its spines on the previous page. Ask them to **turn and talk** in response to the following questions:

- How does the puffer fish look different after it swells up?
- How do you think it would feel to touch the puffer’s skin after it puffs out? What words in the text make you think that? (e.g., “not soft and smooth”...“hard and covered with sharp spines”...)

**Think Aloud:** I think I am beginning to understand why predators would stay away from the puffer fish when it puffs up!

**Think Aloud:** Wow! The puffer’s stomach becomes almost one hundred times bigger when it is puffed up!!

Direct students’ attention to the labeled diagram. Ask students to use the picture to explain to their partner how the puffer fish swells up. It is important for students to realize that the puffer fills its stomach with water (not air), and that the other organs get pushed out of the way. Invite a student to explain what the diagram shows.

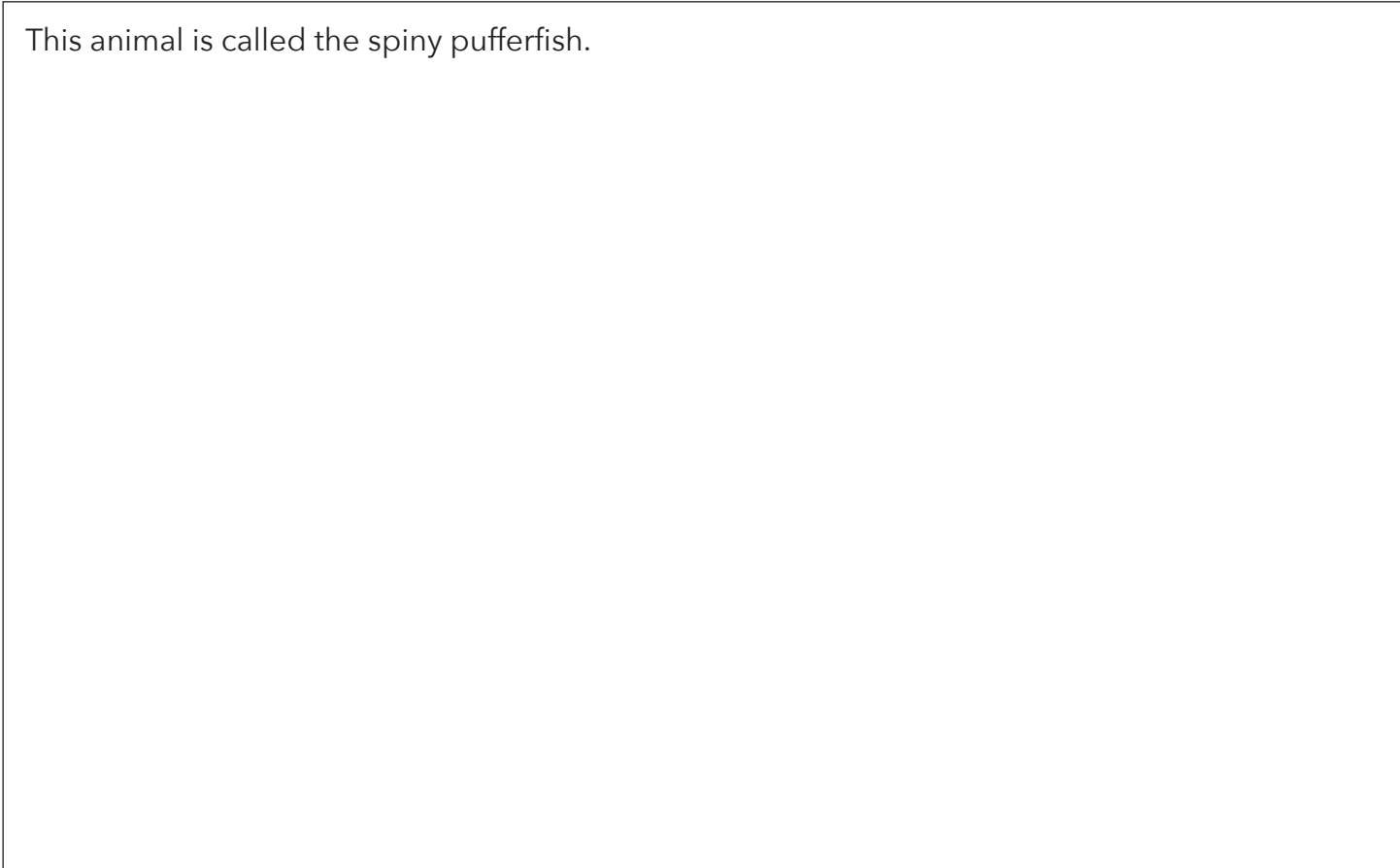
**Formative Assessment:** Invite students to draw/write in response to the following open-ended question: *What did you learn about the puffer fish? OR, How does the puffer keep safe from bigger fish that want to eat it?*

**STUDENT WORKSHEET: Part 1**

Name: \_\_\_\_\_ **ANSWER KEY**

**Draw** a spiny pufferfish. **Label** the spines.

This animal is called the spiny pufferfish.



**Explain** how the pufferfish uses its spines.

*The pufferfish uses its spines for protection.*

*Sharks won't eat an animal that is covered in sharp spines.*

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STUDENT WORKSHEET: Part 2

Name: \_\_\_\_\_ **ANSWER KEY**

**Pick** one animal in the exhibition. **Draw** it and **label** one body part.

This animal is called the  
*Answers will vary.*

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**Explain** how the animal uses its body part.

*Answers will vary.*

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**Pick** another animal. **Draw** it and **label** one body part.

This animal is called the  
*Answers will vary.*

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**Explain** how the animal uses its body part.

*Answers will vary.*

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**ESSAY SCORING RUBRIC: TEACHER VERSION - page 1**

Scoring Criteria		Exceeds	Meets	Approaches	Needs Additional Support
		4	3	2	1
<b>RESEARCH</b> (worth 1/3)	<b>Article:</b> "Who Wants a Spiny Snack?"	Accurately presents information relevant to all parts of the prompt with paraphrased details from the article	Presents information from the article relevant to the prompt with accuracy and sufficient detail	Presents information from the article relevant to the purpose of the prompt with minor lapses in accuracy or completeness	Attempts to present information in response to the prompt, but lacks connections to the article or relevance to the purpose of the prompt
	<b>Museum Exhibition:</b> <i>Life at the Limits</i>	Accurately presents information relevant to all parts of the prompt with paraphrased details from the exhibition	Presents information from the exhibition relevant to the prompt with accuracy and sufficient detail	Presents information from the exhibition relevant to the purpose of the prompt with minor lapses in accuracy or completeness	Attempts to present information in response to the prompt, but lacks connections to the exhibition content or relevance to the purpose of the prompt
<b>SCIENCE</b> (worth 1/3)	<b>Science Explanations</b>	Integrates relevant and accurate science content with thorough explanations that demonstrate in-depth understanding of animal body parts	Accurately presents science content relevant to the prompt with sufficient explanations that demonstrate understanding of animal body parts	Briefly notes science content relevant to the prompt; shows basic or uneven understanding of animal body parts; minor errors in explanation	Attempts to include animal body parts in explanations, but understanding of the topic is weak; content is irrelevant, inappropriate, or inaccurate
		Uses three labeled illustrations to accurately communicate relevant information about the spiny pufferfish and two other animals; each illustration has at least one labeled body part	Includes three labeled illustrations to communicate relevant information about the spiny pufferfish and two other animals with one label per animal	Includes three illustrations without labels or only one properly labeled illustration	No illustrations
<b>WRITING</b> (worth 1/3)	<b>Focus</b>	Maintains a strongly developed focus on the writing prompt for the entire essay	Maintains focus on the writing prompt for the majority of the essay	Addresses the prompt but is off-task some of the time	Does not address the prompt for most or all of the essay
		Introduces the topic of animal body parts	Names the topic of animal body parts	X	Does not introduce the topic of animal body parts
		Provides a concluding section	Provides a concluding sentence	X	Provides no sense of closure
	<b>Development</b>	Includes a description of multiple body parts of three animals along with accurate information about the function of that body part	Includes a description of one body part for each of three animals along with information about the function of that body part	Does not include animal names or does not include a description of body parts for all of the selected animals	Does not name any animals or body parts



ARTICLE

## Who wants a spiny snack?

Not many animals! How the spiny puffer stays safe in the ocean

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© iStock Photo/GlobalP

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that helps an animal live. Predators have adaptations that help them hunt. Imagine a shark's sharp teeth. This adaptation helps a shark catch and eat fish.



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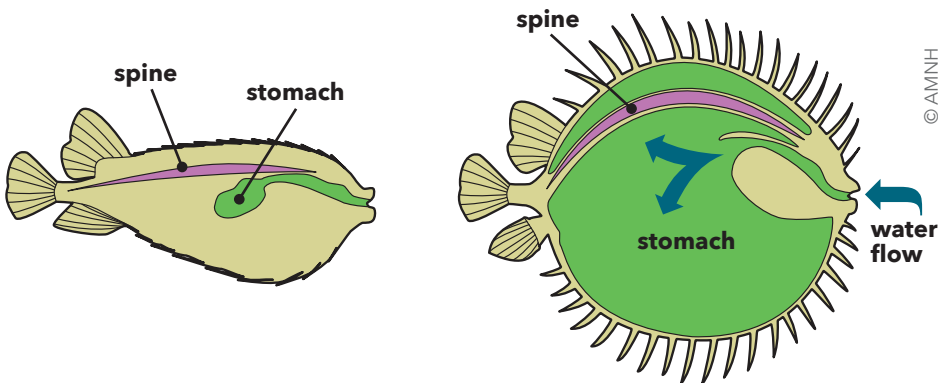


A pufferfish's skin is hard and covered with sharp spines.

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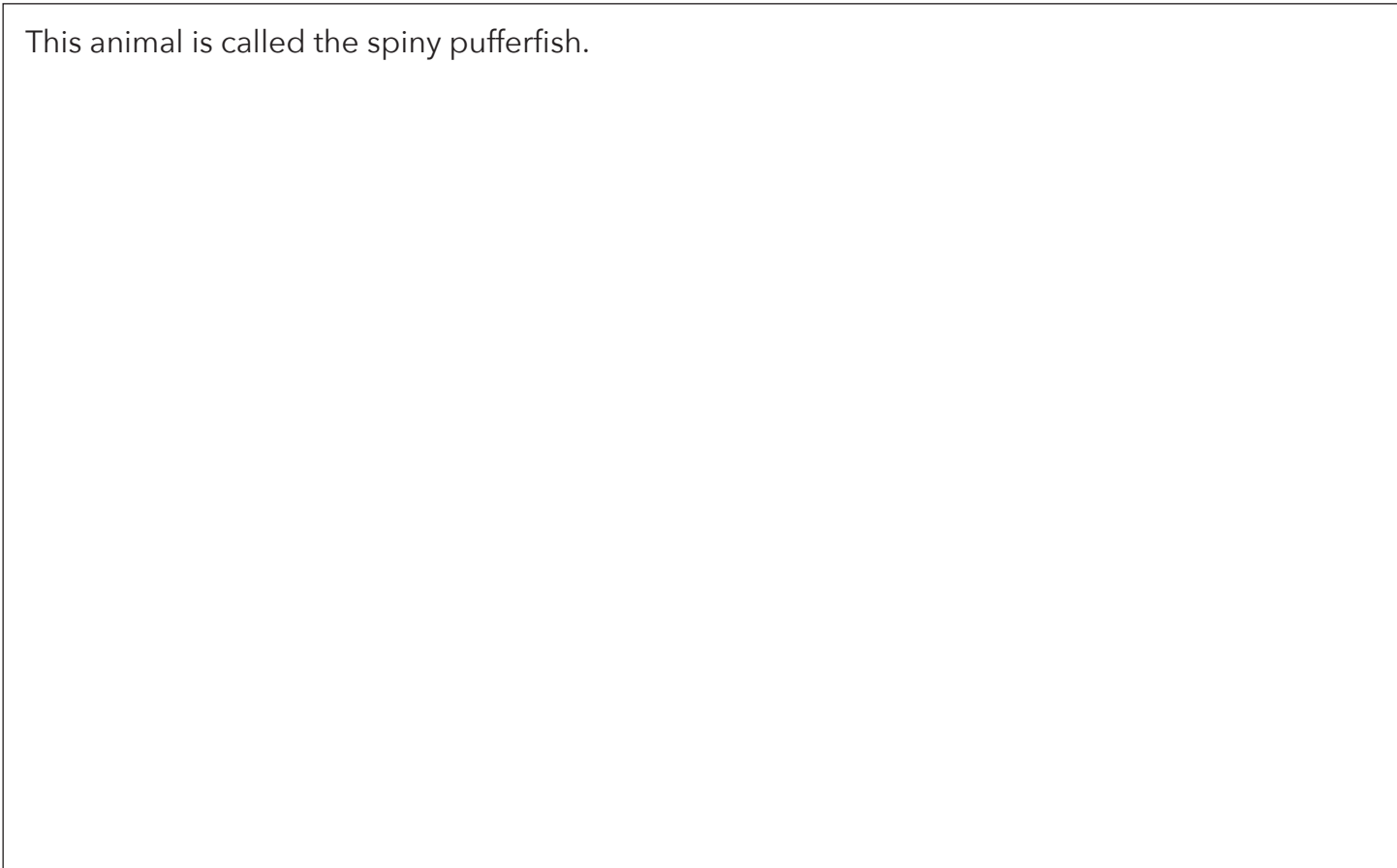
Article adapted from "A Fish Story" by Adam Summers, *Natural History* magazine, October 2001.

**STUDENT WORKSHEET: Part 1**

Name: \_\_\_\_\_

**Draw** a spiny pufferfish. **Label** the spines.

This animal is called the spiny pufferfish.



**Explain** how the pufferfish uses its spines.

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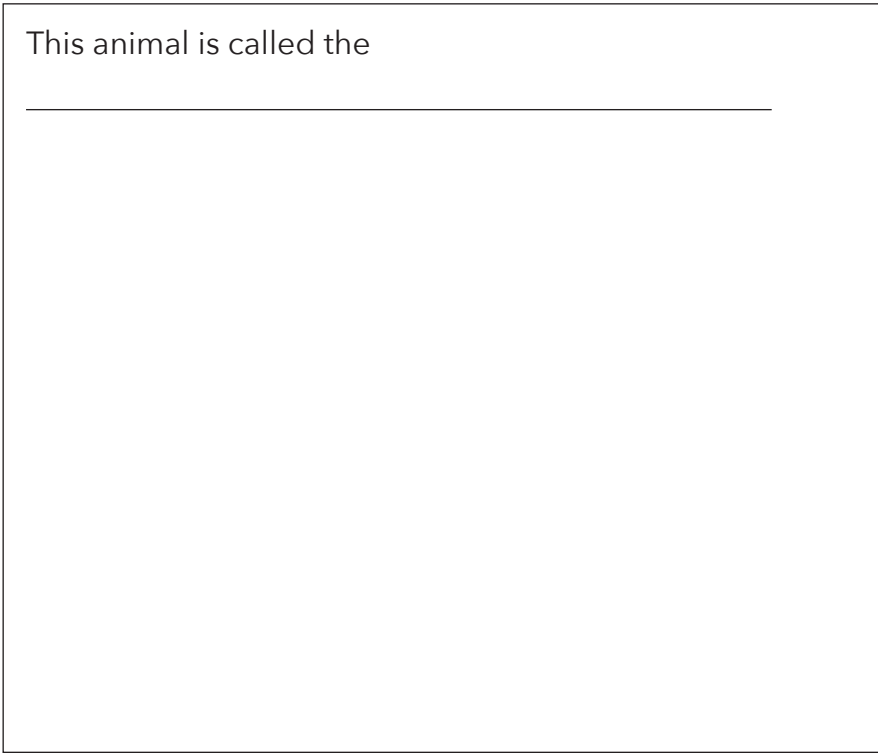
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**STUDENT WORKSHEET: Part 2**

Name: \_\_\_\_\_

**Pick** one animal in the exhibition. **Draw** it and **label** one body part.

This animal is called the  
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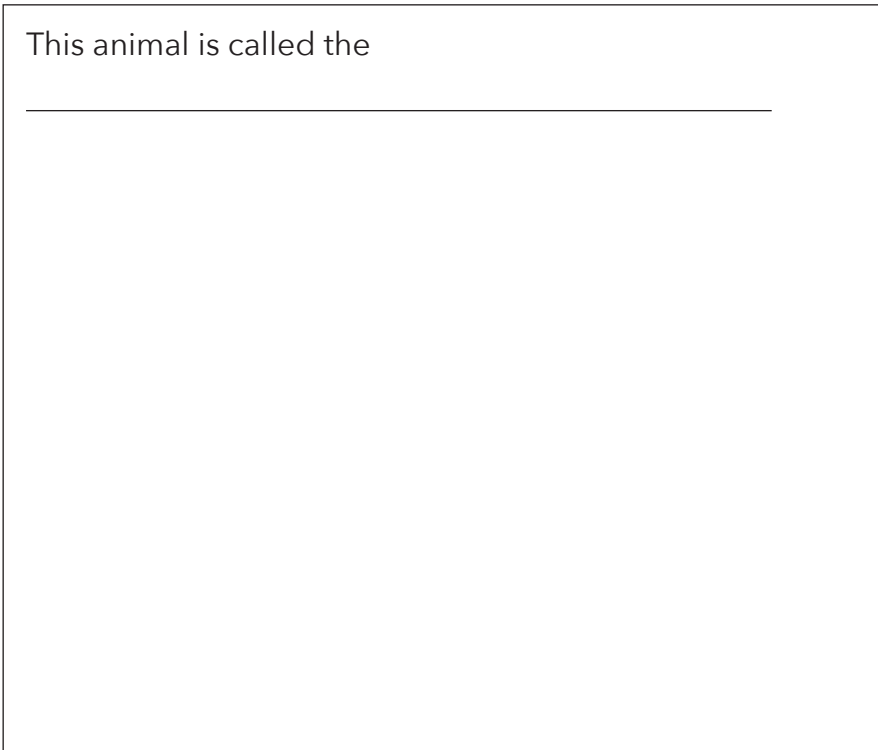


**Explain** how the animal uses its body part.

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**Pick** another animal. **Draw** it and **label** one body part.

This animal is called the  
\_\_\_\_\_



**Explain** how the animal uses its body part.

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## STUDENT WRITING TASK

You have learned about animals by reading the article, "Who Wants a Spiny Snack?" and by exploring the *Life at the Limits* exhibition.

Now you will write a book to teach your friends about these animals.

Your book will include three animals. The first animal will be the spiny pufferfish. The other two animals will be from the *Life at the Limits* exhibition.

For each animal, name one body part that helps this animal. Then explain in your own words how this body part works. Include a drawing of each animal and label the body part that you have described.

**ESSAY SCORING RUBRIC: STUDENT VERSION**

Scoring Criteria		Exceeds	Meets	Approaches	Needs Additional Support
		4	3	2	1
<b>RESEARCH</b> (worth 1/3)	<b>Article:</b> "Who Wants a Spiny Snack?"	I used what I learned in the article to write a detailed book in my own words	I used what I learned in the article to write my book	I used what I learned in the article to write my book but I am not sure if everything I wrote is correct	I did not use any information from the article to write my book
	<b>Museum Exhibition:</b> <i>Life at the Limits</i>	I used what I learned in the exhibition to write a detailed book in my own words	I used what I learned in the exhibition to write my book	I used what I learned in the exhibition to write my book but I am not sure if everything I wrote is correct	I did not use any information from the exhibition to write my book
<b>SCIENCE</b> (worth 1/3)	<b>Science Explanations</b>	All of the information I wrote about animal body parts is correct	Most of the information I wrote about animal body parts is correct	Some of the information I included about animal body parts is correct	None of the information I wrote about animal body parts is correct
		I drew pictures of the spiny pufferfish and two other animals and labeled their body parts to show how they work	I drew pictures of the spiny pufferfish and two other animals and labeled their body parts	I drew pictures of one or two animals and labeled their body parts	I did not include any illustrations
<b>WRITING</b> (worth 1/3)	<b>Focus</b>	My whole book is about animals and their body parts	Most of my book is about animals and their body parts	Some of my book is about animals and their body parts	My book is not about animal body parts
		I introduced my topic	I named my topic	X	I did not introduce my topic
		I wrote an ending paragraph	I wrote an ending to my book	X	I did not write an ending to my book
	<b>Development</b>	I explained how the body parts of the puffer fish and two other animals work in detail	I explained how the body parts of the puffer fish and two other animals work	I explained how the body parts of the one or two animals work	I did not explain how any animal body parts work