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.
• 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)
• 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.
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.

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.

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...
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.

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.

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!
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.

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?

Article adapted from “A Fish Story” by Adam Summers, Natural History magazine, October 2001.
STUDENT WORKSHEET: Part 1

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.
STUDENT WORKSHEET: Part 2

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

This animal is called the

*Answers will vary.*

Explain how the animal uses its body part.

*Answers will vary.*

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

This animal is called the

*Answers will vary.*

Explain how the animal uses its body part.

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

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.

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.

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
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.

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.

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!
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.
STUDENT WORKSHEET: Part 1

Draw a spiny pufferfish. Label the spines.

This animal is called the spiny pufferfish.

Explain how the pufferfish uses its spines.
STUDENT WORKSHEET: Part 2

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

This animal is called the ________________________________

Explain how the animal uses its body part.

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

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

This animal is called the ________________________________

Explain how the animal uses its body part.

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________
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

<table>
<thead>
<tr>
<th>Scoring Criteria</th>
<th>Exceeds</th>
<th>Meets</th>
<th>Approaches</th>
<th>Needs Additional Support</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>RESEARCH</strong></td>
<td></td>
<td></td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Article:</td>
<td>I used what I learned in the article to write a detailed book in my own words</td>
<td>I used what I learned in the article to write my book</td>
<td>I used what I learned in the exhibition to write my book</td>
<td>I did not use any information from the article to write my book</td>
</tr>
<tr>
<td>Museum Exhibition:</td>
<td>I used what I learned in the exhibition to write a detailed book in my own words</td>
<td>I used what I learned in the exhibition to write my book</td>
<td>I used what I learned in the exhibition to write my book</td>
<td>I did not use any information from the exhibition to write my book</td>
</tr>
<tr>
<td><strong>SCIENCE</strong></td>
<td></td>
<td></td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Science Explanations</td>
<td>All of the information I wrote about animal body parts is correct</td>
<td>Most of the information I wrote about animal body parts is correct</td>
<td>Some of the information I included about animal body parts is correct</td>
<td>None of the information I wrote about animal body parts is correct</td>
</tr>
<tr>
<td></td>
<td>I drew pictures of the spiny pufferfish and two other animals and labeled their body parts to show how they work</td>
<td>I drew pictures of the spiny pufferfish and two other animals and labeled their body parts</td>
<td>I drew pictures of one or two animals and labeled their body parts</td>
<td>I did not include any illustrations</td>
</tr>
<tr>
<td><strong>WRITING</strong></td>
<td></td>
<td></td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Focus</td>
<td>My whole book is about animals and their body parts</td>
<td>Most of my book is about animals and their body parts</td>
<td>Some of my book is about animals and their body parts</td>
<td>My book is not about animal body parts</td>
</tr>
<tr>
<td></td>
<td>I introduced my topic</td>
<td>I named my topic</td>
<td>X</td>
<td>I did not introduce my topic</td>
</tr>
<tr>
<td>Development</td>
<td>I explained how the body parts of the puffer fish and two other animals work in detail</td>
<td>I explained how the body parts of the puffer fish and two other animals work</td>
<td>I explained how the body parts of the one or two animals work</td>
<td>I did not explain how any animal body parts work</td>
</tr>
</tbody>
</table>