

LESSON 4: INVASION OF THE FISHAPODS!

*When did vertebrate animals move ashore?
Why did they do it—and what did they find?*

Lesson 4 highlights the evolution of tetrapods, the four-limbed animals that gave rise to famous animals like dinosaurs...and us!

Lesson Plan

[Quick Dip Video](#)

Classroom Activity: Fins to Feet Mini-Book



Out of the Blue: How Animals Evolved from Prehistoric Seas

Lesson 4: INVASION OF THE FISHAPODS!

Lesson Plan

INVASION OF THE FISHAPODS! Around 400 million years ago, animals with backbones crawled onto dry land for the first time. What kind of critters were they? Why and when did they leave their watery homes—and how do we know? Answers take us back to the first chordate animals in the Cambrian Period and on through the Age of Fishes to recent discoveries of fossils that show the evolutionary transition from fish to tetrapods (four-limbed animals).

In **Lesson 4**, students delve further into the book and watch Quick Dip #4. They use creative story structure as a framework for a STEM/Lit activity, making “mini-books” that explore diversity and variation within ecosystems of long ago. This lesson helps children imagine how animals adapted to new conditions on shore long ago.



Learning Objectives

- ✓ I can show how the body structure of fish is similar to mine
- ✓ I can identify what types of animals are tetrapods, including amphibians, reptiles, birds, and mammals
- ✓ I can write and illustrate a story that shows how animals adapt to ecosystems

Time Required

This lesson can be managed in a single one-hour classroom session or divided into two.

1. Read from the book (focus on Devonian to Permian Periods); watch Quick Dip Video #4.
2. Classroom Activity – *Fins to Feet Mini-Book*

NGSS Focus: Variation and Diversity; Ecosystems

Performance Expectation (3-5): variations in characteristics among individuals of the same species may provide advantages in surviving, finding mates, and reproducing

3-LS3-2. Use evidence to support the explanation that traits can be influenced by the environment.

LS3.B: Variation of Traits. Different organisms vary in how they look and function because they have different inherited information. The environment also affects the traits that an organism develops.

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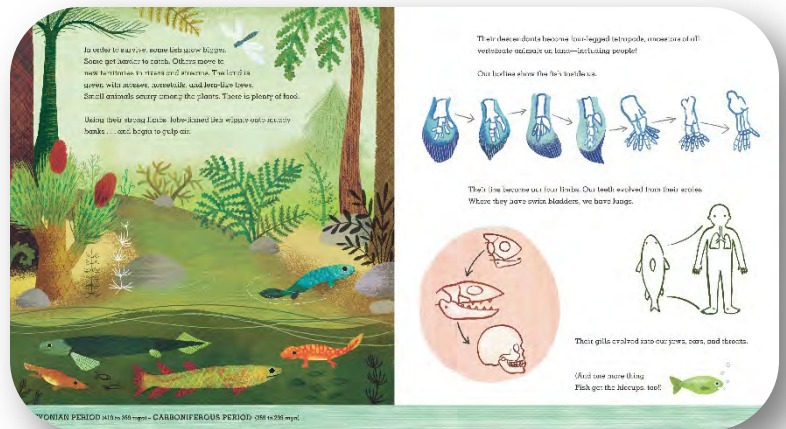
Materials Needed

- A copy of *Out of the Blue: How Animals Evolved from Prehistoric Seas*
- [Quick Dip Video #4: INVASION OF THE FISHAPODS!](#) (video available at www.elizabethshreeve.com or [YouTube Elizabeth Shreeve Books](#))
- Markers, pencils, blank paper
- Print-outs of worksheet charts (see below or in [Pages-to-Print Package](#))
- Staples or clips

Video & Classroom Activity

STEP 1: Read and Prepare

1. Introduce the topic and ask students to think of a favorite animal from the book or from their own experience or imagination. They will be writing and drawing about that animal, then creating a story of how it might evolve as it adapted to conditions on land or in water.
2. Print copies of the Mini-Book Worksheets (see below or in [Pages-to-Print Package](#))
3. Read aloud from the book, focusing on pages that follow the evolution of chordate animals from the Devonian/Age of Fishes to Permian Periods (up to the Permian Extinction).
 - Do fish have backbones? What are the advantages of having a backbone?
 - How would a fish need to change in order to live on dry land?
4. On the Devonian to Carboniferous spread, discuss how our bodies “show the fish inside us.” One trait we share is the basic bone structure in our limbs. Using arms as the example, we have one bone in the upper arm, two bones between elbow and wrist, lots of small bones in our hands, and multiple fingers.
 - Can students feel this pattern in their arms? Wiggle some fingers!



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STEP 2: Watch Quick Dip Video #4

Watch the [Quick Dip Video #4: INVASION OF THE FISHAPODS!](#) available with Teaching Videos at www.elizabethshreeve.com and at [YouTube Elizabeth Shreeve Books](#)

Discuss questions at the end of the video.

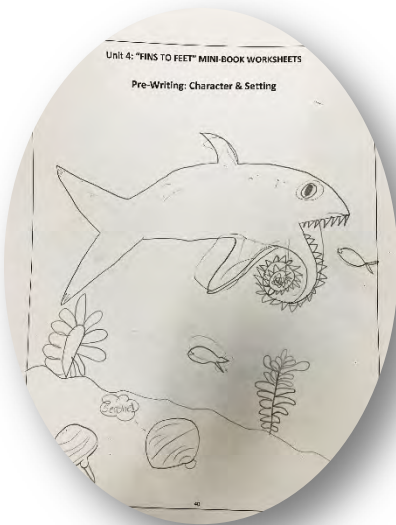
1. Animals with backbones are part of the chordate group. Can you name a chordate animal that lives in the ocean?
2. What is a tetrapod? Can you name a tetrapod that lives on land or flies in the air?
3. What are some parts of our bodies that are similar to those of fish? What are some parts that are different?
4. Can you imagine a land animal with three or five limbs instead of four?
5. If you could choose...how many legs or arms would YOU have?

For Grades 3+, be sure to check out other videos at [YouTube Elizabeth Shreeve Books](#):

- “TAKE THE PLUNGE: Introduction to the Research and Writing Process”
- “TALKING TO THE SCIENTISTS: Interviews with Three Experts Behind the Book.”

STEP 3: Pre-Writing

Now it's time to make a mini-book, starting with PRE-WRITING exercises of creating a character, establishing a setting, and deciding on a story problem or question.



This STEM/Lit activity encourages students to consider how animals adapt to new conditions. It uses a creative story structure as a framework for making original short books.

1. Supply each student with print-outs of the following charts and drawing/writing tools.

They will use these pages to describe a favorite ocean animal and its home. The animal can be from *Out of the Blue*, from a different book or video, or from their own imagination. To bring their story to life, they can even imagine BEING that animal!

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2. Have students draw a picture and write words to describe their animal.
 - What does it look like? Does it have a shell? Does it have a soft squishy body, a backbone like a prehistoric shark, or an exoskeleton like a sea scorpion?
 - How does it move around? What does it eat? Is it a predator or prey?
 - Does it have a name (real or made-up)?
3. Have students describe the ocean scene using more pictures and words.
 - Does your animal live in warm, tropical seas, cold Arctic waters, or somewhere else? Does it live in the deep sea or near the surface?
 - What's around it? Are there sponges, corals, or a kelp forest? Other animals?

STEP 4: Make a Mini-Book

After pre-writing, students are ready to follow prompts on the worksheets, below, and assemble the mini-books. Make sure students make a cover using the worksheet below, including title, author/illustrator name, and artwork.

Prompts are:

Character

- What does it look like? Does it have a shell? Does it have a soft squishy body, a backbone like a prehistoric shark, or an exoskeleton like a sea scorpion?
- How does it move around? What does it eat? Is it a predator or prey?

Setting

- Does your animal live in warm, tropical seas, cold Arctic waters, or somewhere else? Does it live in the deep sea or near the surface?
- What's around it? Are there sponges or corals? A kelp forest? Other animals?



Note: It maybe be useful to remind students that in real life, animals don't actually "make decisions" during the course of evolution. Instead, when conditions change, they move to new locations, adapt new ways to survive, or go extinct. But this activity calls for artistic license!

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STEP 4: Present & Discuss

Each student now has a mini-book of several pages.

- Ask students to share their stories. What were their original ocean animals?
- Did their animal move onto land or stay in the water? Why?
- How does their animal's great-great-great-great (many more "greats"!) grandchild look and live differently than its distant ancestor? How did the family line (lineage) adapt and change (evolve) over time?
- Did those changes happen quickly or over a long time?

This activity reinforces:

- Ways in which animals evolve in relationship to their environments.
- How family lineages can diverge through the course of evolution, resulting in animals that look and behave differently.
- Reporting to a group on a topic, using descriptive details.



Visit www.elizabethshreeve.com for more activities and resources.

Bye for now!

Lesson 4: “FINS TO FEET” MINI-BOOK WORKSHEETS

COVER PAGE:

Title, author/illustrator’s name, artwork

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Pre-Writing: Character & Setting

Write notes and make sketches about an ocean animal (“character”) and its home (“setting”).

Character

- What does it look like? Does it have a shell? Does it have a soft squishy body, a backbone like a prehistoric shark, or an exoskeleton like a sea scorpion?
- How does it move around? What does it eat? Is it a predator or prey?

Setting

- Does your animal live in warm, tropical seas, cold Arctic waters, or somewhere else? Does it live in the deep sea or near the surface?
- What’s around it? Are there sponges, corals, or a kelp forest? Other animals?

Pre-writing is for brainstorming. Get messy, go wild, work fast!

Lesson 4: “FINS TO FEET” MINI-BOOK WORKSHEETS

WHAT HAPPENS NEXT?

Competition is heating up in the ocean.

There are too many predators and too little food. Yikes!

Stories usually include some kind of problem or question. So, guess what? The ocean’s changing...and your animal’s life is about to change, too. How will it survive? How will it adapt (over many generations!) to new places? Which brings us to...

THE FIRST BIG DECISION FOR YOU, THE AUTHOR...

- Will your animal become a **land dweller** and adapt to new conditions on land? (Go to “A”)
 - Or will it remain an **ocean dweller** and adapt new ways to survive? (Go to “B”)

A. Story prompts for Land Dwellers: IT’S A WHOLE NEW WORLD!

Through Earth’s long history, many types of ocean animals have moved onto land and adapted to new ways of life. Over time, those populations of animals changed a lot.

- Why did your ocean animal go onto land? (More food? Fewer predators? Anything else?)
- How will life on land be different? (Breathing, moving, eating, predators, drying out)

Next, imagine the great-great-great-great (*many more “greats”!*) grandchild of your animal that has moved onto land.

- What would it look like?
- Would it live in a tree? On the beach?

On the next pages, describe your animal’s story and its descendants after millions more years in the ocean. Use pictures and words!

B. Story prompts for Ocean Dwellers: LIFE IS SWISHY IN THE SEA!

Through Earth’s long history, many other types of animals have stayed in the ocean. Over millions of years, they changed too!

- Why was your ocean animal happy to stay in the water? (Its body is squishy? It needs to float? It was able to hide from predators—or maybe it’s already the top predator?)

Next, imagine the great-great-great-great (*many more “greats”!*) grandchild of your ocean animal.

- Has its body changed or stayed the same?
- Has the ocean changed?

On the next pages, describe your animal’s story and its descendants after millions more years in the ocean. Use pictures and words!

Lesson 4: “FINS TO FEET” MINI-BOOK WORKSHEETS

Describe your animal as they look BEFORE moving onto land or evolving further in the ocean

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**Millions of Years Later...
how do they look and behave?**

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C. PUT IT ALL TOGETHER

Combine your pages, including cover, pre-writing, descriptions of original animal, how it adapted to changing conditions, and its descendants. Add more here, if you like. Staple or clip together...

Now you’ve got a mini-book!