



# LESSON 7: FOOD MATTERS

## INTRODUCTION

We often think of food webs on land. There are interesting food webs in the ocean, too. This lesson explores how scientists know that matter flows from food to the animals eating it, then links to the idea that this transfer of matter means that plastics in the ocean are a reason for concern.

## LESSON SUMMARY

In this lesson, students learn about basic fish anatomy and use data to determine what happens to the food that an animal eats once it is in their bodies. Using this information, students consider what happens when an animal eats microplastics and share ways to keep plastics out of the ocean.

## OBJECTIVES

- Students will be able to describe how matter flows through food webs in the ocean.
- Students will be able to explain the impact of plastic in the ocean on the animals that live there.

## ESTIMATED TIME

60 minutes. If you would like to break this lesson up over multiple days, consider pausing between steps 8 and 9.

## STANDARDS ADDRESSED

**Science (NGSS):** 5-LS2-1. Develop a model to describe the movement of matter among plants, animals, decomposers, and the environment.

## **OCEAN LITERACY PRINCIPLES**

5 The ocean supports a great diversity of life and ecosystems.

6 The ocean and humans are inextricably interconnected.

### **FOCUS QUESTION**

What happens to the “stuff” that makes up food when an animal eats it? What happens if an animal eats something it should not?

### **MATERIALS**

- Fish Anatomy handout, one per student
- Fish Anatomy handout, one copy to display (optional)
- Different-colored pens or pencils
- What Happens to Food? master, one copy to display
- Ocean Food Web master, one copy to display
- NOAA resource on the Great Pacific Garbage Patch, see Preparation section

## **PREPARATION**

Read through the lesson in advance. In step 11, there is a choice of resources to use with your students. Determine which resource(s) you would like to use with your students. If you choose to use the video, make sure you have the materials you will need to show the video in class. If you prefer to use one or both of the readings, consider if you will print copies or display them for students to read.

## **FACILITATION**

**Step 1.** Start the lesson by asking students what they think happens to the food that they eat. They may share different ideas, including our bodies using it for energy, the food leaving the body as waste, it getting “digested,” or others. Accept all answers at this point, paying attention to those ideas that may represent a partial understanding.

**Step 2.** Distribute the handout, Fish Anatomy, to students. You may also wish to display a copy of the handout so you can point out the different labeled parts of the fish. Share with students that scientists wanted to understand what happens to food when an animal eats it. Scientists have a way to mark the food that fish eat so they can trace where that food ends up. Tell students to think of it as soaking something in glow-in-the-dark paint so that the paint soaks into every part of the object. These markers stay on food particles, even when they break down.

**Step 3.** Tell students that they are going to have a chance to think about the different results a scientist might see, depending on what food gives to our bodies. Give each group one of the following scenarios and ask them to use a colored pen or pencil to draw small circles to indicate where scientists might find the labeled food in the fish if the scenario is correct. Consider writing each scenario on a small piece of paper to give to students so the group can continue to refer to it. If other ideas came up in Step 1 that would be good for students to think about, you may wish to include those.

For your own information as you facilitate this lesson, the third statement about food breaking down into smaller pieces and becoming part of the body is correct. It represents what the scientists found in their investigations. The other statements are based on common conceptions that students may have.

- We eat food to fill our stomachs so we can be strong.
- We eat food to give us energy. Energy moves out of food particles from the digestive tract into the body.
- We need food to grow and maintain our bodies. Food breaks down into smaller pieces, which move into the body and become part of it.
- We need vitamins from food. The vitamins move out of food particles from the digestive tract and into the body.
- We eat food to help us stay strong. Food breaks into smaller pieces of protein which then move into the muscles to build them up.

**Step 4.** As students work, circulate around the room to make sure students are on the right track. Once groups have had a chance to finish drawing where they think the food would be found in the fish. The following table is to support you in helping the students.



SCENARIO	WHERE LABELED FOOD WOULD BE
We eat food to fill our stomachs so we can be strong.	Students should draw small circles in the stomach and/or along the whole digestive system
We eat food to give us energy. Energy moves out of food particles from the digestive tract into the body.	Students should draw small circles within the digestive system.
We need food to grow and maintain our bodies. Food breaks down into smaller pieces, which move into the body and become part of it.	Students should draw small circles through the whole fish body.
We need vitamins from food. The vitamins move out of food particles from the digestive tract and into the body.	Students should draw small circles within the digestive system.
We eat food to help us stay strong. Food breaks into smaller pieces of protein which then move into the muscles to build them up.	Students should draw small circles in the muscles on the diagram. They may also draw them in the digestive system to show the labeled food after the fish ate it and before it broke down.

**Step 5.** Ask each group to share the scenario they worked on and what they drew on the fish. If more than one group had the same scenario, have them compare what they drew on the fish.

**Step 6.** Have students begin a legend for their fish figure by drawing a small circle in the color they have been using and writing “prediction from scenario” next to it. Then ask them to choose a different colored pen or pencil for the next part of the activity.

**Step 7.** Divide students into new groups so that each group has one student who was exploring each scenario. If you did not add any additional scenarios, each group will have 5 students. Have the students sit close to each other to form the new groups.

**Step 8.** Tell students that you are going to share what scientists found about what happens to food. Display the master, What Happens to Food? Ask students to take a minute to observe the representation quietly. Have them add what they see to their fish graphic by drawing triangles with the new color of pen or pencil. Ask them to add to the legend to show that the triangles represent what scientists found. Then have students talk with their groups to see which scenario it seems to match. Students should find that the image matches that food breaks down and becomes part of the body. Hold a class discussion about their ideas, pointing out that the food became part of all the different tissues in the body. Describe how food breaks down and then becomes part of the matter—the particles—that make up the body of the animal that ate the food.

**Step 9.** Show students the master, Ocean Food Web. Share that this web shows several of the relationships between animals that live in the ocean. When animals eat food, they get energy and matter from the food. Have students choose one food chain from the web, starting with plankton. Explain that this is one set of animals that get energy and matter from each other in order—the same way a grasshopper gets energy and matter from grass and then a bird can get energy and matter from the grasshopper. The bird does not eat the grass directly, but the grass, grasshopper, and bird make a food chain. Ask them to draw the food chain they chose. Encourage them to draw the animals fairly large because they will need to add to them.

**Step 10.** Tell students to imagine that the plankton is all labeled to see where its matter goes. Ask them to draw colored triangles to show that the plankton is labeled. Then ask them to add in the label where they think they would eventually see it. After giving students some time, hold a class discussion to make sure students understand that the matter from the plankton would be incorporated not only into the next animal, but that once that animal became food, the label would become part of the third animal as well. Each of the three animals should have colored triangles when students have completed their drawings.

**Step 11.** Share with students that one of the things scientists have found in recent years is a lot of plastic in the ocean. Show students the NOAA video, [Trash Talk: What is the Great Pacific Garbage Patch](https://marinedebris.noaa.gov/videos/trash-talk-what-great-pacific-garbage-patch-0) (<https://marinedebris.noaa.gov/videos/trash-talk-what-great-pacific-garbage-patch-0>)

If you are unable to play the video for your students, consider using one or both of the following NOAA resources.

- [What is the Great Pacific Garbage Patch?](#)
- [How Big is the Great Pacific Garbage Patch?: Science vs. Myth](#)

If you use these resources, orient students to the map to show that the continental United States is on the right side of the graphic and Hawaii is visible just west of the label, “Eastern Garbage Patch.” Have students use a reading strategy, such as popcorn reading or read-summarize by paragraph, to share the information with the class. Share that plastics have been found throughout the ocean, not just in these patches.

**Step 12.** Remind students that many animals live in the ocean. Others migrate through different parts of the ocean, such as humpback whales making seasonal migrations from Alaska to Hawaii. Highlight the last sentence of the reading that animals may ingest, or eat, plastics. Have students think about what this means for food chains and food webs, based on what they have been learning. Then have them discuss their ideas in their small groups.

**Step 13.** Hold a class discussion about what may happen when animals eat plastics. They should come to understand that the plastic may become part of their bodies and may be passed on to other animals in the food web. Ask students to discuss ideas of how they can help keep plastics out of the ocean. The end of the video in step 11 focused on prevention and you can use those ideas to guide the discussion.



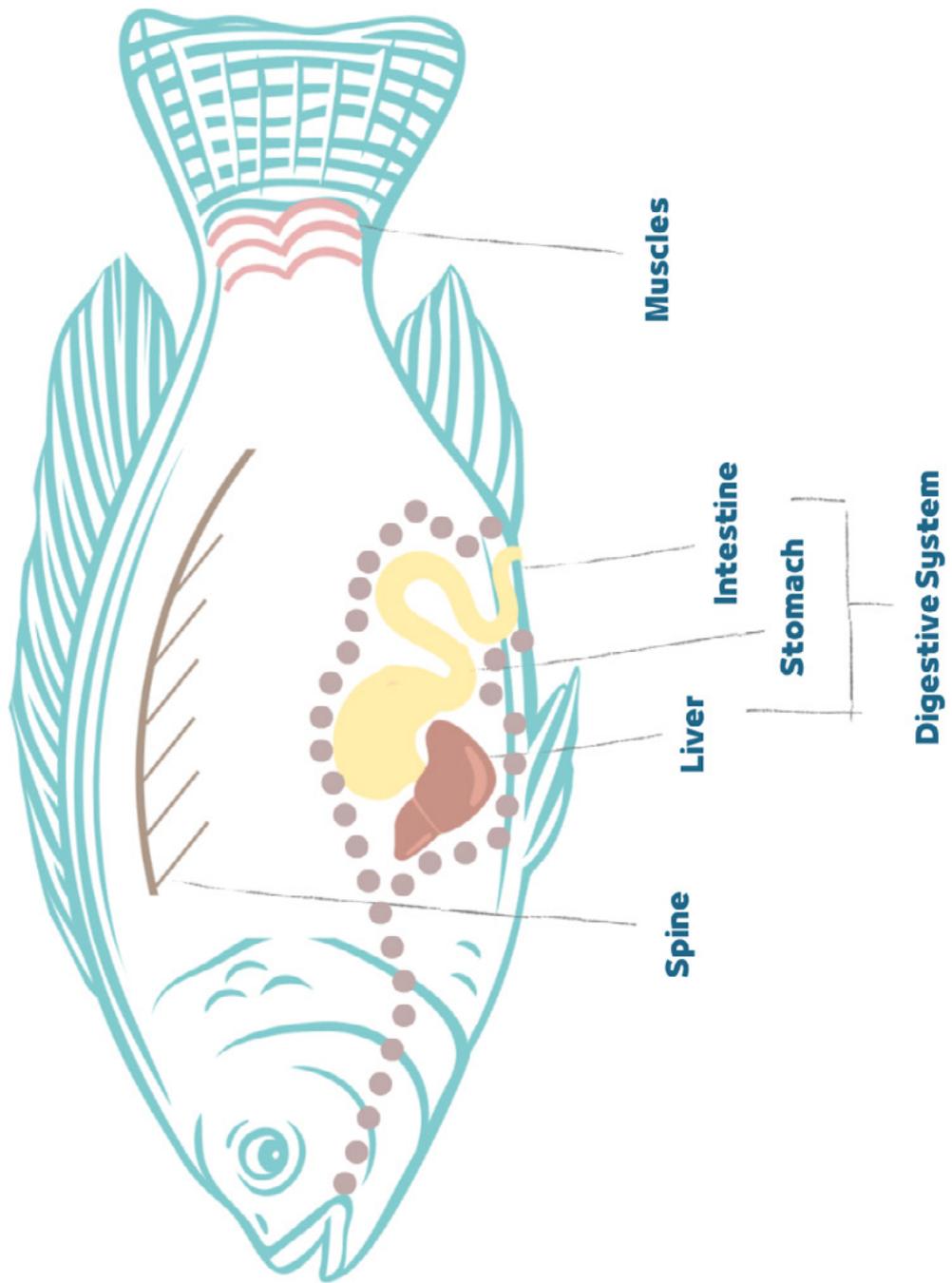
## EXTENSION

NOAA's Marine Debris Program has many resources for teachers and students at <https://marinedebris.noaa.gov/activities-and-curricula>. Consider expanding this lesson to focus students on other aspects of marine debris and its impacts using the resources there.

The NOAA Ocean Today Video Collection: Every Full Moon - Trash Talk is a series of 15 videos discussing marine debris in more detail: what it is, where it comes from, how it harms animals, activities students can do in the classroom, and what students can do on their own to address the problem.

### Lesson 7 NOAA References

- NOAA Marine Debris Program video Trash Talk: What is the Great Pacific Garbage Patch (<https://marinedebris.noaa.gov/videos/trash-talk-what-great-pacific-garbage-patch-0>)
- NOAA Ocean Service, What is the Great Pacific Garbage Patch? (<https://oceanservice.noaa.gov/facts/garbagepatch.html>)
- NOAA Office of Response and Restoration, How Big is the Great Pacific Garbage Patch? Science vs. Myth (<https://response.restoration.noaa.gov/about/media/how-big-great-pacific-garbage-patch-science-vs-myth.html>)



**WHAT HAPPENS TO FOOD?**



# OCEAN FOOD WEB

