

13 Biodiversity in the Ocean

BIG IDEAS

- Oceans support thriving communities of organisms that depend on each other for survival.
- Organisms can be classified into groups according to their characteristics and behaviors.

Engage

Lesson Preview

Before reading and trying the activities in your textbook, survey the lesson by scanning the headings, images, captions and bold terms. Record what you predict the lesson will be about in the first row of the chart below. Then record questions that arose from scanning the lesson in the second row. As you read, record in the third row of the chart the answers to your questions. When you have completed the lesson, record a short summary of the lesson in the last row.

Survey	<i>Answers will vary.</i>
Question	
Read	
Retell	

Vocabulary Review

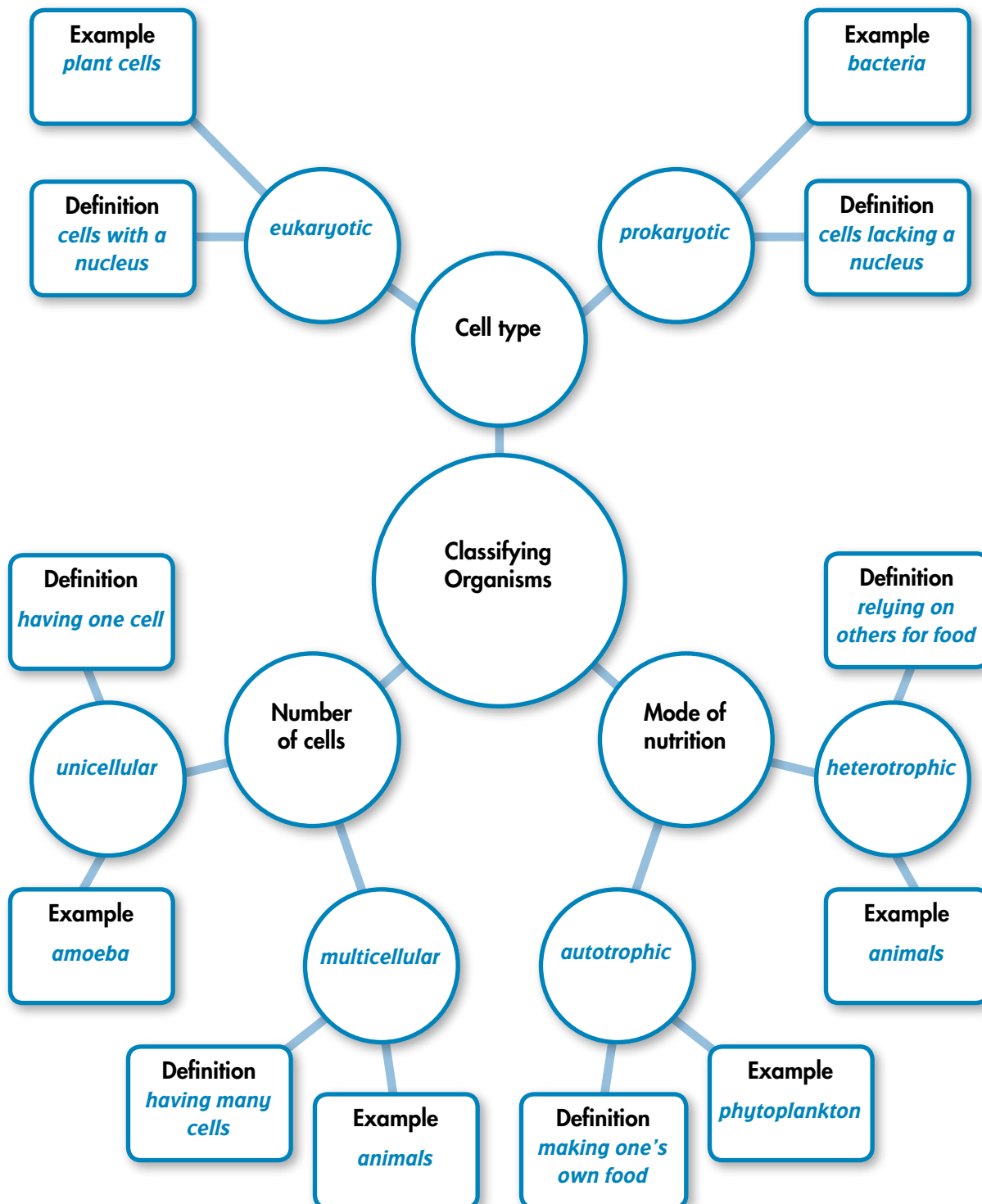
Complete the chart below as you read pages 262–263 of your textbook. Write the definition of each vocabulary term in your own words. Then write a note to yourself on how you can remember the meaning of each term. Use the chart to review key concepts after you have finished the lesson.

Term	Definition	How I Will Remember
Biodiversity	<i>The variety of organisms living in a place</i>	<i>Answers will vary. Some sample responses are shown.</i>
Population	<i>A group of the same species</i>	<i>The population of a country is the people who live there.</i>
Genetic diversity	<i>Differences based on inherited traits</i>	<i>Genetic means related to genes; diversity is a synonym for variety or difference.</i>
Plankton	<i>Small marine organisms that travel with water</i>	
Nekton	<i>Marine animals that can swim freely</i>	

Explore

Build Concept Vocabulary

Before trying the activities in the Explore section of your textbook, use the concept web below to build your understanding of key concept vocabulary. The center and inner circles have been completed with criteria for classifying organisms. Record in the outer circles categories of each criteria along with a definition and example for each.



Practice Process Skills: MAKE OBSERVATIONS

The labs on pages 264–269 of your textbook ask you to make observations about plankton. Remember from Lesson 3 that making observations is a key skill in the process of Scientific Inquiry. When we make observations we use our senses to take in information about our world.

Before conducting the labs described in your textbook, practice making observations with the following activity. Look at the picture below. Describe the picture with as many details as possible in the spaces provided.

Scientists often use tools to extend their senses and make more detailed observations. For the lab in your textbook, you will use a microscope. Microscopes enlarge objects and help us see tiny organisms, items, or details that are hard to detect with the eye alone.

1. *Two fish are swimming in the water.*

2. *A frog is sitting on a rock.*

3. *At least five kinds of plants line the*

edge of the water.

4. *A dragonfly is flying above the water.*

5. *It looks like there might be a bird*

sitting in the plants.

6. _____

7. _____

8. _____



Credit: photos.com

Recall that data from observations can be quantitative or qualitative. Quantitative data involve numbers or measurements of things. Qualitative data include physical, unmeasured descriptions.

Classify the following observations as quantitative or qualitative by placing a check mark in the appropriate column. When you have finished, go back and classify the observations you made about the picture as quantitative or qualitative.

Observation	Qualitative	Quantitative
Five seagulls perched on the buoy.		✓
A colorful kite flew in the sky.	✓	
The waves were strong as they crashed against the shore.	✓	
The temperature of the water was 23° C.		✓
The wind blew north at 20 kilometers per hour.		✓

Review What You Learned

After completing the Local Plankton Exploration lab described on pages 266–269 of your textbook, answer the following questions to review what you learned.

- Describe the experience of making your own scientific tools. What was interesting, difficult or surprising about making the plankton net?

Answers will vary. A sample response follows: I never knew that I could make a scientific

tool out of such common materials. It was hard to get the wire to attach, but I made sure to

scoop quickly. The bottles with tight snap-on tops worked best.

- Describe the experience of collecting your own scientific samples. What was interesting, difficult or surprising about collecting the plankton samples?

Answers will vary. A sample response follows: The first time I put my net into the pond I

dropped the net, so I had to fish it out. I think I disrupted some of the organisms. After that

I was careful, and I could see the plankton being dragged by the net.

3. When you observed the plankton samples under the microscope, what did you find most interesting, difficult or surprising?

Answers will vary. A sample response follows: I could tell that they were all green, and I

could even see some chloroplasts. I was really surprised that the plankton were moving!

That made them interesting, but also difficult to observe.

4. How did the organisms you collected in your local environment compare to those seen on the DVD?

Answers will vary.

Explain

Vocabulary Review

As you read pages 270–280 of your textbook, define each vocabulary term in your own words. Then write yourself a note that will help you remember the meaning of each term.

Term	Definition	How I Will Remember
Taxonomy	<i>Biological way of organizing organisms into categories</i>	<i>Answers will vary. Some sample responses are shown.</i>
Binomial nomenclature	<i>A system for naming organisms in which an organism's genus is followed by its species name; two-name naming</i>	<i>The prefix bi- means two, and nomenclature means naming.</i>
Hierarchy	<i>An order of rank</i>	

Term	Definition	How I Will Remember
Invertebrates	<i>Animals that do not have a backbone</i>	<i>The prefix in- means without, and vertebra means backbone.</i>
Fertilization	<i>The process of a sperm cell joining with an egg</i>	
Chemosynthesis	<i>The process of using minerals or chemicals to make sugar</i>	<i>Chemo is a prefix for chemicals and synthesis means put together.</i>
Halophile	<i>An organism that lives in very salty water</i>	
Methanogen	<i>An organism that thrives on methane</i>	<i>I can see the terms methane in methanogens.</i>
Thermophile	<i>An organism that is found in very hot conditions</i>	<i>Thermo means heat and phile means loving, so thermophile means loving heat.</i>
Common ancestor	<i>An organism or species that has two or more descendants in common</i>	

Practice Process Skills: RECORD DATA

Page 272 of your textbook asks you to complete a data table using text that you will read. Scientists often organize data into simple tables to make it easier to review and analyze information. Before completing a data table, it is always important to review the information and headings in the first column and row of the chart.

Look at the data table in your textbook and answer the questions below to help you get started with the activity.

1. Read each question in the data table on page 272. You will record the answers to these questions for each kingdom in your data table. Using your own words, what information will you need to record in each row of the table?

1. Name some common cell structures that organisms in the kingdom have.
2. Tell whether organisms in the kingdom are producers or consumers.
3. Tell whether organisms in the kingdom are single- or multi-celled.
4. Do organisms in the kingdom have cells with nuclei or do they have cells without nuclei?
5. Name examples of organisms in the kingdom that live on land or in freshwater.
6. Name examples of organisms in the kingdom that live in the ocean.

Now practice answering the table questions for the Kingdom Animalia.

2. Are animals unicellular or multicellular?

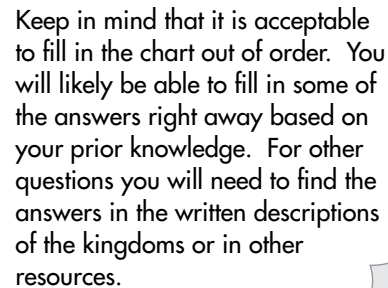
Animals are multicellular.

3. Are animals autotrophs or heterotrophs—do they produce their own food?

Animals are heterotrophs.

4. Are animals eukaryotic or prokaryotic—do they have a nucleus in their cells?

Animals have cells that contain a nucleus, so they are eukaryotic.



Keep in mind that it is acceptable to fill in the chart out of order. You will likely be able to fill in some of the answers right away based on your prior knowledge. For other questions you will need to find the answers in the written descriptions of the kingdoms or in other resources.

Hint: Humans are animals.

5. Think about the structures of animal cells. What are some organelles that you find in the cells of animals?

Animal cells have a nucleus, organelles and mitochondria, but no chloroplasts or cell walls.

6. Finally, it is time to list some examples. What are three examples of land-based animals? What are three examples of marine animals? *Answers will vary.*

Land Animals	Marine Animals
1. <u>Cats</u>	1. <u>Dolphins</u>
2. <u>Monkeys</u>	2. <u>Tuna</u>
3. <u>Vultures</u>	3. <u>Zooplankton</u>

You have answered questions about a Kingdom that you are familiar with, Animalia. Now practice finding answers in the text to complete the data table for the Protista Kingdom. Use the text about Protista on page 274 of your textbook to answer the questions below. Then apply what you learned to complete the data table on page 272.

1. Read the first paragraph. What information does it supply?

It says that some protists can perform photosynthesis (are autotrophic) and some are heterotrophic.

2. Read the first sentence of the second paragraph. What information does it supply?

It says that protists have cell walls, a nucleus and a cell membrane. Only some have chloroplasts.

3. Now it is time to search for information about the number of cells and cell structures. What do the two paragraphs say?

Protists can be unicellular or multicellular. Most protists have cell walls, some have chloroplasts and all have a nucleus and a cell membrane.

4. Now scan the two paragraphs and images again. Can you find any examples of marine protists? How about land or freshwater protists?

Kelp, diatoms, dinoflagellates and rockweed are marine protists. Protists that cause malaria are found on land.

Elaborate

Review What You Learned

In the Investigating the Structure and Function of the Squid lab, you observed the internal and external anatomy of a squid. Answer the following questions to review what you learned.

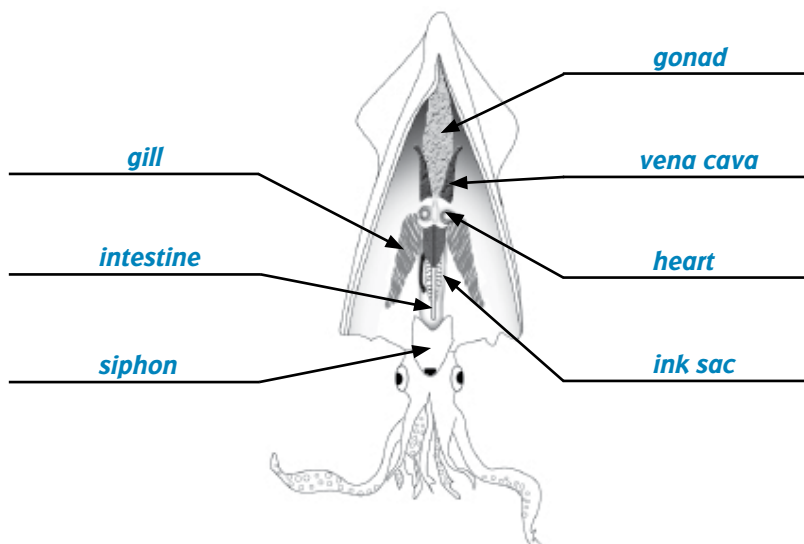
1. What are the important features of the external anatomy?

The external anatomy includes the fins, mantle, eyes, arms, tentacles, mouth and siphon.

2. What are the important features of the internal anatomy?

The internal organs are the gills, hearts, kidney, stomach, intestines, ink sac, vena cava and gonad. There is also a pen that is like a shell.

3. Label the diagram with the important features of the internal and external anatomy.



4. How does the squid's anatomy support the functions of its body parts?

Answers will vary. A sample response follows: Squids move by sucking in and then squirting out water through their siphons. They have a rubbery mass that protects their internal organs. Their large wide-set eyes help squid to spot prey. Their tentacles allow them to grab prey and their suction cups help them hold on to prey.

Use the diagram you labeled to help you complete the data table. Write down the names of 10 internal or external anatomical parts, followed by a description of the structure and function of each part.

Internal or external anatomy	Structure	Function
Tentacles	8, long, thin, with suction cups at the tips	Grab prey
<i>Arms</i>	<i>2, short, thick, with suction cups all along them</i>	<i>Hold the food near the mouth when eating</i>
<i>Siphon</i>	<i>Sticks out from the mantle, tubular</i>	<i>Allows water to pass through, and allows squid to move in a certain direction</i>
<i>Mantle</i>	<i>Thick, flexible, tubular</i>	<i>Holds internal organs</i>
<i>Eyes</i>	<i>Very large and off to the side</i>	<i>See prey easily in the dark ocean waters</i>
<i>Gills</i>	<i>Feathery and thin</i>	<i>Take in oxygen from the water as it passes through the siphon</i>
<i>Hearts</i>	<i>3, flat, white</i>	<i>Pump oxygenated blood to the body</i>
<i>Ink sac</i>	<i>Muscular bag</i>	<i>Releases ink as a defense</i>
<i>Gonad</i>	<i>Tall and pointy, located at the top of the squid</i>	<i>Reproduction</i>
<i>Pen</i>	<i>Clear, long, plastic-like</i>	<i>Supports the squid</i>

Evaluate

Lesson Summary

- Oceans support a diversity of life. Diversity describes not only different types of organisms, but differences from organism to organism within a species.
- Ecosystems thrive with higher levels of biodiversity.
- Plankton are biologically diverse organisms that depend on the movement of water for travel.
- Organisms are classified biologically with a science called taxonomy.
- Organisms are connected in an evolutionary manner to their common ancestors through the Tree of Life.
- Organisms have structures that enable them to carry out life processes and meet survival requirements.
- An organism's structures supports its functions.

Lesson Review

*Return to the chart on page 127 of this workbook that you started at the beginning of this lesson. Retell the key concepts of the lesson in your own words. To help organize your thoughts, use the graphic organizer below. **Answers will vary.***

Important Idea	Important Idea	Important Idea	Important Idea

Summary