DATE: NAME: CLASS:

UNIT 1

Unit 1 Summary

BLM 1-1

Goal • Use this summary to review the concepts in Unit 1, Water Systems on Earth.

Chapter 1 The water cycle plays a vital role on Earth.

- Water is distributed throughout the world, in the oceans, on the land, and in the ground. (1.1)
- Ocean water is different from fresh water. (1.2)
- There is a limited supply of usable fresh water. (1.3)

Chapter 2 Oceans control the water cycle.

- Features of the ocean basins were created by tectonic processes. (2.1)
- Technology allows humans to explore the ocean to tremendous depths. (2.1)
- Ocean currents are created by a number of factors. (2.2)
- The effects of water can directly or indirectly change the surface of Earth. (2.3)

Chapter 3 Bodies of water influence climate and species distribution.

- Ocean waters influence the world's climates. (3.1)
- There are a variety of freshwater and saltwater environments on Earth. (3.2)
- Bodies of water influence species distribution. (3.2)
- Human are affecting the quality of water on Earth. (3.3)

DATE: NAME: CLASS:

UNIT 1

Unit 1 Key Terms

BLM 1-2

Goal • Use this page to review the Unit 1 Key Terms.

Chapter 1 Key Terms	Chapter 2 Key Terms	Chapter 3 Key Terms
atmosphere crevasse density drainage basin freezing point glacier global warming gravity ground water hydrosphere iceberg lithosphere run-off salinity water cycle	abyssal plain bays breaker continental drift continental shelf continental slope Coriolis effect crest density current headlands neap tide ocean current ocean ridges spring tide swell thermocline tidal range tide trench trough tsunami upwelling wavelength	acid precipitation aquaculture bioindicator species bioluminescence climate convection estuary invasive species overfishing phytoplankton specific heat capacity weather wetland zooplankton

DATE: NAME: CLASS:

UNIT 1

Chapter 1 Key Terms

BLM 1-3

Goal • Use this page to review the Key Terms in Chapter 1.

Match each Key Term in the left column with its definition in the right column. Write the missing definition.

Key Term	Definition
(a) atmosphere	1. Water that is below Earth's surface
(b) crevasse	2. The amount of salt dissolved in a certain amount of water
(c) density	3. A moving mass of ice and snow
(d) drainage basin	4. A deep crack in a glacier
(e) freezing point	5. The temperature at which a liquid will change from a liquid to a solid
(f) glacier	6. The force that keeps us on the Earth and causes water to run downhill
(g) global warming	7. Water's constantly changing form, with no beginning and no end
(h) gravity	8. The environment surrounding the planet Earth
(i) ground water	9. A large chunk of ice that has fallen off a glacier and crashed into the ocean
(j) hydrosphere	10. The solid rock ground of Earth's crust
(k) iceberg	11. The area of land that drains into a body of water
(l) lithosphere	12. Water that does not soak into the ground, but flows across Earth's surface
(m) run-off	13. The increase in the average temperatures of Earth's near surface air and oceans
(n) salinity	14. The amount of mass of a substance in a certain amount of volume
(o) water cycle	

DATE: NAME: CLASS:

UNIT 1

Chapter 2 Key Terms

BLM 1-4

Goal • Use this list to help you review the Key Terms in Chapter 2.

Create a list of 10 Key Terms or phrases from the descriptions below. Then find the words and phrases in the puzzle.

1. The submerged part of the continent between the coast and the edge of the basin (11 letters, 5 letters)	
2. A large amount of ocean water that moves in a particular and unchanging direction (5 letters, 7 letters)	
3. The layer of ocean that exists at a depth approximately 200 m to 1000 m beneath the surface (11 letters)	
4. The vertical movements of water from the sea floor to the ocean surface (10 letters)	
5. Smooth waves caused by winds and storms far out in the ocean (6 letters)	
6. The highest part of a wave (5 letters)	
7. Located in the coastline between headlands (4 letters)	
8. The daily low rise and fall of the ocean (5 letters)	
9. Giant waves produced by earthquakes or landslides on the ocean floor (8 letters)	
10. Where the ocean floor is wide, open, and flat (7 letters, 5 letters)	

DATE: NAME: CLASS:

BLM 1-4 continued

B T S E R C R E K A E R B S Y S T E O
H D E N S I T Y C U R R E N T T R N C
C I R C U L A R O R Y S Y S S E T D E
A S E R Q O D A E S P I S E R P T T A
R M E E S I O I G N I R R U D S H H N
D K S I M A N U S T C C S R E O E E R
I T S O R G A N N G K H M A R E R R I
A B Y S S A L P L A I N E M W R M D B
C O R I O L I S E F F E C T O T O E A
C O N T I N E N T A L S H E L F C S Y
L C R Y G E S S T I D E S A E H L L S
C O N T I N E N T A L D R I F T I L T
X S M T Z E K N M F L L K T T O N E E
W O C E A N C U R R E N T T C M E W M
Q L M M U P W E L L I N G S V S R S S

DATE: NAME: CLASS:

UNIT 1

Chapter 3 Key Terms

BLM 1-5

Goal • Use the graphic organizer below to help you learn and review the Key Terms in Chapter 3.

Work in a small group. Choose three Key Terms and write a riddle about each one. Other group members should write riddles about different Key Terms. Ask other group members to guess the answers to your riddles while you guess the answers to theirs. Together, check the answer, and revise the riddles if you need to.

acid precipitation	aquaculture	bioindicator species	bioluminescence
climate	convection	estuary	invasive species
overfishing	phytoplankton	specific heat capacity	weather
wetland	zooplankton		

For example:

I am a general description of the temperature and precipitation around you over many years.

What am I? _____

Riddle 1:

What am I? _____

Riddle 2:

What am I? _____

Riddle 3:

What am I? _____

DATE: NAME: CLASS:

UNIT 1

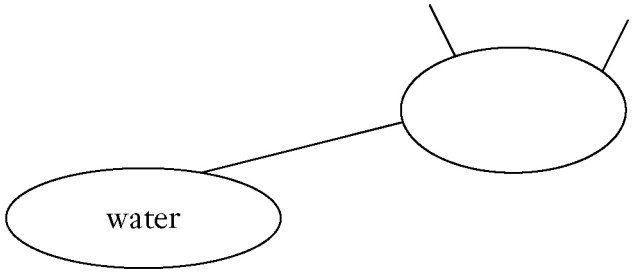
The Many Ways People Use Water

BLM 1-6

Goal • Use this page to create your mind map for Find Out Activity, The Many Ways People Use Water.

What to Do

1. Create a mind map in the space below to show all the different ways water is being used in the figure on page 5 of your textbook. Try to group the uses in your mind map into different categories such as "household use," "personal use," and "recreational activities."



2. Pick one of your categories and imagine that the water uses listed under it were not available to you anymore. Write a brief paragraph about how your life would be affected.

DATE: NAME: CLASS:

UNIT 1

The Water Cycle

BLM 1-7

Goal • Use this page to review your understanding of the water cycle.

What to Do

Draw and label a diagram of the water cycle in the space provided below. Show the location of your community in your diagram. Be sure to include the following terms:

run-off	precipitation	evaporation	condensation
ground water	lithosphere	atmosphere	hydrosphere

Think About It

Which parts of the water cycle have you observed in or near your community?

DATE: NAME: CLASS:

UNIT 1

A Water Cycle Model

BLM 1-8

Goal • Use this page to sketch your model for Find Out Activity 1-1A, A Water Cycle Model.

List of Materials	Sketch of Model
• electric kettle • bowls of various sizes • oven mitts or heat-resistant gloves • ice • hot plate • modelling clay • sand • soil • water • refrigerator • freezer	

Evaluate

1. (a) Did your model work as you expected? _____

_____

(b) What adjustments did you make so it would work, or work better? _____

_____

2. (a) What scientific knowledge did you use to help you develop your model? _____

_____

(b) What scientific knowledge did your model help you develop? _____

_____

3. What ideas did other groups have that you would like to use? What ideas did your group have that others wanted to use?

_____

_____

_____

4. What part did heat energy play in your model? What part does it play in the water cycle?

_____

_____

_____

DATE: NAME: CLASS:

UNIT 1

Salt Water

BLM 1-9

Goal • Use this page to make a circle graph of scientific data.

What to Do

Use the data from Figure 1.7 on page 16 of your textbook to make a circle graph of the components of ocean salts. This pie graph represents only the salts, not the water. You will need a protractor, pencil, and calculator for this activity.

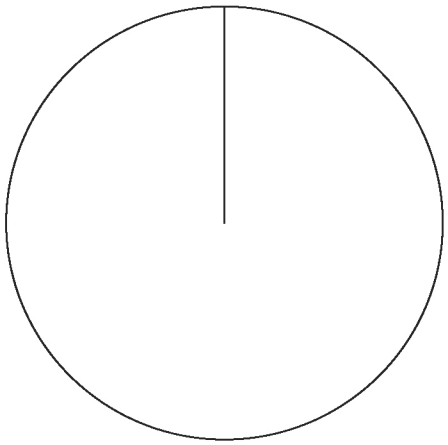
A diameter has been drawn in to help you. Because a circle has 360°, 100% of the circle is 360°, and 1% of the circle is 3.6°. Use your calculator to multiply each percentage by 3.6 to find the number of degrees to use to draw that section of the circle graph.

Colour the sections, and include a colour-coded legend. When you are finished, answer the question at the bottom of the page.

Calculations (show all your work):

Sodium: Chloride: Magnesium:

Sulfate: Calcium: Potassium: Others:



Question

What chemical is most abundant in ocean salt? _____

DATE: NAME: CLASS:

UNIT 1

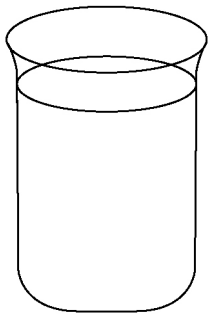
Salinity's Effect on Water Density

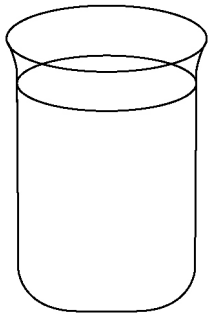
BLM 1-10

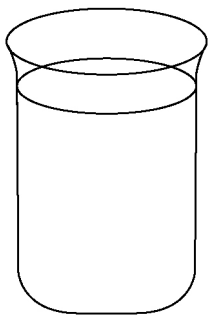
Goal • Use this data table to record your observations during Core Lab Conduct an Investigation 1-2B, Salinity's Effect on Water Density.

What to Do

Use coloured pencils to sketch the mixture created in each test.

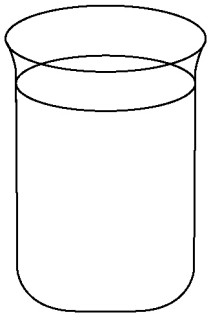
Test Number	Eye Dropper Solution	Beaker Solution	Sketch
1	Very salty water (green—2 drops)	Colourless tap water ($\frac{2}{3}$ beaker)	
Observations Inference			

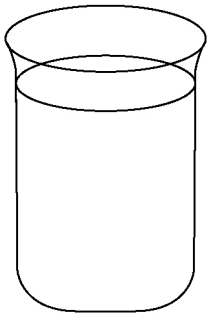
Test Number	Eye Dropper Solution	Beaker Solution	Sketch
2	Tap water (blue—2 drops)	Very salty water (colourless) ($\frac{2}{3}$ beaker)	
Observations Inference			

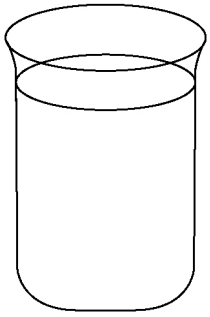
Test Number	Eye Dropper Solution	Beaker Solution	Sketch
3	Tap water (colourless—3 cm deep)	Very salty water (green—$\frac{1}{2}$ beaker)	
Observations Inference			

DATE: NAME: CLASS:

BLM 1-10 continued

Test Number	Eye Dropper Solution	Beaker Solution	Sketch
4	Slightly salty water (red—2 drops)	Mixture from test number 3	
Observations Inference			

Test Number	Eye Dropper Solution	Beaker Solution	Sketch
5	Slightly salty water (red—2 drops)	Mixture from test number 4	
Observations Inference			

Test Number	Eye Dropper Solution	Beaker Solution	Sketch
6		Mixture from test number 5	
Observations Inference			

Analyze

1. When you put the very salty water (green) into the colourless tap water, which one sank?

_____

Explain why this happened.

_____

_____

2. When you put the blue tap water into the very salty water, which one floated on the other?

_____

Explain why this happened.

_____

_____

3. (a) What happened when you added the slightly salty water (red) to the:

(i) very salty water (green) layer?

_____

(ii) colourless tap water layer?

_____

(b) Why did the red water do this?

_____

4. Why did the different types of water not mix by themselves?

_____

_____

_____

DATE: NAME: CLASS:

BLM 1-10 continued

Conclude and Apply

1. How does the amount of salt dissolved in water affect its density?

_____

2. Explain how waters with different densities will act when they meet.

_____

_____

3. Describe what happens when fresh water from a river meets salty ocean water.

_____

_____

4. What causes salt water and fresh water to mix in the ocean?

_____

_____

5. Describe environments on Earth where fresh water would meet salt water.

_____

_____

DATE: NAME: CLASS:

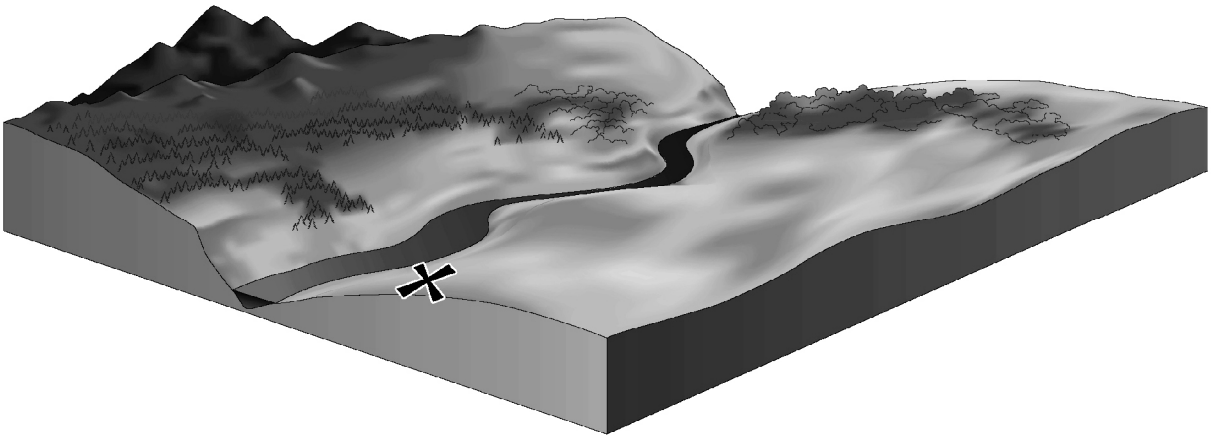
UNIT 1

Tracking Run-off

BLM 1-11

Goal • Use this table to record your answers to What to Do in Find Out Activity 1-3A, Tracking Run-off.

What to Do



Proposed Action by the Community	Possible Consequences Related to the Run-off	Possible Solutions

DATE: NAME: CLASS:

UNIT 1

How Can Global Warming Be Slowed?

BLM 1-12

Goal • Use this page to the record ideas you brainstorm while completing Find Out Activity 1-3B, How Can Global Warming Be Slowed?

Ways in Which We Rely on Energy From Burning Fossil Fuels in Our Community	Ways in Which We Can Change Our Daily Activities to Reduce Our Reliance on Energy From Burning Fossil Fuels

DATE: NAME: CLASS:

UNIT 1

Chapter 1 Review

BLM 1-13

Goal • Check your understanding of Chapter 1.

What to Do

Circle the letter of the best answer.

1. Where can most of the world's fresh water be found?
   A. frozen as ice
   B. in oceans
   C. in streams and rivers
   D. under the ground

2. Why does ocean water sink beneath fresh water when the two meet?
   A. Fresh water contains no dissolved solids.
   B. Fresh water tends to be warmer than ocean water.
   C. Ocean water is denser than fresh water.
   D. Ocean water moves slower than fresh water.

3. What is all of the water on Earth called?
   A. fresh water
   B. the atmosphere
   C. the hydrosphere
   D. the lithosphere

4. Which of the following would help lower the amount of run-off reaching a river?
   A. increasing the amount of vegetation around the river
   B. increasing the depth of the soil around the river
   C. increasing the number of trees cut around the river
   D. increasing the slope around the river

5. What is the name for an area of land in which all the precipitation that falls ends up in the same river?
   A. continental divide
   B. drainage basin
   C. flood plain
   D. river bank

6. What is the name for a scientist who studies water systems and helps find solutions to problems of water quality and quantity?
   A. geographer
   B. geologist
   C. hydrologist
   D. oceanographer

7. How is global warming affecting Earth?
   A. Average global temperatures are decreasing.
   B. Glaciers are forming more quickly.
   C. Sea levels are rising.
   D. The size of glaciers is increasing.

8. When did the last ice age end?
   A. 4200 years ago
   B. 11 000 years ago
   C. 120 000 years ago
   D. 11 million years ago

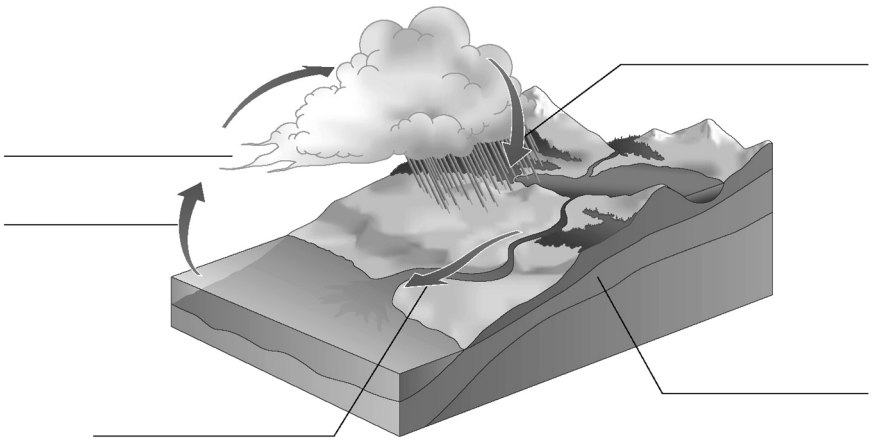
9. Which of the following is *not* a factor that affects run off?
   A. the amount of rain
   B. the nature of the ground material
   C. the slope of the land
   D. the temperature

Match the Term on the left with the best Descriptor on the right.
Each Descriptor may be used only once.

Term	Descriptor
_____ 10. evaporation	A. caused by adding heat to water vapour
_____ 11. global warming	B. converts liquid water into gaseous water vapour
_____ 12. groundwater	C. the amount of salt dissolved in a specific amount of water
_____ 13. lithosphere	D. the increase in temperatures of Earth's atmosphere and oceans
_____ 14. run-off	E. the solid rocky ground of Earth's crust
_____ 15. salinity	F. water that makes its way into spaces between rocks
	G. water that runs over the Earth's surface and into rivers and lakes

Short Answer Questions

16. (a) Label this diagram of the water cycle.



(b) Explain how this cycle works.

_____

_____

_____

17. The oceans are constantly being filled up with fresh water from precipitation and run-off. Explain why they are still salty.

_____

_____

_____

18. (a) What happens when the cold water of the Labrador Current meets the warmer water of the Gulf Stream?

_____

_____

(b) Why does this happen?

_____

_____

DATE: NAME: CLASS:

UNIT 1

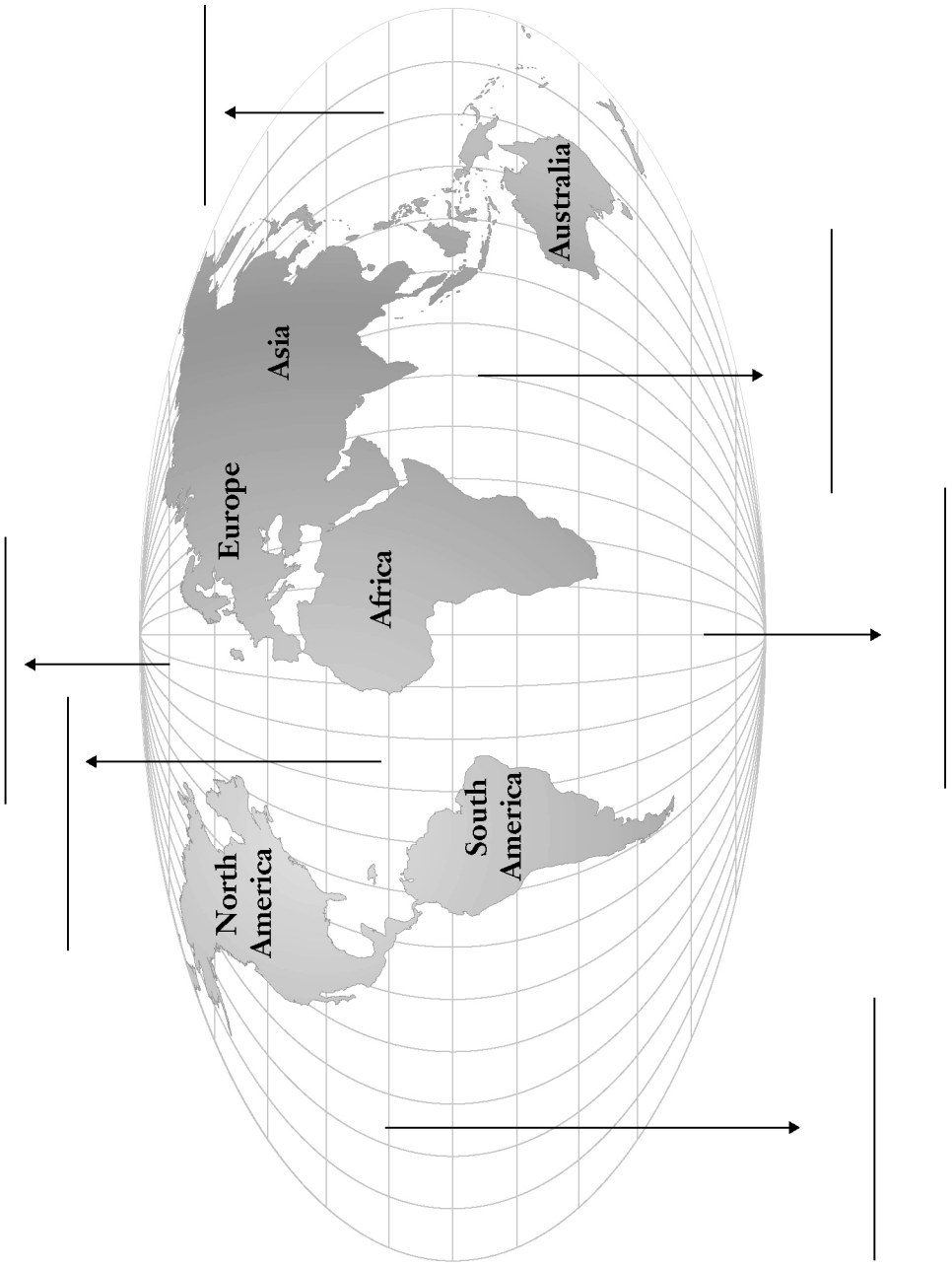
Earth's Oceans

BLM 1-14

Goal • Use this activity to review Earth's oceans.

What to Do

Write the names of the oceans and draw in the water currents on this map.



DATE: NAME: CLASS:

UNIT 1

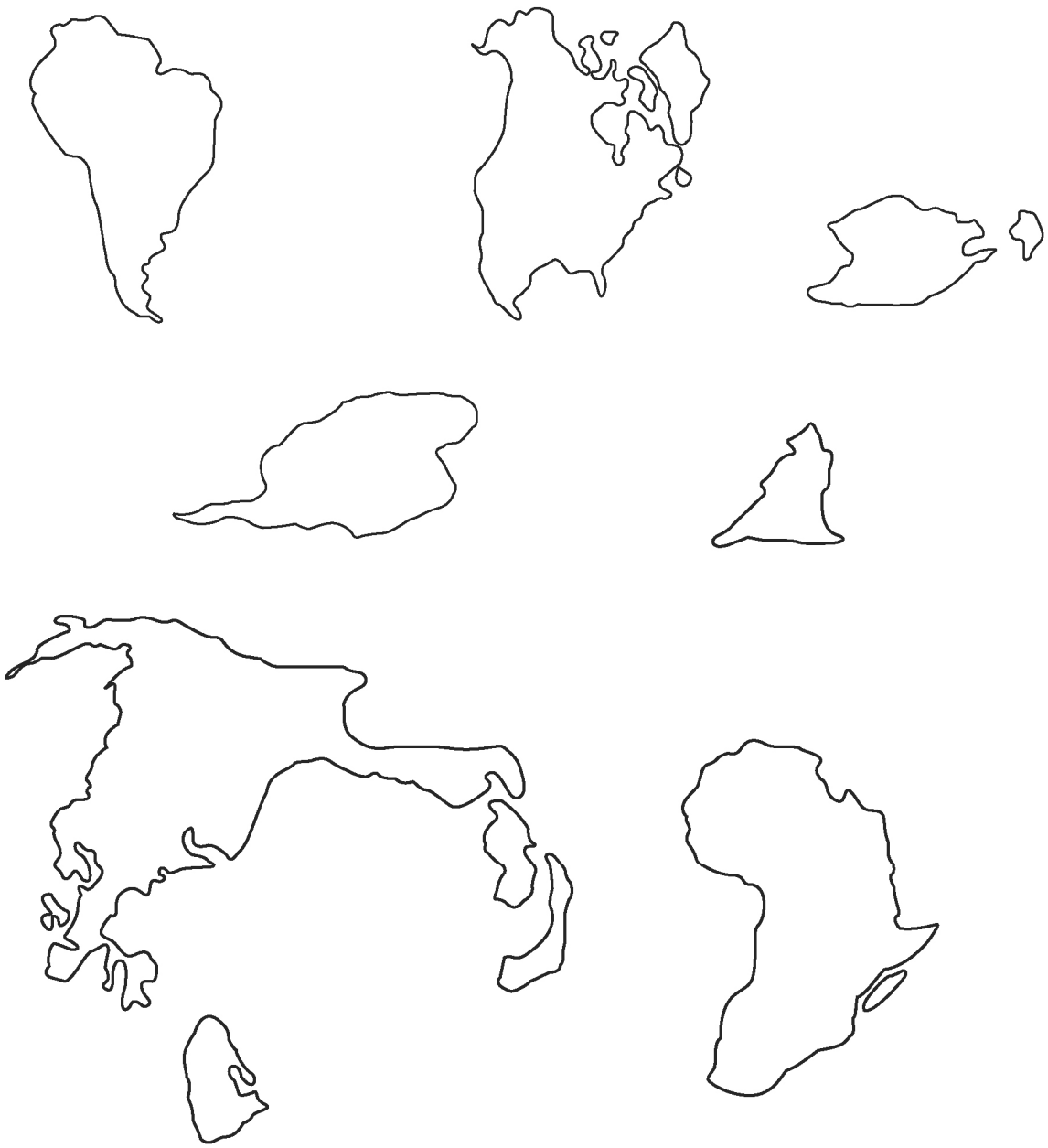
Origin of the Oceans

BLM 1-15

Goal • Use these cutouts to review the movement of tectonic plates and to create the oceans and continents we know today.

What to Do

Cut out these land masses. Using page 40 of the textbook as a guide, place them as they were 200 million years ago. Then move them apart to form the continents that we know today. The shape of some continents may be somewhat different from what you are used to seeing. That is because the continents here are drawn as if you are seeing them on a spherical globe (as on page 40).



DATE: NAME: CLASS:

UNIT 1

On the Ocean Floor

BLM 1-16

Goal • Use this page to communicate your understanding of the features of the ocean floor.

What to Do

A. You are part of an exploratory diving team, exploring an old ship graveyard at the bottom of the Atlantic Ocean. To prepare your team for the dive, you draw a rough sketch of the features on the ocean floor. Label each of these features in your drawing: continental shelf, continental slope, mid-Atlantic ridge, and abyssal plain.

B. The divers on your team ask for more information. Answer each of their questions:

1. Because there is no wind, ice, or rain at the ocean bottom, what shapes the features that are found there?

_____

2. What would be the land equivalent of each feature?

mid-Atlantic ridge

_____

trench

_____

abyssal plain

_____

DATE: NAME: CLASS:

UNIT 1

Getting to Know the Ocean Floor Data Table

BLM 1-17

Goal • Use this data table to record your measurements from Conduct an Investigation 2-1B, Getting to Know the Ocean Floor.

Distance (cm)	Depth 1 (cm) Ruler	Depth 2 (cm) Straw
0		
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
16		
17		
18		
19		
20		

DATE: NAME: CLASS:

UNIT 1

What's Down There?

BLM 1-18

Goal • Use this page to graph your findings from Conduct an Investigation 2-1B, Getting to Know the Ocean Floor.

What to Do

Follow the directions on pages 48 and 49 of your textbook. Use your data to draw a cross section of the model ocean floor you explored on this graph paper. Then answer the questions that follow.

Title: _____

Visually compare the model ocean floor with your profile. Did the measuring method you used provide an accurate cross section of your model sea floor? Explain.

_____

_____

_____

DATE: NAME: CLASS:

UNIT 1

Water Systems on Earth's Surface—Research Activity

BLM 1-19

Goal • You will research an investigative ocean technology.

What to Do

Use your textbook or other research materials to learn about one of the following investigative ocean technologies:

- sonar
- satellites
- core sampling
- underwater photography / videography
- deep sea submersibles
- SCUBA diving

Then answer the following questions:

1. How does the technology work?

_____

_____

_____

_____

2. What information does it give?

_____

_____

3. How has the technology evolved from past to present?

_____

_____

_____

_____

4. What are the strengths and weaknesses of the technology?

_____

_____

5. Give examples of public and private institutions that use this tool. Make sure that some of your examples are Canadian.

_____

_____

_____

_____

6. Make a sketch or include a picture of your technology.

DATE: NAME: CLASS:

UNIT 1

Winds and Currents

BLM 1-20

Goal • Use this page to complete Find Out Activity 2-2A, Winds and Currents.

What to Do

2. Using the space below, sketch what happens when you gently blow on the straw just above the water over the floating papers.

3. Using the space below, sketch what happens when the floating papers meet.

4. Place an object in the centre of the pan. Repeat step 3. Sketch what happens.

What Did You Find Out?

1. How did the wind you created affect the movement of water on the surface of the pan?

_____

_____

2. What was the effect of two winds coming from opposite directions?

_____

_____

3. How did the object affect the path of the paper?

_____

_____

4. Based on the results of this activity, what do you think happens when surface currents in the ocean meet an object such as a large island?

_____

_____

DATE: NAME: CLASS:

UNIT 1

Deep Ocean Currents

BLM 1-21

Goal • Perform this experiment to learn about the cyclic nature of deep ocean currents.

Safety Precautions

- Wipe up all spills immediately.
- Take care when working with hot water.

Advance Preparation

1 day before: Add a few drops of blue food colouring to tap water. Pour the coloured water into an ice-cube tray. Let the ice set in the freezer.

What to Do

1. Take three beakers and fill one with cold water, one with warm water, and one with hot water.
2. Dunk a blue ice cube into the beaker of hot water. Draw and describe what you observe. Repeat with the warm water and the cold water.

Hot	Warm	Cold

Questions

1. What does this experiment suggest about a cause of deep ocean currents?

_____

_____

2. In your own words, how would you describe a deep ocean current?

_____

_____

DATE: NAME: CLASS:

UNIT 1

Properties of Ocean Water

BLM 1-22

Goal • Use these questions to help reinforce your understanding of temperature and density currents.

What to Do

Answer the following questions.

Temperature

1. At what depth is water temperature the warmest in the ocean? Why?

_____

_____

_____

2. What main factors contribute to the heat in the ocean?

_____

_____

_____

3. What is responsible for mixing the heat evenly through the ocean waters?

_____

_____

_____

4. What are some characteristics of the mixed layer of water in the ocean?

_____

_____

_____

5. What does the word “thermocline” mean?

_____

_____

_____

DATE: NAME: CLASS:

BLM 1-22 continued

Density Currents

1. What is density?

_____

2. Why does water have different densities?

_____

_____

_____

3. What is a density current?

_____

_____

_____

4. What is the relationship between salinity and density?

_____

5. What factors increase salinity in water?

_____

DATE: NAME: CLASS:

UNIT 1

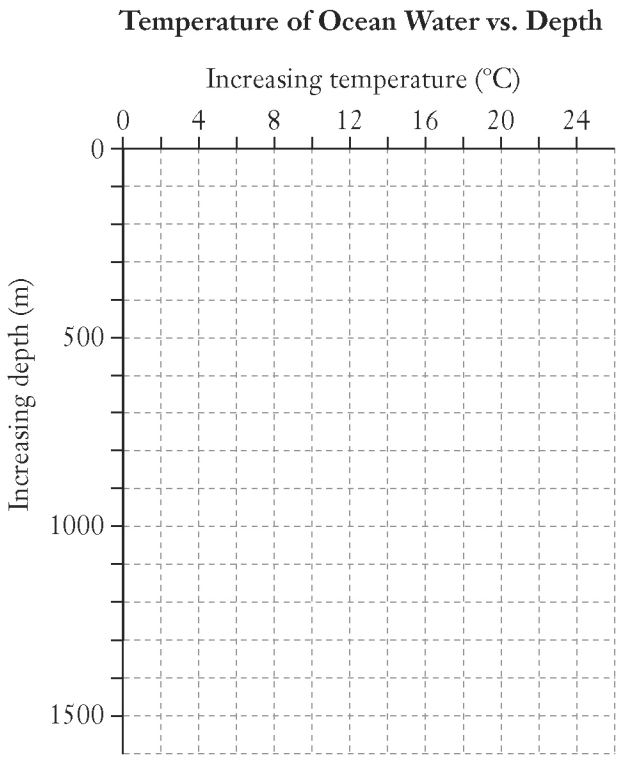
Graphing Ocean Temperatures

BLM 1-23

Goal • Graph your data from Conduct an Investigation 2-2B, Temperature and Water Density.

What to Do

Draw your graph.



What Did You Find Out?

1. What is the relationship between temperature and water depth?

_____

2. Does the temperature of water change at a constant rate as you go deeper?

_____

3. Between what depths is the temperature difference the greatest?
   (a) 0–400 m (b) 400–800 m (c) 800–1200 m

_____

4. (a) Which is denser, hot water or cold water? Explain why.

_____

_____

_____

(b) How does the density of water affect the water's ability to float or sink?

_____

_____

_____

(c) What do you think would happen when cold water from the Labrador Current meets the warm water from the Gulf Stream?

_____

_____

_____

DATE: NAME: CLASS:

UNIT 1

A Day at the Beach

BLM 1-24

Goal • Use this page to communicate your understanding of the effects of waves on the beach.

What to Do

Imagine that you are a lifeguard at a popular ocean beach. You have been asked to speak to swimmers about the factors that change shore lines. Which factors will you discuss?

_____

_____

Design a safety poster to alert people to the effects of waves on the beach. Decide what information people need to know and sketch a poster in this space or on a separate piece of paper. Remember to print or write clearly. Use colour to help convey your message.

DATE: NAME: CLASS:

UNIT 1

The Tide is High

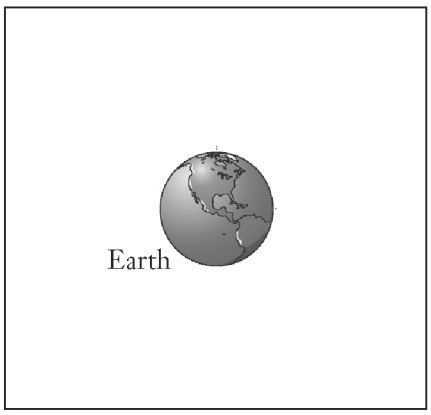
BLM 1-25

Goal • Use this page to reinforce your understanding of tides.

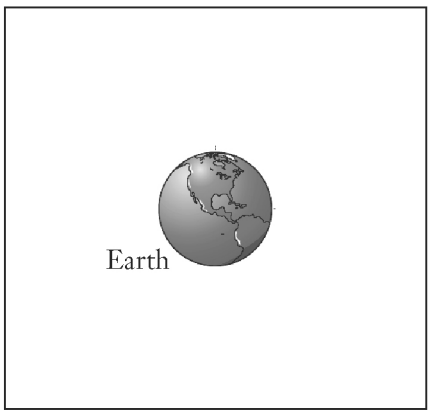
What to Do

Tides are the regular daily cycle of the slow rise and fall of the ocean. Illustrate the terms "spring tide" and "neap tide" in the boxes that follow showing the position of Earth, the Moon, and the Sun. Then answer the questions.

Spring Tide



Neap Tide



Questions

1. What is the difference between a spring tide and a neap tide?

_____

_____

2. What does tidal range mean?

_____

3. How does gravity affect tides?

_____

_____

DATE: NAME: CLASS:

UNIT 1

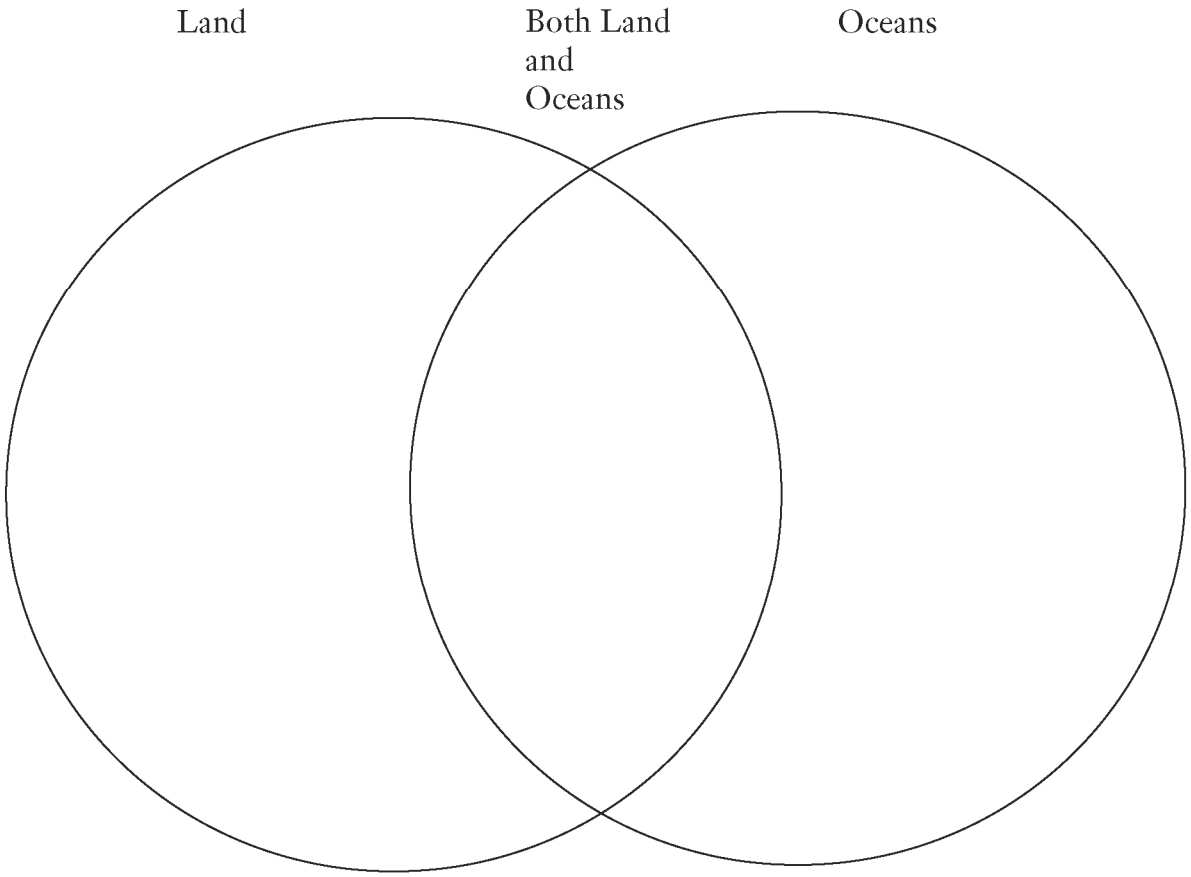
How Well Do You Know the Ocean?

BLM 1-26

Goal • Use this Venn diagram to demonstrate your understanding of ocean vocabulary.

What to Do

Compare and contrast geography and oceanography. Where the circles intersect, list all the points you can think of that apply to both land and oceans. List points on the ocean side that apply only to oceans. List points on the land side that apply only to land.



DATE: NAME: CLASS:

UNIT 1

By the Seashore—Shoreline Feature

BLM 1-27

Goal • Use this page to help you complete Activity 2-3A, By the Seashore.

What to Do

Choose from one of the following features:

- beaches
- shoals
- sand bars
- sea caves
- sea arches
- sea stacks

Analyze:

Describe your shoreline feature.

_____

_____

_____

_____

How was your feature created?

_____

_____

_____

_____

What are some examples of your feature?

_____

_____

_____

For your presentation you will need a photograph of your chosen feature so that you can describe the processes that created it.

DATE: NAME: CLASS:

UNIT 1

Waves and Beaches Activity

BLM 1-28

Goal • Use this page to investigate how waves affect beaches, in Conduct an Investigation 2-3B, Waves and Beaches

What to Do

Record your hypothesis, results, and conclusions in Conduct an Investigation 2-3B, Waves and Beaches on this page.

Hypothesis: _____

_____

In this table, sketch each beach you build before and after you create waves.

	Before	After
Beach Mixture 1 (shallow) Height: _____		
Beach Mixture 1 (steep) Height: _____		
Beach Mixture 2 (shallow) Height: _____		
Beach Mixture 2 (steep) Height: _____		

Analyze

1. Based on your models, compare the effect of wave action on a beach made mostly of sand to the effect of wave action on a beach made mostly of gravel.

_____

_____

_____

2. How does the slope of a beach affect erosion by waves?

_____

_____

3. How do the materials on a beach affect erosion by waves? Explain your observations by referring to the difference in the mass of grains of sand and pieces of gravel.

_____

_____

_____

_____

Conclude and Apply

4. Based on the results of this investigation, what effect to you think a large storm at sea might have on a sandy beach?

_____

_____

5. Beach erosion is a problem for many seaside communities. Suggest what might be done to prevent a beach from eroding.

_____

_____

_____

DATE: NAME: CLASS:

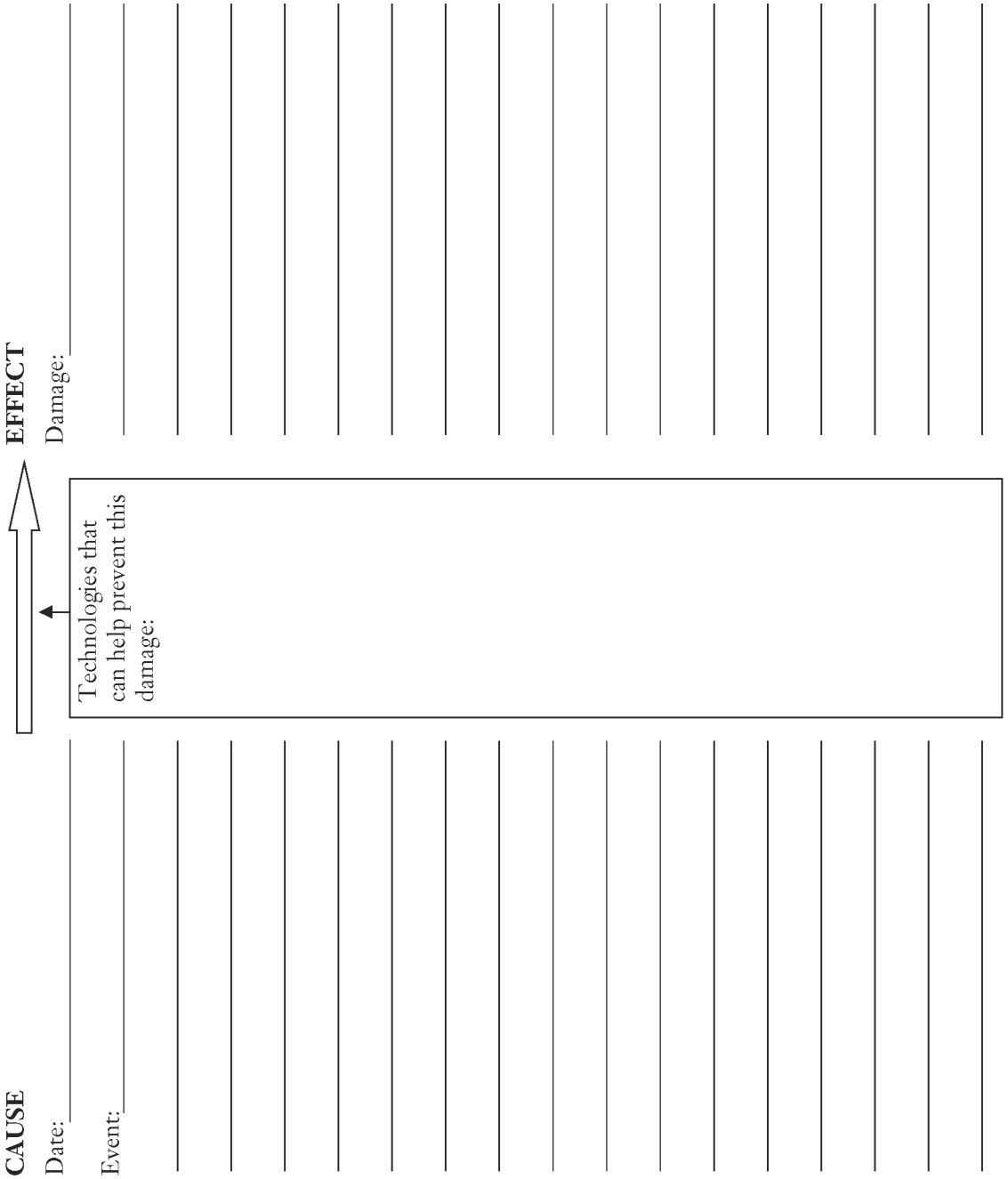
UNIT 1 **BLM 1-29**

Safeguarding Our Shorelines Activity

Goal • Record results of your research in Think About It 2-3B, Safeguarding Our Shorelines.

What to Do

As you research events that have damaged shorelines, use this page to organize the information you find.



DATE: NAME: CLASS:

UNIT 1

Chapter 2 Review

BLM 1-30

Goal • Check your understanding of Chapter 2.

What to Do

Circle the letter of the best answer.

1. Where do scientists believe most of the water that formed the oceans came from?
   A. comets from space
   B. melting glaciers
   C. rainfall
   D. water rising through cracks in Earth

2. Which of the following describes the plate motion at a mid-ocean ridge?
   A. Plates dive beneath one another.
   B. Plates move apart.
   C. Plates move together.
   D. Plates slide past each other.

3. What is the name for the flat, shallow part of the ocean floor found at the edge of a continent?
   A. continental divide
   B. continental rise
   C. continental shelf
   D. continental slope

4. Which of the following is not a cause of surface currents in the ocean?
   A. Earth's spin
   B. ocean depth changes
   C. water hitting the continents
   D. wind action

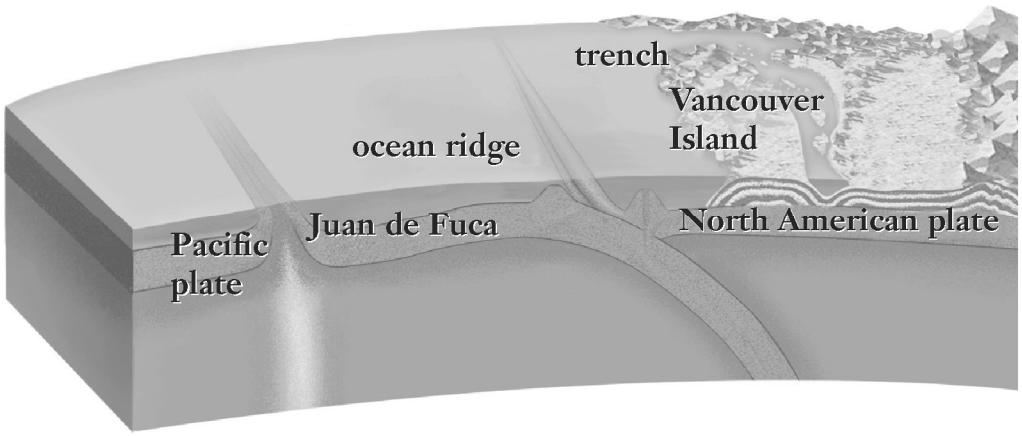
5. Which of the following is *not* correct?
   A. Crewed submersibles allow people to control the vehicle from a ship that is safely on the surface.
   B. New deep sea cameras and video allow pictures and video to be taken 6000 m beneath the surface of the sea.
   C. Satellites can receive information from buoys that are anchored to the ocean floor at fixed points.
   D. Sonar mapping uses sound waves to probe the seabed.

6. Why does the ocean have tides?
   A. Earth rotates.
   B. Earth's distance to the Sun changes.
   C. The Moon has a gravitational pull on Earth.
   D. The Moon's magnetic field attracts water.

7. As winds and currents move over the spinning Earth, their path gets redirected depending on what side of the equator they are on. What is the name of this alteration of direction?
   A. Coriolis effect
   B. density currents effect
   C. el Niño effect
   D. upwellings effect

8. Which of the following best describes the thermocline?
   A. the deep water layer, where temperatures approach the freezing point
   B. the layer where the temperature varies significantly, approximately 200 m to 1000 m beneath the surface
   C. the mixed layer
   D. the warmest layer, where the Sun's energy heats the water

Use the following diagram to answer question 9.



9. What is happening where the Juan de Fuca plate and the North American plate meet?
   A. The plates are pulling apart.
   B. The plates are pushing together.
   C. The plates are shifting east.
   D. The plates are shifting west.

10. Which of the following are the most important causes of deep ocean currents?
    A. water depth and organic materials
    B. water salinity and the spin of Earth
    C. water temperature and salinity
    D. water temperature and wind direction

**Match the Term on the left with the best Descriptor on the right.
Each Descriptor may be used only once.**

Term	Descriptor
_____ 11. abyssal plain _____ 12. bay _____ 13. tsunami _____ 14. upwelling	A. large ocean wave often caused by an earthquake B. occurs when water rises from deep in the ocean C. flat area on ocean floor D. indented areas where oceans reach into the land E. underwater landslide in the ocean

Short Answer Questions

15. (a) List three factors that affect water currents on the surface of the ocean.

_____

_____

_____

(b) Describe in detail how one of these factors affects water currents on the surface of the ocean.

_____

_____

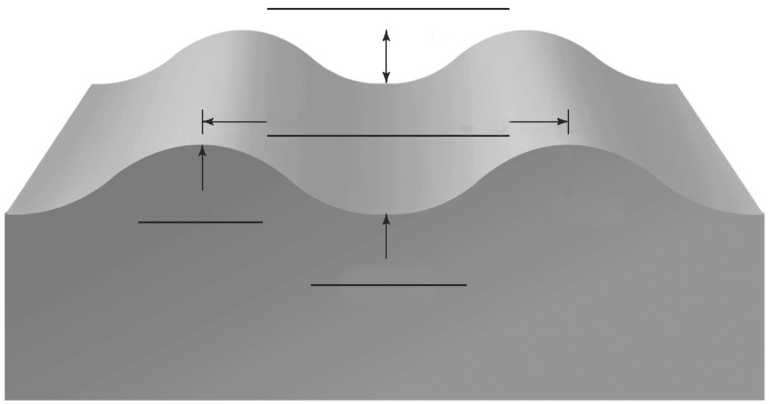
_____

16. Explain how scientists use sonar to map the ocean floor.

_____

_____

17. Identify wavelength, wave height, crest, and trough on the following diagram.



18. (a) Explain how beaches are formed.

_____

_____

_____

_____

(b) Explain how bays are formed.

_____

_____

_____

DATE: NAME: CLASS:

UNIT 1

Understanding Water and Climate

BLM 1-31

Goal • Use this page to reinforce your understanding of warm and cold ocean currents.

What to Do

Use pages 82 and 83 of your textbook as a reference in answering the following questions.

1. Where do warm currents originate?

_____

2. How do warm currents affect climate?

_____

_____

3. Where do cold currents originate?

_____

4. How do cold currents affect climate?

_____

_____

5. How does the difference in temperature between water and land affect weather systems?

_____

_____

6. Why do you think that land near a large lake is warmer in the winter than land away from a large lake?

_____

_____

7. Why is Britain's climate much milder than northern Labrador's, even though both places are at approximately the same latitude?

_____

_____

DATE: NAME: CLASS:

UNIT 1

Learning How Liquids Lose Heat

BLM 1-32

Goal • Use this page to complete Find Out Activity 3-1A, Learning How Liquids Lose Heat.

What to Do

Fill in the data table.

Time (min)	Temperature (°C) Water	Temperature (°C) Salt Water	Temperature (°C) Cooking Oil
0			
0.5			
1.0			
1.5			
2.0			
2.5			
3.0			
3.5			
4.0			
4.5			
5.0			

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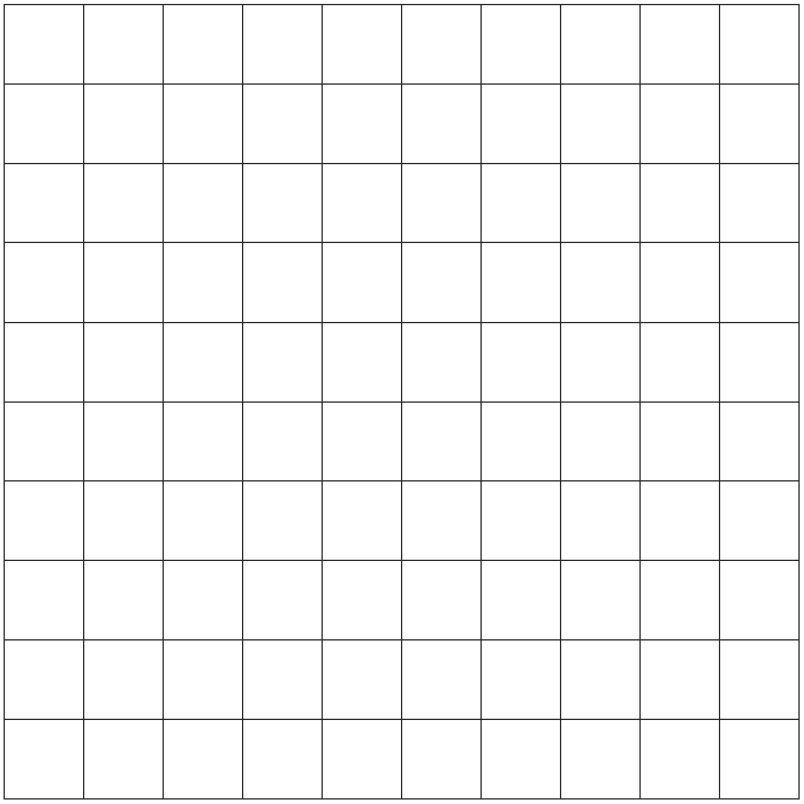
BLM 1-32 continued

Graph the data in your table.



What Did You Learn?

1. Which liquid heated up the quickest? _____

2. Which liquid kept its heat the longest (that is, which one cooled down the slowest)?

_____

3. What do the results in your graph suggest about the specific heat capacity of water, salt water, and oil?

_____

_____

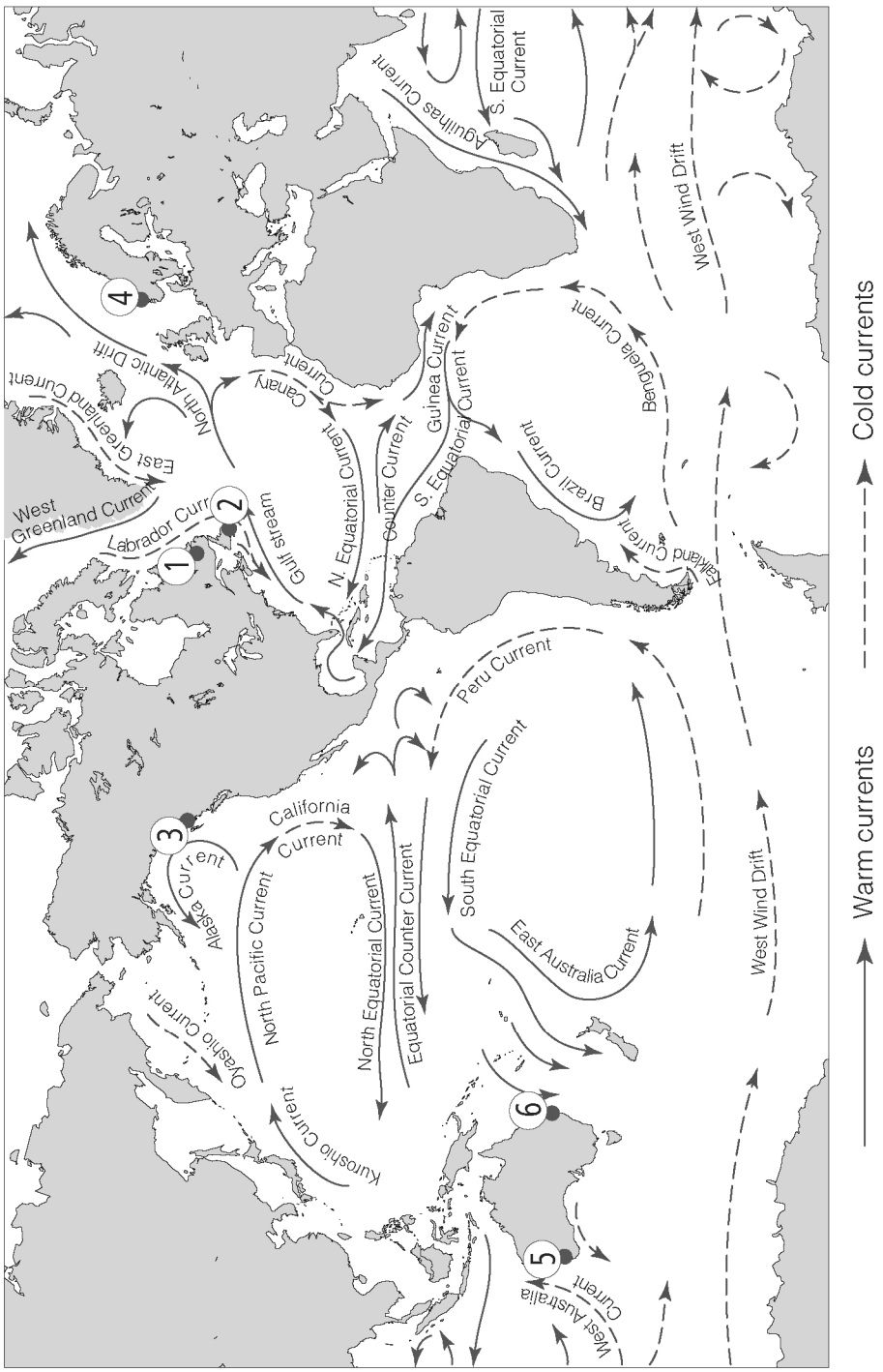
DATE: NAME: CLASS:

UNIT 1

Currents and Climate Map

BLM 1-33

Goal • Use this map to help you complete Think About It Activity 3-1B, Currents and Climate.



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UNIT 1

Organisms in Freshwater Environments

BLM 1-34

Goal • Record the organisms that live in freshwater environments.

What to Do

Record all the organisms you know for each freshwater environment in the middle column. Some organisms may belong to more than one freshwater environment. After you have read Section 3.2, or have done some research, add other organisms to the right-hand column.

Freshwater Environment	Before Reading	After Reading
Lakes and ponds		
Rivers and streams		
Wetlands		
Estuaries		

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UNIT 1

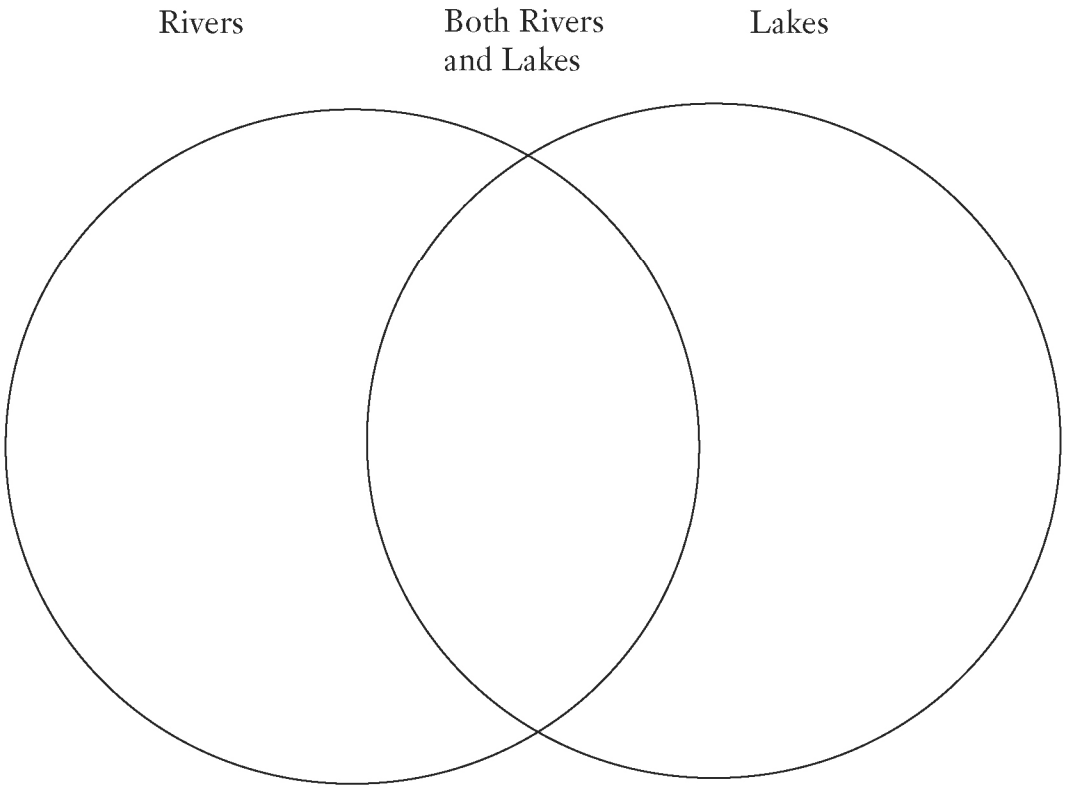
Rivers and Lakes

BLM 1-35

Goal • Use this page to review the similarities and differences between river and lake environments.

What to Do

Compare and contrast rivers and lakes. Where the circles intersect, list all the points you can think of that apply to both rivers and lakes. List points on the river side that apply only to rivers. List points on the lake side that apply only to lakes.



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UNIT 1

Abiotic Factors

BLM 1-36

Goal • Research the non-living factors that influence where and how an organism lives and grows.

What to Do

Choose from one of the following organisms:

Freshwater Species
- caddisfly larvae
- dragonfly larvae
- salmon
- mud trout
- American eel
- leech

- snow crab
- scallop
- halibut
- cod
- capelin
- octopus

Analyze

1. Where does your organism live?

_____

2. What does it eat?

_____

3. What predators does it have?

_____

_____

4. What abiotic factors influence where it lives?

_____

_____

_____

_____

For your presentation, you will need a photograph of your organism in its environment to assist you when describing the influences of abiotic factors on it.

DATE: NAME: CLASS:

UNIT 1 **BLM 1-37**

Too Much of a Good Thing Data Table

Goal • Use this page to record your data for Conduct an Investigation 3-2B, Too Much of a Good Thing.

				Turbidity										
Beaker	Fertilizer (mL)	Water (mL)	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7	Day 8	Day 9	Day 10	Day 11
A	1	15											
B	2	14											
C	4	12											
D	8	8											
E	16	0											
F	0	16											

Analyze

1. Which beaker was clearest? Which beaker was the most turbid?

_____

_____

2. How did the increase in the amount of fertilizer added to a beaker affect the growth of algae in the beaker?

_____

_____

3. Do you consider any of the water in the beakers to be polluted? Explain your answer.

_____

_____

4. Which variable was the dependent (responding) variable in this investigation? Which variable was independent (manipulated)?

_____

_____

5. The fertilizer that you used in this experiment contains phosphates. Soaps and detergents used to contain phosphates. In recent years, most manufacturers have made them phosphate-free. Why do you think this change has been made?

_____

_____

6. Write a statement explaining how too much plant grown in an aquatic habitat may have negative effects.

_____

_____

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UNIT 1

How Do Your Actions Affect the Ocean?

BLM 1-38

Goal • Use this page to complete Think About It Activity 3-3A, How Do Your Actions Affect the Ocean?

Activity	How It Affects the Ocean

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UNIT 1

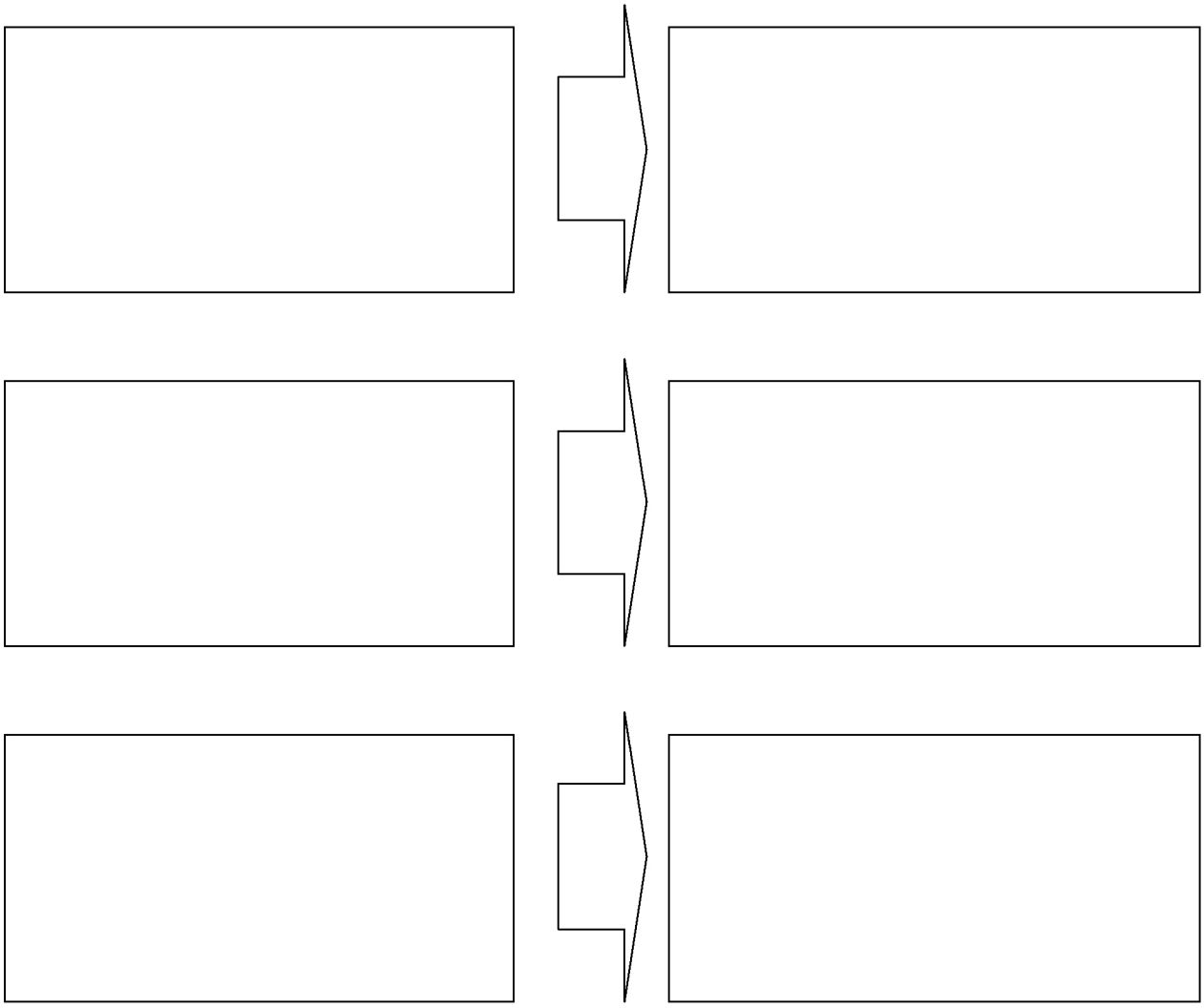
Streams of Pollution

BLM 1-39

Goal • Use this organizer to explore the issue of water pollution.

What to Do

Work in small groups to complete the cause and effect organizer. List three causes of pollution found on pages 101 and 102 of your textbook. Record the effects given in the textbook, and brainstorm other effects in your group.



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UNIT 1

Understanding Air Pollution and Water Systems

BLM 1-40

Goal • Use this page to reinforce your understanding of air pollution and water systems.

What to Do

Answer the following questions. Refer to pages 102 and 103 of your textbook if you need help.

1. How does the water cycle use evaporation and condensation to move water from one place to another?

_____

_____

_____

2. What are some examples of human activities that affect processes in the water cycle?

_____

_____

_____

3. What is acid precipitation?

_____

_____

4. Just how acidic is acid precipitation? Compare it to familiar household acids.

_____

_____

_____

DATE: NAME: CLASS:

UNIT 1

Understanding the Effects of Pollution

BLM 1-41

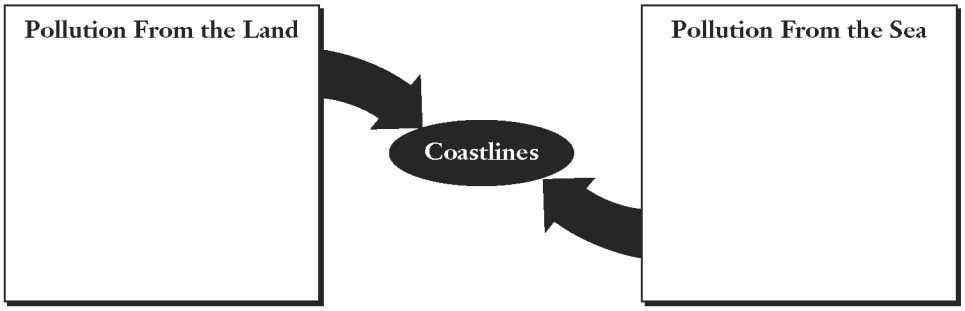
Goal • Use this page to explore your understanding of the effects of pollution.

Introduction

Coastlines, of all areas of the oceans, have the most marine life, but are also at the greatest risk from pollution.

What to Do

Fill in the boxes with sources of pollution that threaten the marine life on coastlines. Then answer the questions that follow.



Questions

1. Why is it important to deal with pollutants before they enter the bodies of animals?

_____

_____

_____

2. Explain the meaning of this sentence using specific examples: Careless habits in one place eventually affect all life on the planet.

_____

_____

_____

_____

_____

DATE: NAME: CLASS:

UNIT 1

People and Water

BLM 1-42

Goal • Use this page to express your understanding of people's role in the water cycle.

What to Do

Answer these questions:

1. What is the water cycle? (Refer to the index or glossary in your textbook if you need help, but write the answer in your own words.)

_____

_____

2. Draw and label a diagram of the water cycle.

3. Add labels or captions to your diagram to show where and how people influence the water cycle.

4. With reference to water, what do you think is meant by the saying that "80% of the world's resources are being used by only 20% of the world's population"?

_____

_____

5. How do you suggest the percentages in question 4 could be changed?

_____

_____

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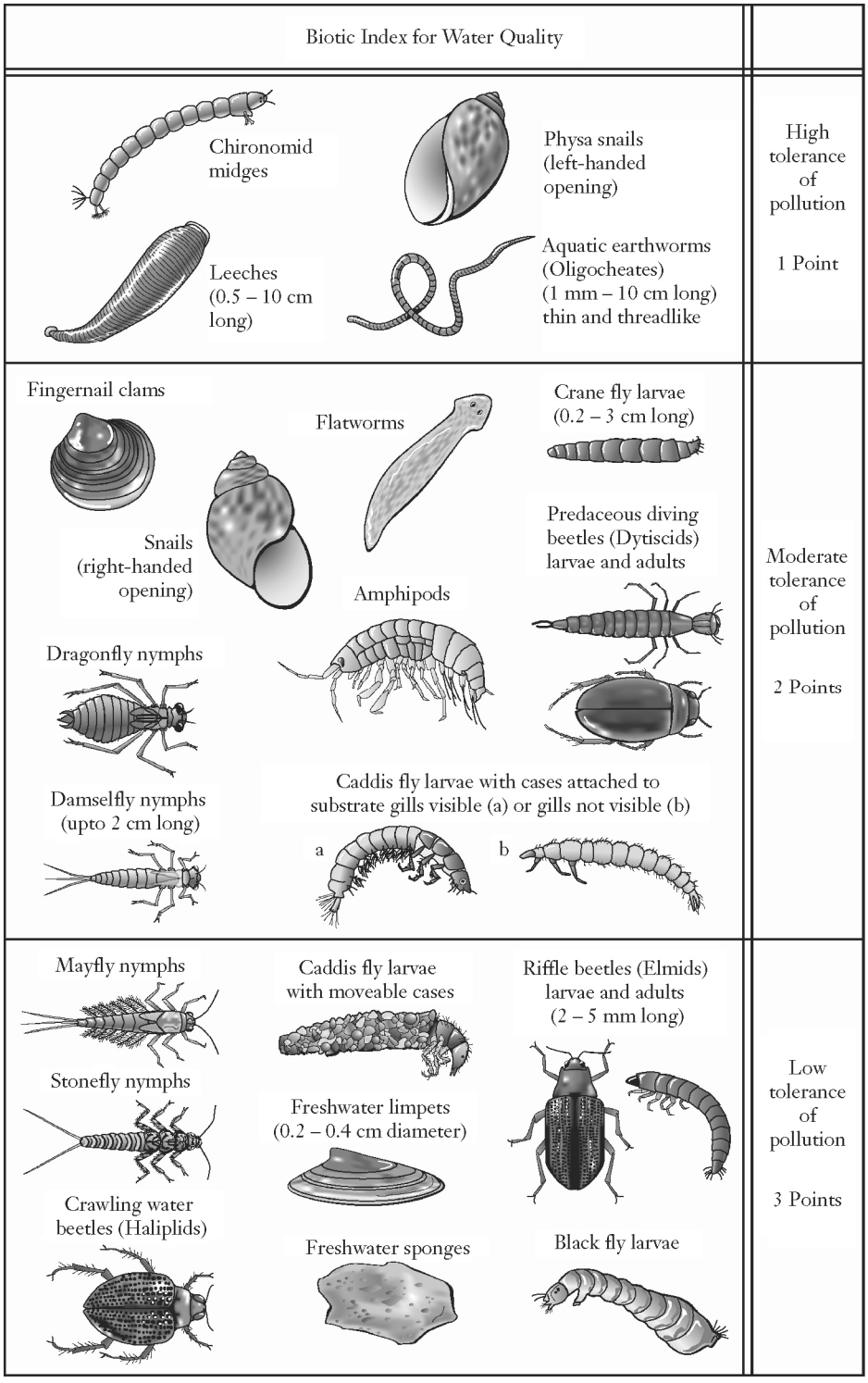
UNIT 1

Biotic Index for Water Quality

BLM 1-43

Goal • Use this page to help you complete LAB A of Core Lab Conduct an Investigation 3-3B, Water Health Test.



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A Freshwater Case Study

Goal • Use this case study to help you assess the health of a freshwater ecosystem.

Background Information

Temperature—a healthy river will have a low temperature. The cooler the water, the more dissolved oxygen it will hold.
Dissolved oxygen—more dissolved oxygen means a healthier environment. Organisms become stressed when dissolved oxygen levels are less than 5mg/L.
Turbidity—refers to how clear the water is. A healthy river has low turbidity, which means the water is clear. High turbidity means that the water is very cloudy.
Phosphates—common chemicals that pollute rivers. Algae grows in the presence of phosphates. A healthy river has low levels of phosphates. Organisms get stressed when phosphate levels rise above 10μg/L.
pH—refers to how acidic the water is. A healthy river has a pH between 5.5 and 8.
Biotic Index—organisms that live in a river can be used to assess the water quality. Organisms that are sensitive to pollution rate higher than organisms that are more tolerant.

The following data was collected in Kelligrews River in October, 2008.
Table 1—Abiotic Tests

Test	Result
Temperature	12°C
Dissolved oxygen	10 g/L
Turbidity	Clear
Phosphates	1μg/L
pH	6

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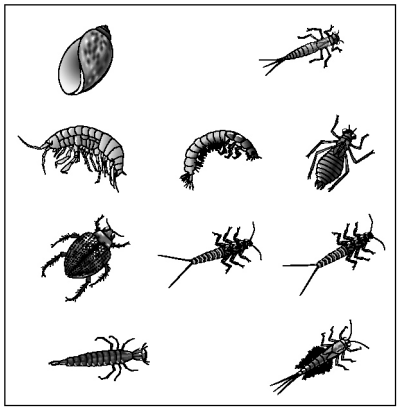
BLM 1-44 continued

In Table 2, use the information on BLM 1-43 or on page 110 of the textbook to calculate the biotic index for the river. The organisms that were found in the river are shown below the table.

Table 2—Biotic Index

Name of Organism	**Points**
1.	
2.	
3.	
4.	
5.	
6.	
7.	
8.	
9.	
10.	
Total biotic index	
Water quality rating (page 109 of textbook)	



Questions

1. What is the most important substance in the water in a river? _____

2. Why is it better if a river has a low temperature?

   _____

3. What is turbidity?

   _____

   _____

4. How can looking at bugs in a river tell us about the water quality?

   _____

   _____

Conclusion

What would the test results be in a healthy freshwater river for each of the following?

Circle the correct answer.

Temperature:	high	or	low
Dissolved Oxygen:	high	or	low
Turbidity:	high	or	low
Phosphates:	high	or	low
pH:	high	or	low
Biotic Index:	high	or	low

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UNIT 1

Water Health Test Table

BLM 1-45

Goal • Use this page to complete LAB A of Core Lab Conduct an Investigation 3-3B, Water Health Test.

What to Do

Use this table in LAB A Part I to record the bioindicator species that you find. Point values can be found on BLM 1-44 and on page 110 of the textbook.

Organism	Points	Organism	Points
1.		6.	
2.		7.	
3.		8.	
4.		9.	
5.		10.	

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UNIT 1

Water Health Abiotic Tests

BLM 1-46

Goal • Use this page to complete LAB A of Core Lab Conduct an Investigation 3-3B, Water Health Test.

What to Do

Use this page to record the results of the abiotic tests in LAB A, Part II.

A. General weather conditions:

_____

B. Air Temperature: _____ 0°C

C. Water Temperature: _____0°C

D. Water pH: _____

E. Turbidity: _____

F. Dissolved Oxygen: _____ mg/L

G. Phosphates: _____ug/L

Analyze—Bioindicator Species

1. How many species of organisms did you identify? _____

2. How many of each species were there in your sample?

_____

_____

3. Based on the bioindicator species, calculate the total biotic index of the stream.

Total biotic index _____

4. Based on your total biotic index, circle the water quality rating for this stream.

0–10: very poor water quality

11–16: poor to intermediate water quality

17–22: intermediate water quality

23–30: good water quality

Analyze—Abiotic Factors

5. Based on the abiotic measurements, circle your water quality rating.

poor water quality good water quality

Conclude

8. Why might bioindicator species be more reliable than abiotic water testing to determine the quality of a freshwater system?

_____

_____

_____

_____

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UNIT 1

Water Health Test—Saltwater Environment

BLM 1-47

Goal • Use this page to complete LAB B of Core Lab Conduct an Investigation 3-3B, Water Health Test.

What to Do

Use this page to record the results of the abiotic tests in LAB B.

1. Air Temperature: _____ 0°C

   Water Temperature: _____0°C

2. Dissolved Oxygen: _____ mg/L

3. Water pH: _____

4. Salinity: _____

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UNIT 1

Activities That Use Water

BLM 1-48

Goal • Use this table to complete the Pause and Reflect activity on page 115 of your textbook.

Activities That Use Water		
Essential (activities that cannot be stopped)	**Limited (activities that can be continued with limited amounts of water)**	**Non-essential (activities that can be stopped completely until water supply is refilled)**

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UNIT 1

Chapter 3 Review

BLM 1-49

Goal • Check your understanding of Chapter 3.

What to Do

Choose the letter of the best answer.

1. Which of the following statements correctly describes water's specific heat capacity?
   A. It takes a large amount of heat to increase water's temperature a small amount.
   B. It takes a small amount of heat to increase water's temperature a large amount.
   C. Water loses heat to the air around it quickly.
   D. In the winter, large areas of land are warmer than the water near them.

2. Which of the following statements is false?
   A. El Niño can cause droughts, forest fires, severe storms, and flooding.
   B. El Niño is a phenomenon caused by slow trade winds.
   C. La Niña is a phenomenon caused by unusually cold ocean temperatures.
   D. La Niña results in decreased numbers of phytoplankton.

3. Which of the following best describes where wetlands can be found?
   A. in areas surrounding rivers, lakes, and streams
   B. in areas where glaciers are melting
   C. in spaces between particles in rock
   D. under areas covered in ice

4. How do plants at the surface of oceans produce their nutrients?
   A. convection
   B. digestion
   C. photosynthesis
   D. turbidity

5. What does bioluminescence describe?
   A. sea creatures that eat other sea creatures
   B. sea creatures that live in the dark
   C. sea creatures that make their own light
   D. sea creatures that need light to live

6. Which of the following is an example of point-source pollution?
   A. air pollution from cars
   B. increased erosion from forestry
   C. pesticides from farming
   D. polluted water coming from a factory

7. Why is most of the pollution in the world's oceans found along the coasts of continents?
   A. High winds along coasts blow garbage against the land.
   B. It rains less along coasts, so pollution is not washed away.
   C. That is where most of the population lives.
   D. That is where the garbage in the ocean builds up.

8. Which of the following is the main source of pollution causing acid precipitation?
   A. air pollution
   B. garbage dumps
   C. oil spills
   D. water pollution

9. What does the pH scale show?
   A. amount of living things in water
   B. how dirty water is
   C. levels of acidity
   D. temperature of water

Match the Term on the left with the best Descriptor on the right.
Each Descriptor may be used only once.

Term	Descriptor
_____ 10. acid precipitation _____ 11. estuary _____ 12. plankton _____ 13. zooplankton	A. tiny animals that eat other types of plankton B. microscopic plants that use photosynthesis to produce their nutrients C. builds up where a river meets the ocean D. caused by chemicals combining with water in the atmosphere

Short Answer Questions

14. Describe three ways estuaries and wetlands in Newfoundland and Labrador are important.

_____

_____

_____

15. (a) Explain how the Green Crab came to exist in Placentia Bay.

_____

_____

(b) Explain how the Green Crab in Placentia Bay disrupts the ocean's food web.

_____

_____

16. (a) Name the difference between point source and non-point source pollution.

_____

_____

_____

(b) Give an example of each.

Point source: _____

Non-point source: _____

DATE: NAME: CLASS:

UNIT 1

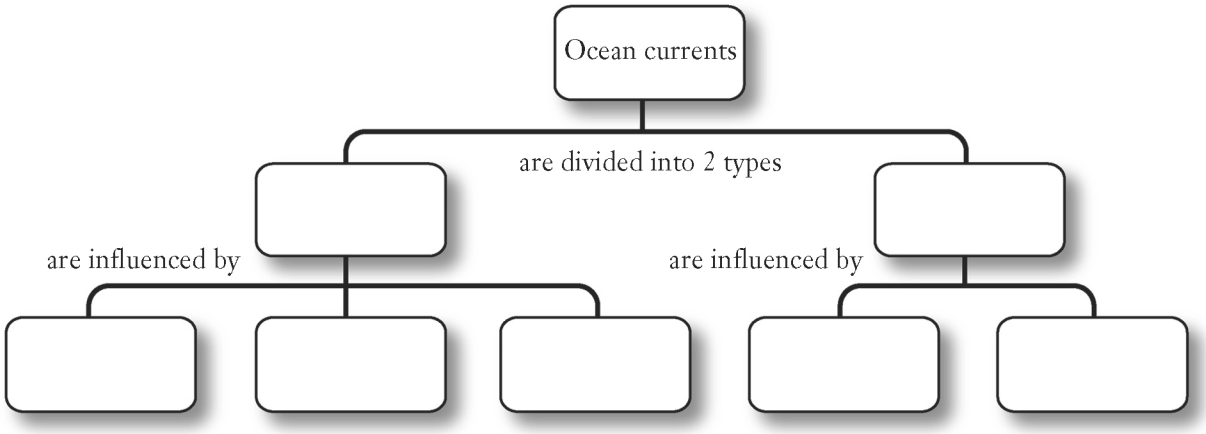
Unit 1 Review—Concept Map and Table

BLM 1-50

Goal • Use this page to review Unit 1.

1. Copy and complete the diagram below using the following vocabulary:

surface current Coriolis effect shape of continents temperature
salinity deep water current uneven heating in the atmosphere (winds)



2. Write each term listed below in the appropriate column.

abyssal plain continental slope mountains volcanoes tectonic processes

Found Only in the Oceans	Found on Land and in the Oceans

DATE: NAME: CLASS:

UNIT 1

Unit 1 Review

BLM 1-51

Goal • Test your understanding of Unit 1.

What to Do

Circle the letter of the best answer.

1. Where is most of Earth's fresh water located?
   A. evaporated in the atmosphere
   B. frozen in ice
   C. stored in oceans
   D. underground in rocks

2. What happens when water found in Earth's atmosphere is slowly cooled down?
   A. condensation
   B. evaporation
   C. freezing
   D. melting

3. Which of the following does not affect surface currents on the ocean?
   A. Earth's spin
   B. melting glaciers
   C. shape of continents
   D. wind

4. The Rocky Mountains separate the Pacific drainage basin from the drainage bases to the east of the mountains. In doing so, the Rocky Mountains form which of the following?
   A. Abyssal Plain
   B. Continental Divide
   C. Continental Shelf
   D. Continental Slope

5. What is salinity?
   A. the amount of mass of a substance in a certain unit of volume
   B. the amount of salt dissolved in a specific amount of water
   C. the force pulling run-off down to the lowest point
   D. the temperature at which a liquid freezes

6. Where is almost two-thirds of the world's fresh water trapped?
   A. crevasses
   B. glaciers
   C. ground water
   D. oceans

7. Why does sea level drop during times when there are a lot of glaciers on Earth (ice ages)?
   A. Ice blocks river water from returning to the ocean.
   B. It is too cold to rain.
   C. The weight of glaciers pushes the ground down.
   D. Water that is usually in the water cycle is frozen as ice.

8. Which of the following features is found only in oceans, and not on land?
   A. abyssal plains
   B. deep canyons
   C. mountains
   D. volcanoes

9. Why does fresh water float on salt water?
   A. Fresh water has more dissolved solids.
   B. Fresh water is usually cooler.
   C. Salt water is denser than fresh water.
   D. Salt water weighs less.

10. Why can acid precipitation damage a much larger area than an oil spill?
    A. Acid precipitation is blown by the wind.
    B. Acid precipitation occurs in cities.
    C. Oil can float on water.
    D. Oil will evaporate quickly.

Match the Term on the left with the best Descriptor on the right.
Each Descriptor may be used only once.

Term	Descriptor
_____ 11. abyssal plain	A. between continental slope and mid-ocean ridge
_____ 12. acid precipitation	B. drops off rapidly to the ocean basin
_____ 13. continental shelf	C. pollution that comes from more than one source
_____ 14. continental slope	D. pollution that comes from one source
_____ 15. non-point source	E. pollution that comes from the sky as rain
_____ 16. point source	F. shallowest part of ocean basin

Short Answer Questions

17. (a) What are the two most important influences on movement of deep ocean currents?

_____

(b) What is the rising of nutrient-rich water from deep in the ocean called?

_____

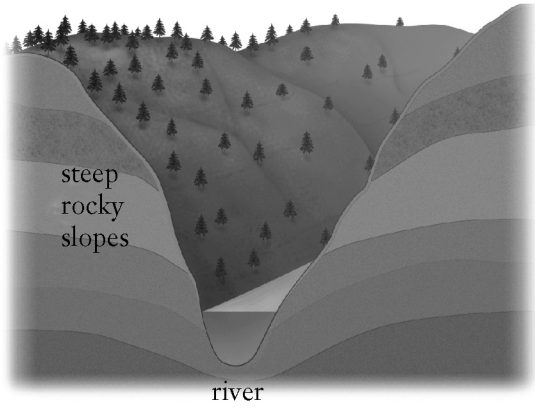
18. Describe the Coriolis effect.

_____

_____

_____

Use the diagram below to answer question 19.



19. Describe three ways to decrease run-off in this area.

_____

_____

_____

20. What role does the Sun play in Earth's tides?

_____

_____

_____

21. Describe the difference between a spring tide and a neap tide.

_____

_____

_____

22. (a) Describe how plates move at mid-ocean ridges.

_____

(b) Explain why the plates move.

_____

_____

23. (a) Explain how acid precipitation forms.

_____

_____

(b) Explain how acid precipitation can affect large areas.

_____

24. (a) What is seismic testing?

_____

_____

(b) Why is seismic testing off the coast of Newfoundland and Labrador a concern to scientists?

_____

_____

25. Explain how new technologies have lead to overfishing off the coast of Newfoundland and Labrador.

_____

_____

_____

Unit 1 BLM Answers

BLM 1-3, Chapter 1 Key Terms

(a) 8
(b) 4
(c) 14
(d) 11
(e) 5
(f) 3
(g) 13
(h) 6
(i) 1
(j) All of the water on Earth
(k) 9
(l) 10
(m) 12
(n) 2
(o) 7

BLM 1-4, Chapter 2 Key Terms

1. continental shelf
2. ocean current
3. thermocline
4. upwellings
5. swells
6. crest
7. bays
8. tides
9. tsunamis
10. abyssal plain

BLM 1-5, Chapter 3 Key Terms

Example Riddle:
I am a general description of the temperature and precipitation around you over many years.
What am I? I am climate.

Sample Answers:
I am the process of heat transfer in air.
What am I? I am convection.
I am a microscopic plant that produces food through photosynthesis.
What am I? I am phytoplankton.
I am a lowland area saturated with water for part of the year.
What am I? I am a wetland.

BLM 1-6, The Many Ways People Use Water

1. Household uses: gardening, caring for pets, washing car
Personal uses: drinking, bathing and showering
Recreational uses: skiing, fishing, building a snowman, water skiing, swimming, surfing, boating, scuba diving
Other uses: caring for livestock, firefighting, generating power, shipping, farming
2. Sample answer: If water was no longer available for my recreational use, I would not be able to do many of the activities I enjoy today. I would not be able to improve my swimming skills. I would miss being able to ski in the winter.

BLM 1-7, The Water Cycle

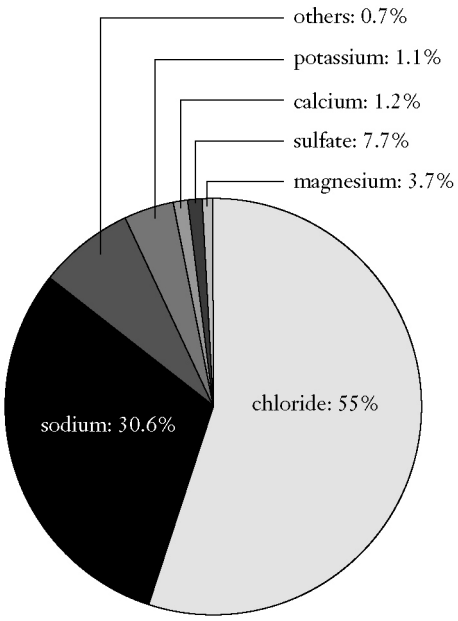
Students' diagrams will vary, but may be similar to the diagram on page 9 of the student textbook. Check that the following terms have been used: run-off, precipitation, evaporation, condensation, ground water, lithosphere, atmosphere, and hydrosphere.

Sample Think About It Answer: I have observed precipitation as rain and snow. I have observed evaporation off the lake. I have observed condensation on my windows.

BLM 1-8, A Water Cycle Model

Students' sketches should include apparatus for both evaporation and condensation. Students should indicate that energy is required for evaporation, and may indicate that energy is given off during condensation.

BLM 1-9, Salt Water



Calculations:

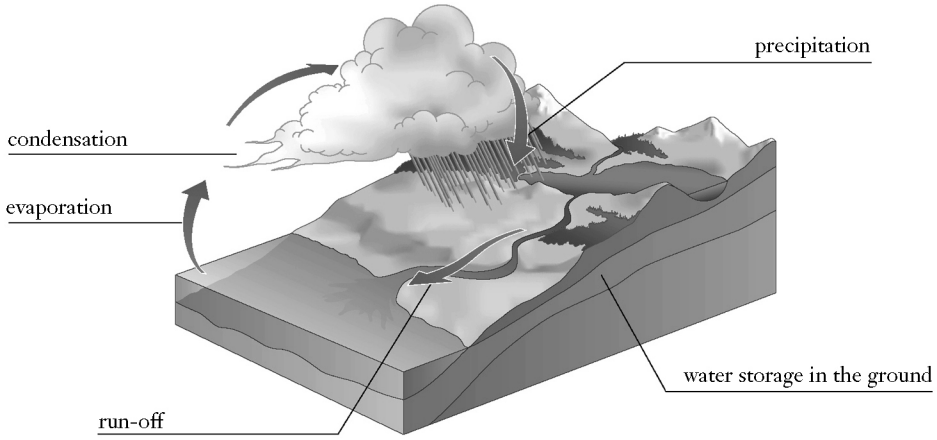
Sodium $3.6 \times 30.6 = 110.16$
Chloride $3.6 \times 55 = 198.00$
Magnesium $3.6 \times 3.7 = 13.32$
Sulfate $3.6 \times 7.7 = 27.72$
Calcium $3.6 \times 1.2 = 4.32$
Potassium $3.6 \times 1.1 = 3.96$
Others $3.6 \times 0.7 = 2.52$

Students can confirm whether their answers add to 360. Answer: The chemical most abundant in ocean salt is chloride.

BLM 1-13, Chapter 1 Review

1. A
2. C
3. C
4. A

5. B
6. C
7. C
8. B
9. D
10. B
11. D
12. F
13. E
14. G
15. C
16. (a)



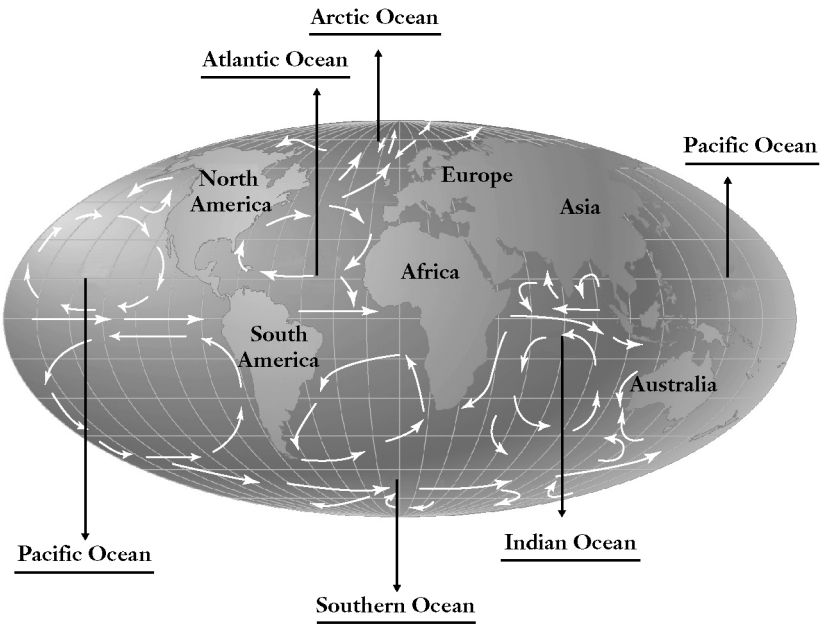
(b) In a continuing cycle, liquid water evaporates to form a gas. The gas travels with wind, condenses, and comes back down to Earth as liquid water (or solid snow). That water runs into lakes, rivers, and oceans, where it evaporates into the atmosphere again.

17. Ocean water is salty because it contains sodium chloride and other dissolved solids. These chemicals are carried to the ocean as run-off, fall into the ocean as precipitation, or are released into the ocean from undersea volcanic eruptions. Run-off picks up dissolved solids as it moves over and through the land. Volcanic eruptions on land release chemicals into the atmosphere and these chemicals are deposited in the ocean through precipitation or run-off. Some of the water itself evaporates, but not the salt.

18. (a) When the cold water of the Labrador Current meets the warm water of the Gulf Stream, nutrients from the sea floor are brought to the surface where they are used by plants to grow. Fish are then attracted to the plants, which makes the area productive for fishing.

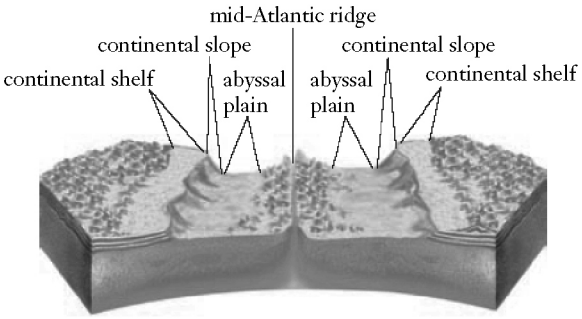
(b) Strong winds push the warmer surface water of the Gulf Stream away from the land, resulting in upwelling, which describes the cold water from the Labrador Current rising from below.

BLM 1-14, Earth's Oceans



BLM 1-16, On the Ocean Floor

A.



B. 1. The features are mainly shaped by the movements of Earth's tectonic plates.
2. mid-Atlantic ridge: mountain chain
trench: canyon
abyssal plain: prairie

BLM 1-19, Water Systems on Earth's Surface—Research Activity

Students' answers will vary depending on the technology they choose to investigate.

BLM 1-21, Deep Ocean Currents

In their diagrams and written descriptions, students should note that in all three cases, the colour moved down to the bottom of the beaker, displacing colourless water. The mixing should be fastest in the hot water and slowest in the cold water.
1. This experiment suggests that deep ocean currents are caused by cold water descending through warmer water, and that the speed is dependent on the temperature.
2. Students' answers should indicate that a deep ocean current is a broad, continuous movement of water in an ocean. Some students may compare it to a river within the ocean.

BLM 1-22, Properties of Ocean Water

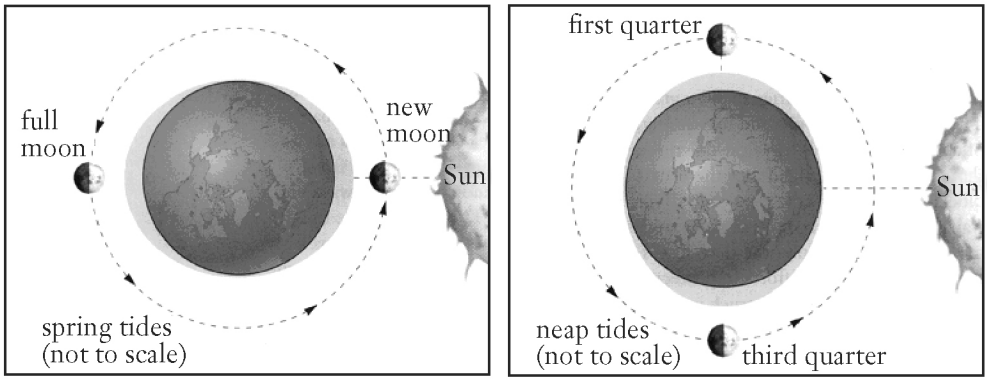
Temperature
1. The water temperature is warmest near the surface. Almost all the heat in the ocean comes from the Sun.
2. The Sun and volcanic activity contribute to the heat in the ocean. The Sun warms the surface and volcanic activity adds small amounts of heat on parts of the sea floor.
3. The heat is evenly mixed by winds and waves.
4. The mixed layer of the ocean is the 200 m closest to the ocean's surface. The heat is evenly mixed by winds and waves.
5. The thermocline is a region of rapid temperature decline, where the temperature may drop from 20°C to 5°C. It is between 200 m and 1000 m beneath the ocean surface.

Density Currents
1. Density is the amount of mass in a certain volume of a substance. (Density equals mass divided by volume.)
2. Water has different densities due to different temperatures and different amounts of salinity.
3. A density current is a mass of dense water that flows beneath the surface waters.
4. The greater the salinity, the denser the water.
5. Evaporation and freezing both increase salinity.

BLM 1-24, A Day at the Beach

Students' answers and posters will vary, but should indicate some understanding that beaches are in a constant state of change due to the continuous action of waves. Winter waves can wash away boardwalks and winter dwellings. Waves can also loosen or move rocks, erode sand, and deposit sediment. Students who have had experience with waves might mention such things as sand castles or clothes being washed away, or difficulties encountered when swimming or boating in waves.

BLM 1-25, The Tide is High



1. Spring tides are the largest tidal movements and occur when the Earth, Sun, and Moon are in a line. Neap tides are the smallest tidal movements and occur when the Sun and Moon are at right angles to each other.
2. Tidal range means the difference between a high tide and a low tide.
3. Tidal movements result mainly from the pull of the Moon's gravity on the ocean. In spring tides, the Sun's gravitational pull is added to the Moon's. During neap tides, the Sun's pull works against the Moon's.

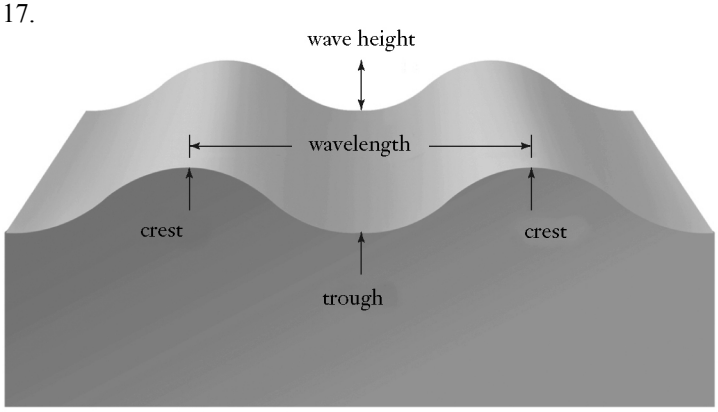
BLM 1-26, How Well Do You Know the Ocean?

Students' answers will vary. Look for the use of terms from this chapter, including the following (on the ocean side): waves, swells, bays, breakers, tides, continental slope, continental shelf, density currents, thermocline, and upwelling. Where the circles intersect, students may have grouped some ocean and land terms together such as mid-Atlantic ridge/mountains, abyssal plain/prairies, trenches/canyons. The land side should reflect geographical terms from earlier units and grades.

BLM 1-30, Chapter 2 Review

1. A
2. B
3. C
4. B
5. A
6. C
7. A
8. B
9. B
10. C
11. C
12. D
13. A
14. B
15. (a) wind action, Earth's spin (Coriolis Effects), the shape of the continents
(b) For example, the shape of the continents affects ocean currents because moving currents turn when they meet a solid surface. Continents deflect east-west currents either to the north or to the south.
16. Sonar uses sound waves to explore the seabed. Scientists can determine the depth of water by directing sound waves down from a ship and measuring the time it takes for the signals to hit the sea floor and bounce back to the surface.

17.



18. (a) Beaches form when fragments of rock carried from the coast by crashing waves rub against each other and are smoothed and ground down into smaller pebbles and grains of sand. These fragments can be washed back into the sea along steep shorelines, but along gentler slopes they can settle and build up to form a beach.
(b) When waves erode a shoreline, the rate of erosion can differ in different areas because of rock composition. Bays are formed in areas that are more easily eroded and recede faster than other areas around them.

BLM 1-31, Understanding Water and Climate

1. Warm currents originate near the equator, where the Sun's heat is most intense.
2. Warm currents affect the climate by transferring their heat to the atmosphere.
3. Cold currents originate in the Arctic and Antarctic regions.
4. Cold currents affect the climate by drawing heat from the air.
5. The difference in temperature between water and land affects weather systems by producing breezes that alter the process of evaporation and condensation near the shoreline. A warm body of water can radiate heat into the air, and a cold body of water can draw heat from the air.

6. Land near a large lake is warmer in winter than land away from a large lake because water has a very high heat capacity. The lake acts as a heat reservoir in the winter, remaining warmer than the land nearby.
7. Britain's climate is warmer than northern Labrador's climate because the Gulf Stream carries warm water to the British Isles.

BLM 1-34, Organisms in Freshwater Environments

Students' answers will vary. After reading, they should identify some of the following organisms:
Lakes and ponds: insects (water boatman, water fleas, mosquito larva), plants with roots, algae, fish (trout), plankton (phytoplankton and zooplankton), amphibians (green frogs), birds (duck), mammals (beaver, muskrat)
Rivers and streams: plants (weeds, mosses, algae), birds (hawks), insects (caddisfly, stonefly, mayfly), amphibians (frogs), snails, worms, fish (brook trout, brown trout, ounaniche)
Wetlands: birds (geese, ducks), sphagnum moss (peat moss)
Estuaries: birds (waterfowl), plants, fish, mammals, insects

BLM 1-35, Rivers and Lakes

Students' answers will vary.
For example: Lakes: deep, slow-moving water, large organisms, plants, nutrients in sediment on bottom
Both Rivers and Lakes: animals, fresh water
Rivers: smaller organisms, faster-moving water, shallow, few plants, more likely to have a rocky bottom

BLM 1-36, Abiotic Factors

Students' answers will vary depending on the organism they choose to research.

BLM 1-39, Streams of Pollution

Students' answers will vary. Causes of pollution can include both point sources and non-point sources. Effects should include those given in the student textbook, such as negative effects on sensitive ecosystems (e.g., beaches and estuaries) and the hazards to some animals that are created by solid waste, as well as additional ideas that students brainstorm.

BLM 1-40, Understanding Air Pollution and Water Systems

1. Evaporation changes liquid water from Earth's surface into gaseous water vapour. Water vapour in the atmosphere condenses when it cools and changes from a gas to a liquid. Liquid and solid water falls from clouds as precipitation and returns to Earth's surface.
2. Human activities, such as adding pesticides and fertilizers, can pollute rivers. Chemicals from industries, smelters, and automobiles can cause acid precipitation.
3. Acid precipitation is precipitation that contains higher than normal levels of acid.
4. Acid precipitation has a pH of less than 5.6.

BLM 1-41, Understanding the Effects of Pollution

Pollution from the land includes pesticides and fertilizers, which are carried in rivers and in run-off from cities and farms. Pollution from the sea includes garbage and sewage discarded by ships at sea or from drilling platforms or broken pipelines.
1. As pollutants pass from organism to organism, they become more concentrated. Since people may be at the top of marine food chains, our health is at risk as oceans become more polluted.
2. Students' answers will vary, but should trace the effects of an action through many parts of an ecosystem. For example, disposing of garbage in the ocean might lead to the disease or death of the fish in the area, which means that seals can no longer survive there, which means that killer whales can no longer survive there. It might also mean that endangered birds that eat the fish could become weak or die and a loss of a species could result. Humans who eat the fish could become sick.

BLM 1-42, People and Water

1. Students' answers should be in their own words and paraphrase this definition: The water cycle is the process in which nearly all water on Earth moves continuously between the oceans, land, and atmosphere.
2. Diagrams will vary, but students should include aspects of all three of oceans, land, and atmosphere.
3. Students might have indicated pollution being added to the cycle through dumping in oceans, smokestacks adding pollution to the atmosphere, or pesticides being added to land. They may have also shown dams built on rivers, rivers diverted, and irrigation bringing water to land. Other answers are also acceptable if they show people influencing the cycle.
4. In some places, such as North America, far more resources are being used up than elsewhere. For example, daily water use in the average home in North America might include bathing, showering, flushing toilets, washing clothes and dishes, drinking, and cooking. In some parts of the world, daily use of water might consist of only a small amount for drinking and cooking.
5. Students' answers will vary, but will likely fall into two categories: reduce the use by the 20% and share resources with the other 80%.

BLM 1-44, A Freshwater Case Study

Name of Organism	Points
1. Physa snail	1
2. Amphipod	2
3. Mayfly nymph	3
4. Predaceous diving beetle larva	2
5. Crawling water beetle	3
6. Caddis fly larva	2
7. Damselfly nymph	2
8. Dragonfly nymph	2
9. Stonefly nymph	3
10. Stonefly nymph	3
Total biotic index	23
Water quality rating (page 109 of textbook)	Good water quality

1. Oxygen is the most important substance in the water in a river.
2. It is better if a river has a low temperature because the cooler the water, the more dissolved oxygen it will hold.
3. Turbidity refers to how clear the water is.
4. Looking at bugs in a river tells us about water quality because some bugs are more sensitive to pollution than others. The bugs in a river are bioindicators of water quality.

Conclusion
Temperature: low
Dissolved Oxygen: high
Turbidity: low
Phosphates: low
pH: neither high nor low
Biotic Index: high

BLM 1-48, Activities That Use Water

Students' answers will vary. The following are sample answers.

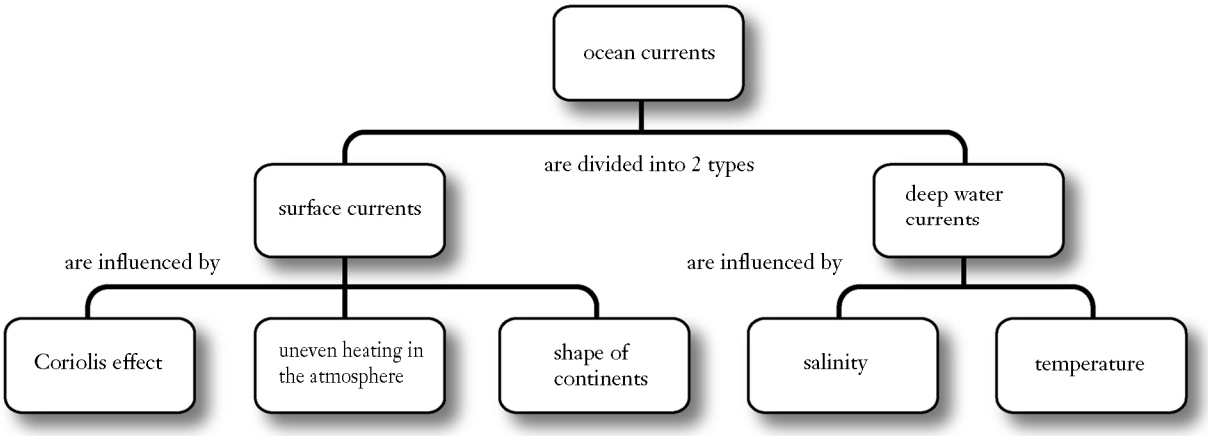
Activities That Use Water		
Essential (activities that cannot be stopped)	**Limited (activities that can be continued with limited amounts of water)**	**Non-essential (activities that can be stopped completely until water supply is refilled)**
Drinking	Bathing or showering	Watering lawns and gardens
Fighting fires		Filling pools
Use of water in a hospital for washing		Washing cars

BLM 1-49, Chapter 3 Review

1. A
2. D
3. A
4. C
5. C
6. D
7. D
8. A
9. C
10. D
11. C
12. B
13. A
14. Wetlands and estuaries are important habitats for migrating birds in Newfoundland and Labrador. Thick vegetation in wetlands acts as a filter for removing pollutants from the water. Wetlands also hold a huge quantity of water and help prevent flooding.
15. (a) The Green Crab came to exist in Placentia Bay through bilge release into the Atlantic from ships from waters around Europe and North Africa.
(b) The Green Crab in Placentia Bay disrupts the ocean's food web because it has caused a rapid decline in the native Rock Crab, which eats clams, mussels, oysters, scallops, and lobsters.
16. (a) Point sources of pollution come from a small, specific area and are easy to identify because the material can be traced to the source. Non-point sources of pollution come from many different sources, not just one. Non-point sources of pollution are difficult to control.
(b) Point source: oil spills
Non-point source: run-off from city streets.

BLM 1-50, Unit 1 Review—Concept Map and Table

1.



2.

Found Only in the Oceans	Found on Land and in the Oceans
Abyssal plain Continental slope	Mountains Volcanoes Tectonic processes

BLM 1-51, Unit 1 Review

1. B
2. A
3. B
4. B
5. B
6. B
7. D
8. A
9. C
10. A
11. A
12. E
13. F
14. B
15. C
16. D
17. (a) The two most important influences on movement of deep ocean currents are water temperature and water salinity.
(b) The rising of nutrient-rich water from deep in the ocean is called upwelling.
18. The Coriolis effect results from Earth's spin. Earth spins from west to east. As currents move over the spinning Earth, their paths get redirected depending on what side of the equator they are on.
19. To decrease run-off in this area, the slope of the land could be decreased, the amount of vegetation could be increased, and the amount of soil on the ground could be increased.

20. Spring tides occur when the Earth, Moon, and Sun are in line. During spring tides, the Sun adds its gravitational pull to the Moon's during the new moon and pulls in the opposite direction during the full moon. Neap tides occur when the Sun and Moon are at right angles to each other. During neap tides, the Sun and Moon pull in different directions.
21. Spring tides occur twice each month, at full Moon and at new Moon. Neap tides also occur twice per month, but during the first-quarter phase and third-quarter phase on the Moon. Spring tides are the largest tidal movements, and occur when the Earth, Moon, and Sun are in a line. Spring tides are extra high and extra low. Neap tides are the smallest tidal movements. They occur when the Sun and Moon are at right angles to each other.
22. (a) Oceanic plates move apart at mid-ocean ridges.
(b) Magma rises from the mantle to push the plates apart.
23. (a) Air pollution mixes with the moisture in the atmosphere, causing the moisture to turn acidic. When the moisture condenses and falls as rain or snow, it is called acid precipitation.
(b) Acid precipitation can affect large areas because clouds containing the precipitation can be blown great distances by the wind.
24. (a) Seismic testing is used to locate oil deposits under the sea floor. It sends out a high pressure burst of air (shock waves) down through the sea floor. Scientists can determine if there is a possibility of oil by the rate of travel of the wave through the ocean bed.
(b) Seismic testing off the coast of Newfoundland and Labrador is a concern because the high pressure shock waves can destroy fish eggs and larvae, cause fish to leave the area, and disrupt the migration paths of whales.
25. New technologies have led to overfishing off the coast of Newfoundland and Labrador because they enable fishing vessels to catch more fish. Factory freezer trawlers can stay out at sea to fish for a long time because they can keep the fish frozen on the ship. Radar technology has also led to overfishing because it allows vessels to locate fish with more accuracy.