Name Master Key Date _____ Class _____

Exploring the Ocean (pp. 350–356)

This section describes how the ocean has been explored over the past several thousand years. The section also describes features of the ocean floor and explains how the ocean floor moves.

Use Target Reading Skills

On the lines provided, write a definition of each term in your own words.

sonar Check students' definitions for accuracy and understanding.

continental shelf

continental slope

abyssal plain

mid-ocean ridge

trench

intertidal zone

neritic zone

open-ocean zone

1. 1 gallon of water = 8 lbs

2. SCUBA
S - self
C - contained
U - underwater
B - breathing
A - apparatus

3. Mariana Trench:
Pacific Ocean
deepest trench = 11 Km deep

Sonar Math

Formula: $\frac{\#\text{ of seconds} \times 1520\text{m}}{2}$

(1.) How deep is the ocean in meters if the sonar blip comes back in 10 seconds?

Solution = $\frac{10 \times 1520}{2}$

$= \frac{15200}{2}$

$= 7600\text{m.}$

$2\overline{)15200} = 7600$ (14, 12, 12, 000)

Exploring the Ocean *(continued)*

Learning About the Ocean (pp. 351–353)

1. Circle the letter of the sentence that is true about the Phoenicians.
   (a.) They were one of the earliest cultures to explore the oceans.
   b. They sailed to Hawaii.
   c. They established sea routes for trade by 2000 B.C.
   d. They lived on islands in the Indian Ocean.

2. Is the following sentence true or false? ~~Captain Cook's~~ HMS Challenger voyages of exploration marked the beginning of the modern science of oceanography. false

3. Why has the deep ocean floor been explored only recently?
   It has been explored only recently because the darkness, cold, and extreme pressure on the ocean floor required scientists to develop technology before they could study there.

4. Is the following sentence true or false? To study the deep ocean floor, scientists have relied on direct methods of gathering information.
   ~~false~~ true

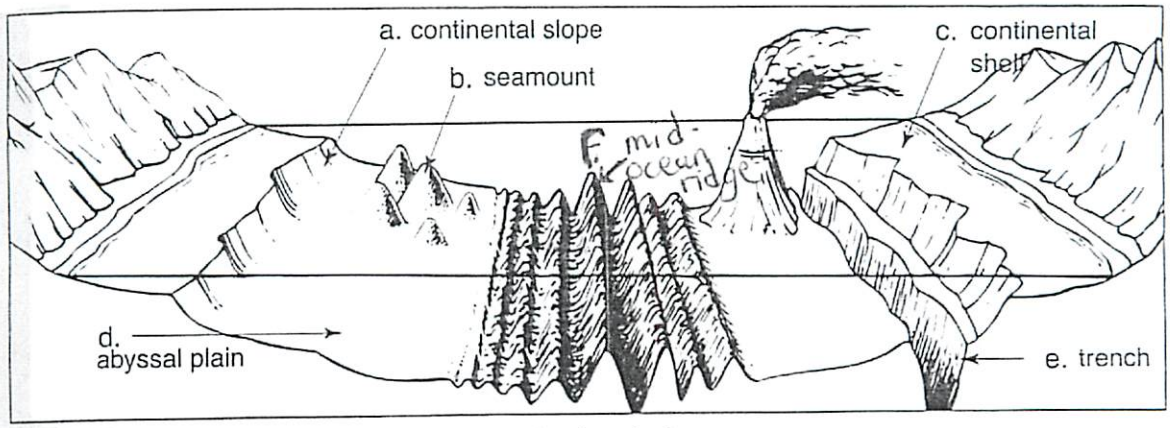
5. Circle the letter of each sentence that is true about sonar.
   (a.) It measures distance.
   (b.) It uses sound waves.
   (c.) It is an indirect way of gathering data.
   d. It uses X-rays.

The Ocean Floor (pp. 354–355)

6. Circle the letter of each sentence that is true about the ocean floor.
   (a.) It is flat and sandy.
   (b.) It is rocky and uneven.
   (c.) It has the biggest mountains on Earth.
   (d.) It has deep canyons.

Name _____ Date _____ Class _____

7. Find and label each of the following ocean floor features in the drawing: continental shelf, continental slope, seamount, abyssal plain, and trench.



Match each feature of the ocean floor with its description.

Feature		Description
f	8. continental shelf	a. Smooth and nearly flat region of the ocean floor
d	9. continental slope	b. Mountain on the ocean floor that is completely under water
b	10. seamount	c. Range of mountains on the ocean floor
a	11. abyssal plain	d. Incline at the edge of the continental shelf
c	12. mid-ocean ridge	e. Canyon in the ocean floor
e	13. trench	f. Shallow area of the ocean floor extending outward from land

14. Is the following sentence true or false? The mid-ocean ridge is made up of a mountain range that winds through the oceans. true

Ocean Zones (p. 356)

15. The part of the ocean that extends from the high-tide line to the low-tide line is called the intertidal zone.

16. The part of the ocean that extends from the low-tide line to the edge of the continental shelf is called the neritic zone.

17. The part of the ocean that extends beyond the edge of the continental shelf is called the open-ocean zone.

18. The open-ocean zone is divided into the surface zone, the transition zone, and the deep zone.

Name _____ Date _____ Class _____

Wave Action (pp. 358–365)

This section explains how waves form and how they change near shore. The section also describes how waves affect the shore and how wave erosion can be reduced.

Use Target Reading Skills

Before you read the section, write what you know about waves. As you read, write what you learn. Accept all logical answers.

What You Know
1. There are waves in the ocean. 2. Wind causes waves.

What You Learned
1. Waves move energy to the shore. 2. Earthquakes cause tsunamis.

What Is a Wave? (pp. 359–360)

1. The movement of energy through a body of water is a(n) wave.

2. How do most waves form?

Most waves form when winds blowing across the water's surface transmit their energy to the water.

3. Is the following sentence true or false? Waves start in the open ocean.

true

4. Circle the letter of each choice that determines the size of a wave.
   (a.) Strength of the wind
   (b.) How long the wind blows
   (c.) How far the wind blows
   d. Amount of water the wave carries

5. Is the following sentence true or false? Water is not moved toward shore by a wave. ~~false~~ true

6. Circle the letter of the sentence that describes what happens to water particles near the surface when a wave passes by.
   a. The water particles move toward shore.
   (b.) The water particles move in circles.
   c. The water particles move randomly.
   d. The water particles move little if at all.

7. Circle the letter of the sentence that describes what happens to water particles in deep water when a wave passes by.
   a. The water particles move away from shore.
   b. The water particles move in large circles.
   c. The water particles move randomly.
   (d.) The water particles move little if at all.

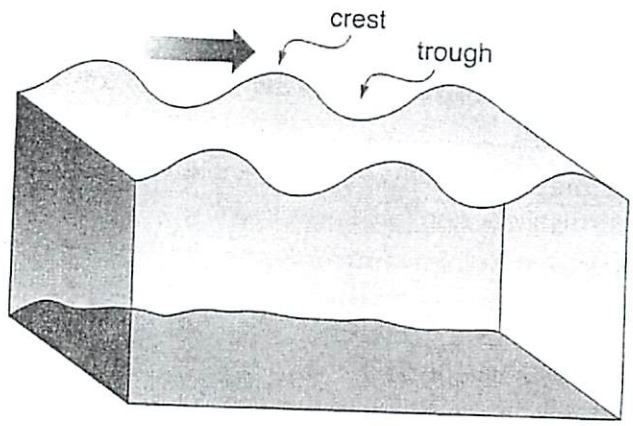
How Waves Change Near Shore (pp. 361–362)

Match the term with its definition.

	Term	Definition
a	8. wavelength	a. Horizontal distance between crests
c	9. frequency	b. Vertical distance from crest to trough
b	10. wave height	c. Number of waves that pass a point in a certain amount of time

Wave Action *(continued)*

11. Label a crest and a trough in the drawing of waves.



12. Is the following sentence true or false? The energy of a wave depends mainly on its ~~wave~~height. ~~false~~ true

13. As a wave approaches shore, what happens to wave height and wavelength?

Near shore, wave height increases and wavelength decreases.

14. How is surf formed?

When a wave reaches a certain height, the crest of the wave topples and breaks onto the shore, forming surf.

15. Water that moves up the beach in a wave flows back out to sea due to gravity.

16. Circle the letter of the sentence that is true about tsunamis.
   a. They are waves.
   b. They are most common in the Atlantic Ocean.
   c. They are felt most in deep water.
   d. They cause earthquakes.

How Waves Affect the Shore (p. 363)

Match the term with its description.

	Term	Description
b	17. longshore drift	a. Underwater ridge of sand
a	18. sandbar	b. Movement of sand along a beach
c	19. rip current	c. Rapid rush of water out to sea

Waves and Beach Erosion (pp. 364–365)

20. How do waves shape a beach?
Waves erode the shore in some places and build it up in others.

21. A wall of rocks or concrete built outward from a beach to stop longshore drift is called a(n) groin.

22. Hills of wind-blown sand covered with plants are called dunes.

Tides (pp. 366–371)

This section explains what causes tides and describes the daily and monthly cycles of tides. The section also explains how energy in tides can be harnessed.

Use Target Reading Skills

Before you read, look at Figure 11. Then write two questions that you have about the diagram. As you read, answer your questions. Accept all logical answers.

Spring and Neap Tides

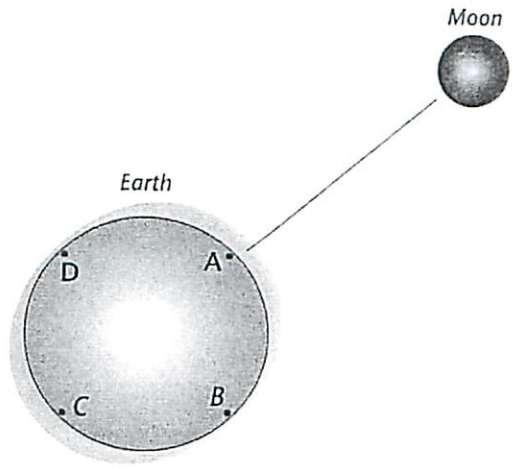
Q. When do spring tides occur?
A. During the full and new moons
Q. What is a neap tide?
A. A smaller tide that happens at the first- and third-quarter moons

What Causes Tides? (pp. 367–370)

1. The daily rise and fall of Earth's water on its coastlines are called tides. change every 6 hrs.

2. What is the difference between high tide and low tide?
High tide is when the water reaches its highest point; low tide is when the water reaches its lowest point.

3. At which two points are tidal bulges occurring when Earth and the moon are in the positions shown in the drawing?
Tidal bulges are occurring at points A and C.



4. Explain why a tidal bulge occurs on the side of Earth opposite the moon.
Water on the side of Earth opposite the moon is pulled less strongly by the moon than the rest of the planet is, so this water is "left behind" to form a bulge.

5. Circle the letter of each sentence that is true about high tides.
   (a.) They occur twice a day.
   (b.) They occur later in the west.
   c. They occur six hours apart.
   d. They occur more often than low tides.

6. Is the following sentence true or false? High tides occur about twelve and a half hours apart. true

7. What factors affect the height of the tide in any particular location?
Factors include landforms such as capes, peninsulas, and islands, and the basins at the mouths of rivers.

8. Is the following sentence true or false? The sun's gravity affects Earth's tides. true

9. Complete the compare/contrast table with the following terms: least, greatest, neap tide, spring tide.

Monthly Tide Cycle		
Type of Tide	Position of Sun and Moon	Difference Between High and Low Tides
a. Spring tide	Sun and moon in straight line	b. Greatest
c. Neap tide	Sun and moon at right angles	d. Least

10. Circle the letter of each sentence that is true about spring tides.
   (a.) They occur twice a month.
   b. They occur only in spring.
   (c.) They occur during a new moon.
   (d.) They occur during a full moon.

Tides *(continued)*

11. Who needs to know the times and heights of tides?
Sailors, marine scientists, people who fish, and others who live along a coast need to know about tides.

Energy From Tides (pp. 370–371)

12. Is the following sentence true or false? The energy stored in tides is potential energy. true

13. Describe how a tidal power plant captures tidal energy.
The energy of tide water moving back to sea powers generators that produce electricity.

Tides are caused by the gravitational pull of the moon and the sun.

14. Circle the letter of the sentence that is true about tidal energy.
   (a.) It is clean.
   b. It is nonrenewable.
   c. It can be used on any coast.
   d. It cannot be harnessed.

Ocean Water Chemistry (pp. 372–377)

This section describes the saltiness of ocean water and the gases that ocean water contains. The section also describes how temperature, pressure, and other properties of ocean water change as you go deeper in the ocean.

Use Target Reading Skills

Preview the red headings in your textbook. In the graphic organizer, ask a how *or* what *question for each heading. As you read, answer your questions.*

Accept all logical answers.

Ocean Water Chemistry

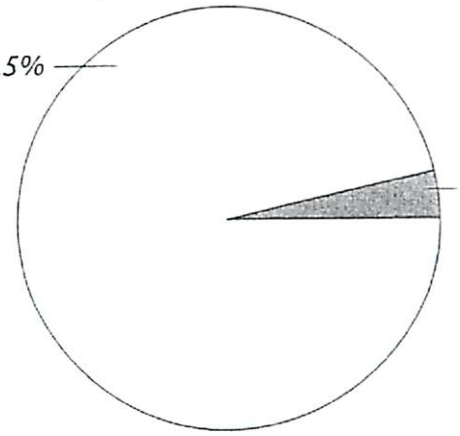
Question	Answer
How salty is the ocean?	One kilogram of ocean water has . . . about 35 grams of salts. That is, ocean water has an average salt concentration of 35 parts per thousand.
How does temperature vary in the surface ocean?	In general, temperature is higher near the equator and lower near the poles.
How do temperature and pressure change with depth?	As you descend, temperature decreases and pressure increases.

The Salty Ocean (pp. 373–374)

1. The total amount of dissolved salts in water is called salinity.

2. Label the two parts of the circle graph.

Composition of Ocean Water



Na Cl
Sodium Chloride

Ocean Water Chemistry *(continued)*

3. Circle the letter of each place in the ocean where salinity is likely to be relatively low.
   (a.) Near melting ice
   (b.) Near the mouth of a large river
   c. Where the climate is hot and dry
   d. Near the poles

4. Circle the letter of the sentence that is true about the effect of salinity on ocean water.
   a. Salinity increases the freezing point of ocean water.
   b. Salinity decreases the density of ocean water.
   c. Salinity decreases the mass of ocean water.
   (d.) Salinity increases the buoyancy of ocean water.

Other Ocean Properties (pp. 375–376)

5. List two gases found in ocean water that are necessary for living things.
   a. oxygen b. carbon dioxide

6. Is the following sentence true or false? There is ~~more~~ less oxygen in seawater than in air. ~~false~~ true

7. Why does warm water stay at the surface of the ocean?
   Warm water stays at the surface because it is less dense than cold water.

8. Is the following sentence true or false? Warm water contains ~~more~~ less dissolved oxygen than does cold water. ~~false~~ true

Changes with Depth (p. 377)

9. A vertical section of the ocean is called the water column.

10. Complete the compare/contrast table.

Depth of Ocean Zones	
Zone	Depth
a. Deep zone	Extends from about 1 kilometer below the surface to the ocean floor
b. Surface zone	Extends from the surface to about 200 meters below warmest
c. Transition zone	Extends from about 200 meters below the surface to about 1 kilometer below the surface

11. Circle the letter of each sentence that is true about temperature in the ocean.
   (a.) Temperature decreases as depth increases.
   b. Temperature is highest in the transition zone.
   c. Temperature drops quickly in the surface zone.
   (d.) Temperature is lowest in the deep zone.

12. Is the following sentence true or false? Below the surface zone, the salinity of ocean water remains fairly constant. true

13. Circle the letter of each sentence that is true about pressure in the ocean.
   (a.) Pressure is the weight of the water above pressing down.
   (b.) Pressure rises continuously as depth increases.
   c. Pressure on the ocean floor is twice as great as pressure at sea level.
   d. A diver can safely withstand pressure at 1 kilometer below sea level.

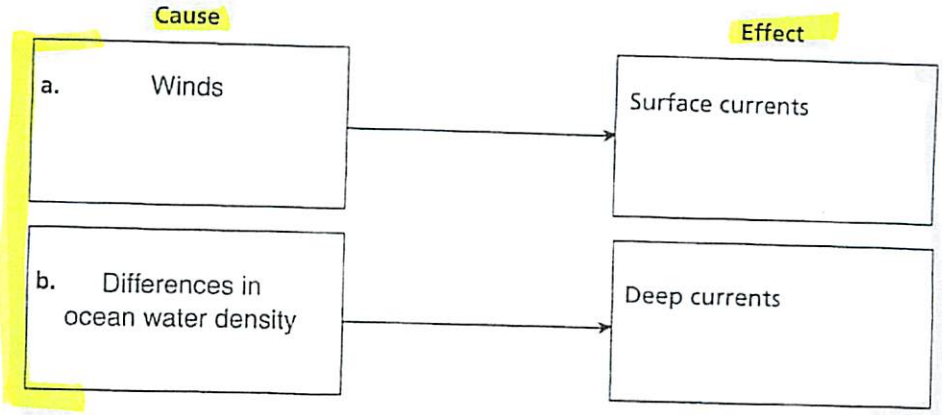
14. An underwater vehicle built to resist pressure is called a(n) submersible.

Name _____ Date _____ Class _____

Currents and Climate (pp. 380–385)

This section describes surface and deep ocean currents and explains how they affect climate.

Use Target Reading Skills



Introduction (p. 380)

1. A large stream of moving water that flows through the oceans is a(n) current.

2. Is the following sentence true or false? Currents carry water great distances. true

Surface Currents (pp. 381–383)

3. Circle the letter of each sentence that is true about surface currents.
   a. They affect water down to 1 kilometer.
   (b.) They are driven mainly by winds.
   (c.) They move in circular patterns.
   d. They occur only in the Pacific Ocean.

Name _____ Date _____ Class _____

4. The effect of Earth's rotation on the direction of winds and currents is called the Coriolis effect.

5. Is the following sentence true or false? In the Northern Hemisphere, surface currents curve to the ~~left~~. right ~~false~~ true

6. The largest and most powerful surface current in the North Atlantic Ocean is the Gulf Stream.

7. Circle the letter of the sentence that is true about the Gulf Stream.
   a. It is caused by strong winds from the north.
   (b.) It carries more water than the Mississippi River.
   c. It is a cold-water current.
   d. It curves westward due to the Coriolis effect.

8. Is the following sentence true or false? In the Southern Hemisphere, surface currents curve to the left. true

9. The pattern of temperature and precipitation typical of an area over a long period of time is called climate.

10. An abnormal climate event that occurs every 2 to 7 years in the Pacific Ocean is called El Niño.

11. How does El Niño begin?
    El Niño begins when an unusual pattern of winds over the western Pacific Ocean causes a vast sheet of warm water to move eastward toward the South American coast.

12. Circle the letter of each sentence that is true about El Niño.
    (a.) It can prevent upwelling.
    (b.) It can affect weather worldwide.
    c. It is fully understood.
    (d.) Its impact can be reduced.

Currents and Climate *(continued)*

Deep Currents (p. 384)

13. How does the Gulf Stream influence the climate along the western coast of Norway?
The warm waters of the Gulf Stream bring the western coast of Norway a fairly mild climate for its northern location.

14. How do cold-water currents affect weather on land near a coast?
They bring cool, dry weather to land near a coast.

15. Deep currents are caused by differences in _____density_____.

16. The density of water depends on its _____temperature_____ and its _____salinity_____.

17. Why does water get denser as it moves toward the poles?
It gets denser because its temperature decreases and its salinity increases.

18. Is the following sentence true or false? Deep ocean currents move and mix water around the world. _____true_____

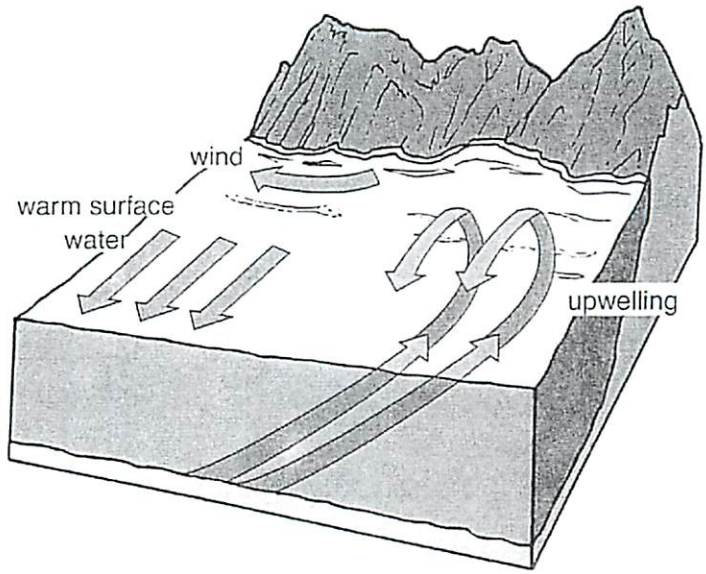
Name _____ Date _____ Class _____

Upwelling (pp. 384–385)

19. The upward movement of cold water from the ocean depths is referred to as upwelling.

20. Is the following sentence true or false? Upwelling is caused by ~~tides~~. wind and cold water
~~false~~ true

21. Label the wind, warm surface water, and the area of upwelling in the diagram below.



22. Why are upwelling zones usually home to enormous schools of fish?
Upwelling zones have so many fish because upwelling brings up nutrients from the deeper layers of the water.

Name _____ Date _____ Class _____

Key Terms

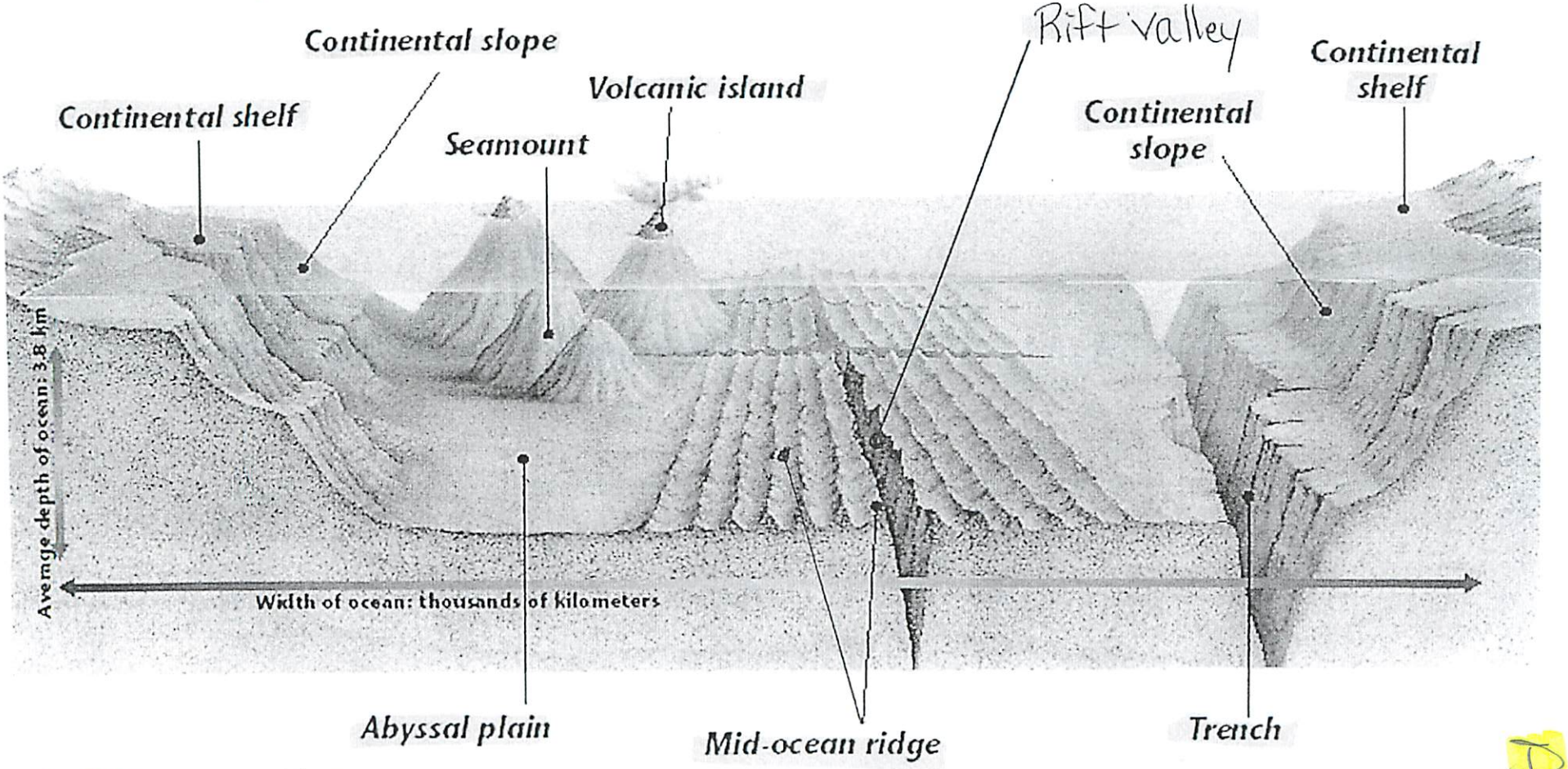
Use the clues to help you unscramble the key terms from the chapter. Then put the numbered letters in order to find the answer to the riddle.

Clues	Key Terms	
1. Structure that reduces erosion	rongi	G R O I N (1)
2. Highest point of a wave	tecsr	C R E S T (2)
3. Ridge of sand near shore	nasdrab	S A N D B A R (3)
4. Distance between two crests	telegawvnh	W A V E L E N G T H (4)
5. Daily rise and fall of water	sdeit	T I D E S (5)
6. Saltiness of water	lstainyi	S A L I N I T Y (6)
7. Number of waves passing by in a given time	curenqefy	F R E Q U E N C Y (7)

Riddle: What causes tides?

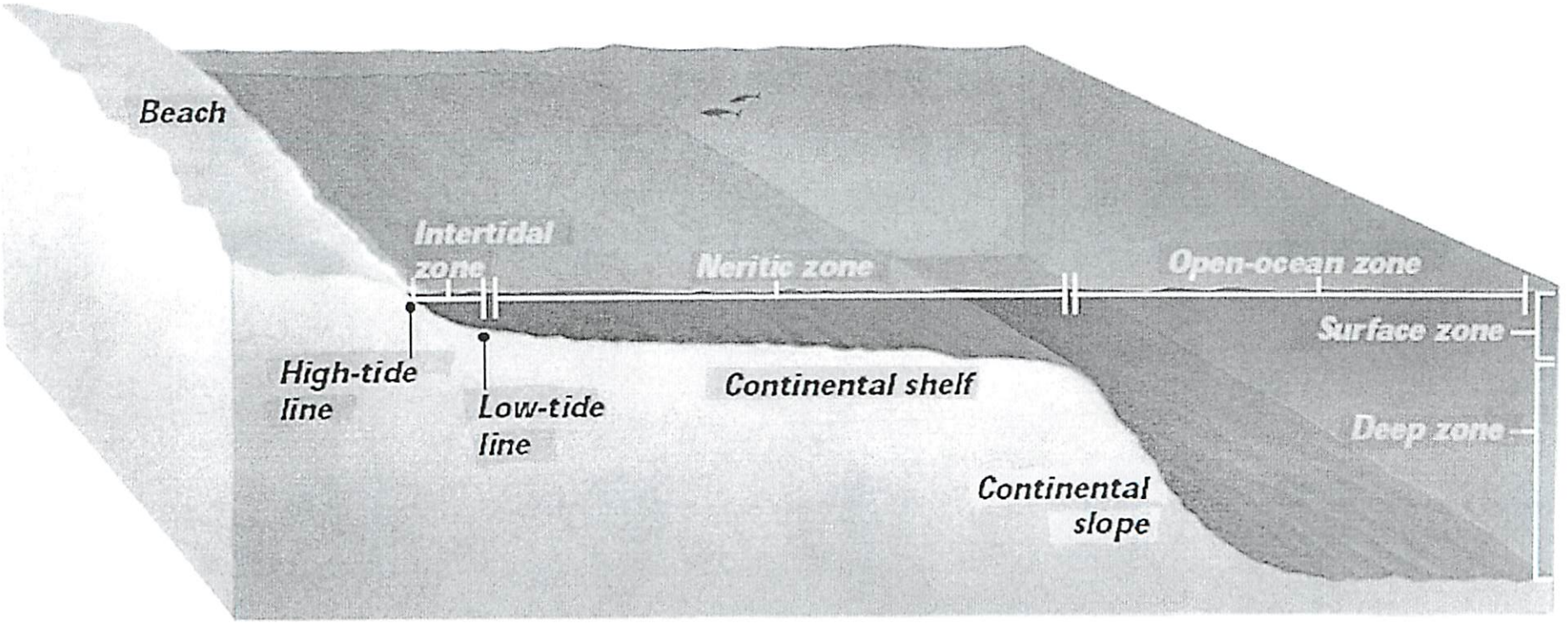
Answer: G R A V I T Y
1 2 3 4 5 6 7

62 Exploring the Ocean Floor



1. Mid-ocean ridge
2. Volcanic island
3. Continental shelf
4. Trench
5. Sea mount
6. Continental slope
7. Abyssal plain

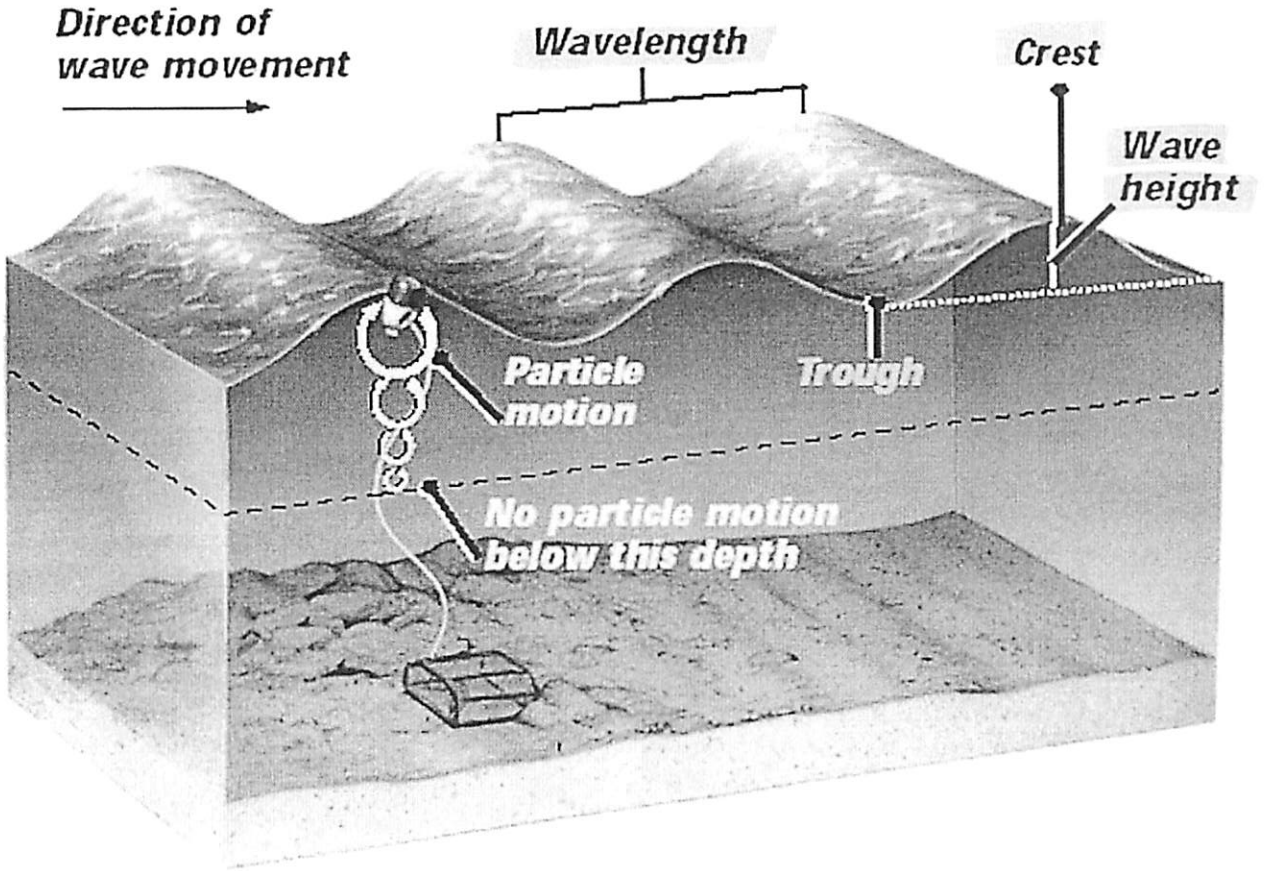
63 Ocean Zones



1. Continental shelf
2. Deep zone
3. Continental slope
4. Intertidal zone
5. Beach
6. Open-ocean zone
7. Low-tide zone
8. Surface zone
9. High-tide line
10. Neritic zone

Key

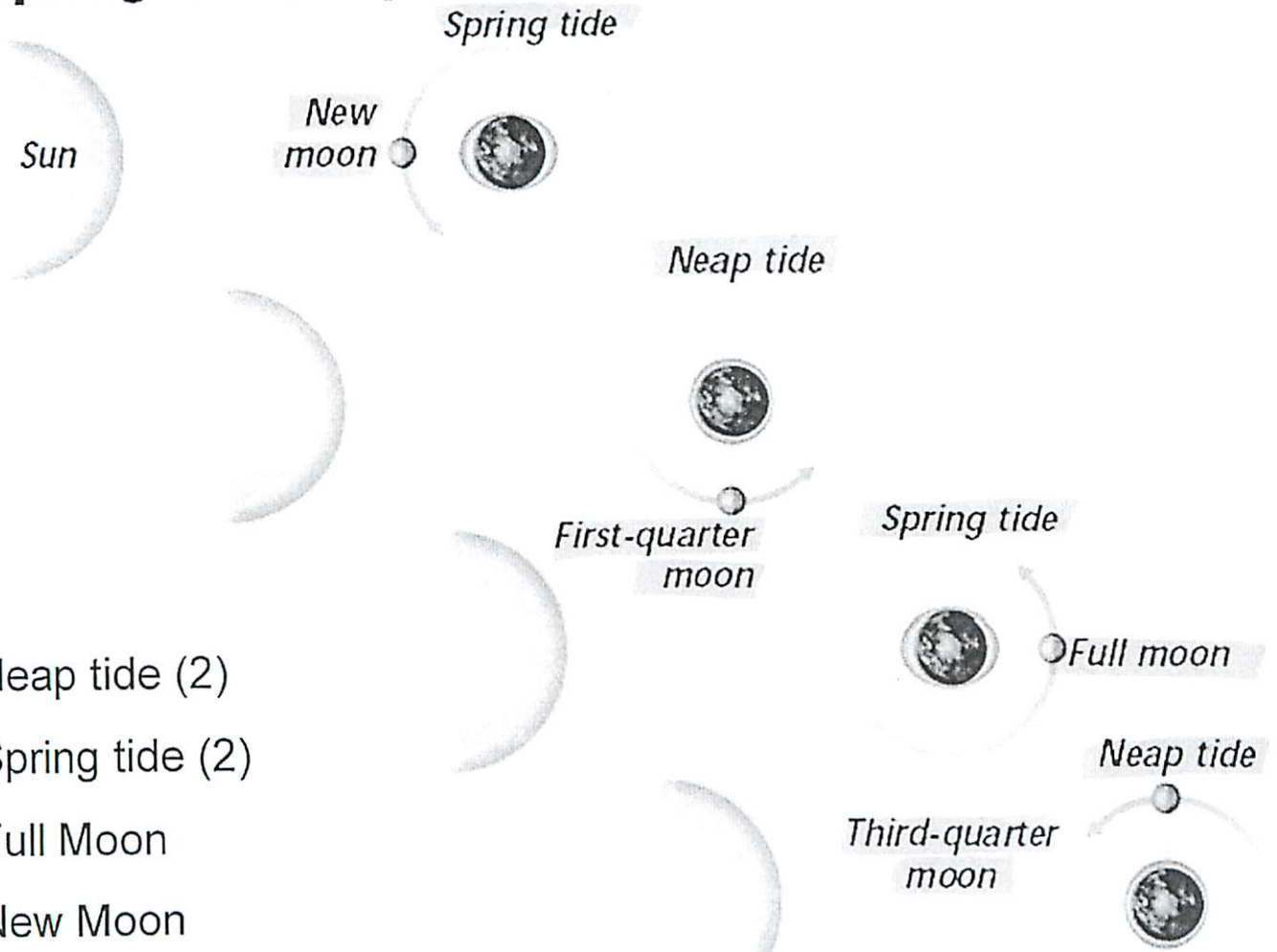
57 Parts of a Wave



1. Wavelength
2. Wave height
3. Trough
4. Crest

Key

59 Spring and Neap Tides



1. Neap tide (2)
2. Spring tide (2)
3. Full Moon
4. New Moon
5. Third-quarter moon
6. First-quarter moon

Ocean Extras from the CRCT

1. Sonar can also be called Echo Sounding.
   Sonar – sound travels 1520 meters per second in ocean water
   10 seconds x 1520 / 2 = 7605 meters = distance to the bottom
2. The Ocean Floor is sometimes called the Ocean Basin
3. There is really only one large ocean on Earth
   Map makers separate it into five regions
   a. Pacific Ocean – largest and deepest
   b. Atlantic Ocean
   c. Indian Ocean
   d. Southern Ocean
   e. Arctic Ocean
4. The mid ocean ridge has mountains that are rise 2500 meters.
5. The rift valley , where parts of Earth's crust pull apart, is in the middle of the mid ocean ridge. Put on chart
6. Wave energy is low when the waves are calm or still.
7. Wave energy is high when the waves are wild.
8. Wind energy is transferred to water by friction
9. The amount of energy in the wind depends on the
   a. Speed of the wind
   b. Length of the time the wind blows
   c. Distance the wind blows
10. The ocean is 3.5% salt and 96.5% water
11. Ocean Water is 35g of salt per 1000g of ocean water
12. Sodium Chloride is table salt (NaCl) The most common salt in ocean water
13. Surface currents are moved by the prevailing winds.
14. The prevailing winds blow in regular directions almost all of the time.

Sonar Math

Formula: $\frac{\#\text{ of seconds} \times 1520\text{m}}{2}$

(2.) How deep is the ocean in Kilometers if the Echo Sounder comes back in 8 seconds?

Solution = $\frac{8 \times 1520\text{m}}{2}$

$= \frac{12160}{2}$

$= 6080\text{ m} = 6.080\text{ Km}$

$1520 \times 8 = 12160$

$12160 \div 2 = 6080$

K H D U D C M
Km m