

Ocean Motions • Guided Reading and Study

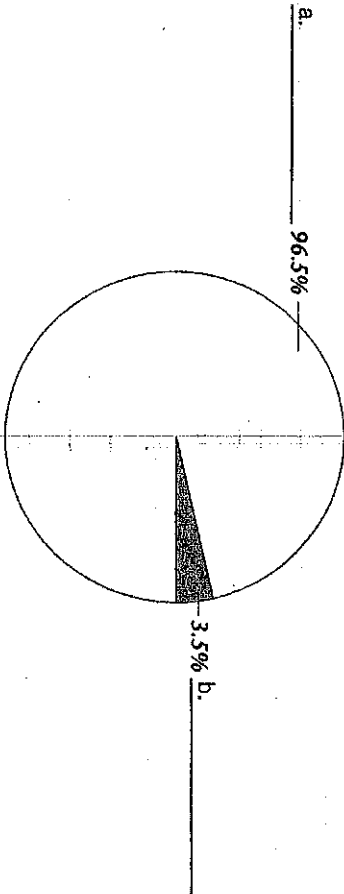
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Ocean Water Chemistry

The Salty Ocean

1. The total amount of dissolved salts in water is called _____.
2. Label the two parts of the circle graph.

Composition of Ocean Water



- a. _____ 96.5%
 - b. _____ 3.5%
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

5. List two gases found in ocean water that are necessary for living things.
 - a. _____
 - b. _____
6. Is the following sentence true or false? There is more oxygen in seawater than in air. _____
7. Why does warm water stay at the surface of the ocean? _____

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

Changes with Depth

9. A vertical section of the ocean is called the _____.
10. Complete the compare/contrast table.

Depth of Ocean Zones	
Zone	Depth
a.	Extends from about 1 kilometer below the surface to the ocean floor
b.	Extends from the surface to about 200 meters below
c.	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. _____
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) _____.

Ocean Motions - Review and Reinforce

Ocean Water Chemistry

Understanding Main Ideas

Fill in the spaces in the table below.

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The Water Column

Depth Zone	Depth Range	Average Temperature (°C)
Surface	1. _____	2. _____
3. _____	4. _____	4°C-10°C
5. _____	1 km to ocean floor	6. _____

Answer the following questions in the spaces provided or on the back of this sheet.

- What is the average salinity of ocean water?
- Name three factors that affect how salty the ocean is.
- Which is more dense, ocean water or fresh water?
- What is the most abundant salt in seawater?
- Why is there more oxygen at the surface of the ocean than in deeper layers?
- What prevents scuba divers from going deeper than about 40 meters below the surface?

Building Vocabulary

Fill in the space to complete each sentence.

- A _____ is an underwater vehicle built of strong materials to resist pressure.
- The total amount of dissolved salts in ocean water is called _____.
- A vertical section of the ocean from the surface to the ocean floor is referred to as the _____.

Ocean Motions - Review and Reinforce

Currents and Climate

Understanding Main Ideas

Fill in the spaces in the table below.

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Comparing Currents

Type of Current	Cause	Possible Temperatures
1. _____	Winds	2. _____
Deep	3. _____	4. _____

Answer each of the following questions in the spaces provided.

- How do surface currents affect climate?
- Why does upwelling attract huge numbers of fish?

Building Vocabulary

Fill in the space to complete each statement.

- _____ are large streams of moving water that flow through the oceans.
- The effect of Earth's rotation on the direction of winds and currents is called the _____.
- _____ is the pattern of temperature and precipitation typical of an area over a long period of time.
- _____ is an abnormal climate event that occurs every 2 to 7 years in the Pacific Ocean.

Ocean Motions • Guided Reading and Study

Currents and Climate

Introduction

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1. A large stream of moving water that flows through the oceans is a(n) _____.
2. Is the following sentence true or false? Currents carry water great distances.

Surface Currents

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.
4. The effect of Earth's rotation on the direction of winds and currents is called the _____.
5. Is the following sentence true or false? In the Northern Hemisphere, surface currents curve to the left.
6. The largest and most powerful surface current in the North Atlantic Ocean is the _____.

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.
9. The pattern of temperature and precipitation typical of an area over a long period of time is called _____.
10. An abnormal climate event that occurs every 2 to 7 years in the Pacific Ocean is called _____.
11. How does El Niño begin?

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.

Deep currents

13. How does the Gulf Stream influence the climate along the west coast of Norway?

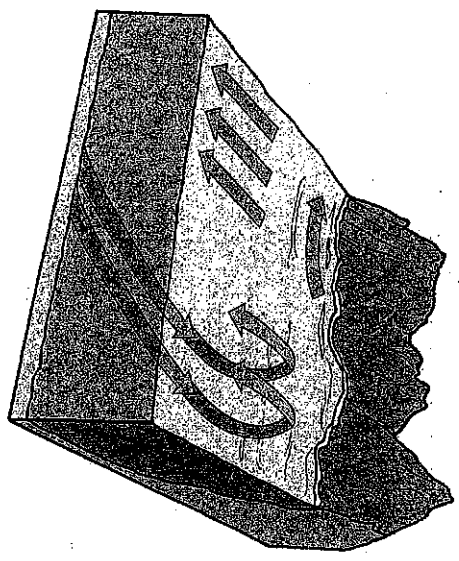
14. How do cold-water currents affect weather on land near a coast?

15. Deep currents are caused by differences in _____.
16. The density of water depends on its _____ and its _____.
17. Why does water get denser as it moves toward the poles?

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

Upwelling

19. The upward movement of cold water from the ocean depths is referred to as _____.
20. Is the following sentence true or false? Upwelling is caused by tides. _____
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?

Name _____ Date _____ Class _____

Ocean Motions • Review and Reinforce

Currents and Climate

pgs. 162-167

Understanding Main Ideas

Fill in the spaces in the table below.

Comparing Currents

Type of Current	Cause	Possible Temperatures
1. _____	Winds	2. _____
Deep	3. _____	4. _____

Answer each of the following questions in the spaces provided.

5. How do surface currents affect climate?

6. Why does upwelling attract huge numbers of fish?

Building Vocabulary

Fill in the space to complete each statement.

- _____ are large streams of moving water that flow through the oceans.
- The effect of Earth's rotation on the direction of winds and currents is called the _____.
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- _____ is an abnormal climate event that occurs every 2 to 7 years in the Pacific Ocean.

Ocean Water Chemistry - Key Concepts

- On average, one kilogram of ocean water contains about 35 grams of salts.
- Like temperatures on land, temperatures at the surface of the ocean vary with location and the seasons. Gases in ocean water vary as well.
- As you descend through the ocean, the water temperature decreases.
- Pressure increases continuously with depth in the ocean.

Ocean Water Chemistry - Key Terms

Salinity -

Currents and Climate - Key Concepts

- Surface currents, which affect water to a depth of several hundred meters, are driven mainly by winds.
- A surface current warms or cools the air above it, influencing the climate of the land near the coast.
- Deep currents are caused by differences in the density of ocean water. Deep currents move and mix water around the world. They carry cold water from the poles toward the equator.
- Upwelling brings up tiny ocean organisms, minerals, and other nutrients from the deeper layers of the water. Without this motion, the surface waters of the open ocean would be very scarce in nutrients.
- Currents provide food and transportation for living organisms and regulate the climate making it suitable for living organisms.

Currents and Climate - Key Terms

Current -

Coriolis effect -

Climate -

Upwelling -

Write a 2-3 sentence response for each of the following questions.

In what ways is the ocean at 1,000 meters deep different from the ocean at the surface in the same location?

Two 1-liter samples of water were taken from the ocean, one during the winter, and one during the summer. Sample A has a mass of 1.02 kg. Sample B has a mass of 1.05 kg. Which sample was taken during the winter? Explain your answer.