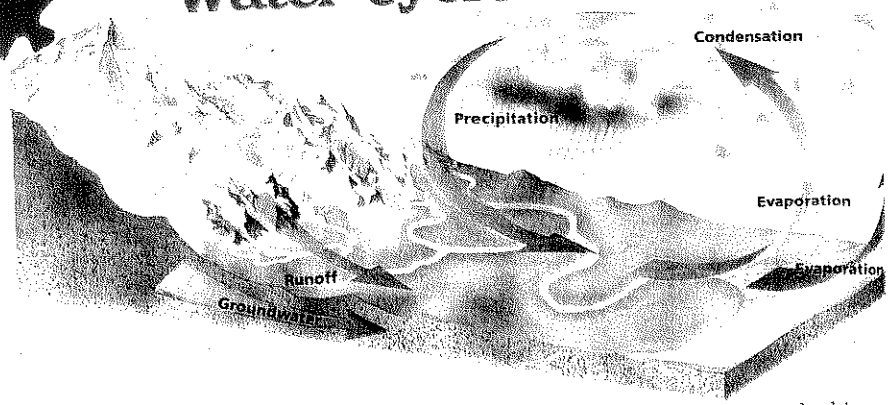
10-1 What is the water cycle?



Objective ▸ Trace the steps in the water cycle.

TechTerms

- **condensation** (kahn-dun-SAY-shun): changing of a gas to a liquid
- **evaporation** (ih-vap-uh-RAY-shun): changing of a liquid to a gas
- **precipitation** (prih-sip-uh-TAY-shun): water that falls to the earth from the atmosphere
- **water cycle:** repeated movement of water between the earth's surface and the atmosphere

Evaporation The changing of a liquid to a gas is **evaporation** (ih-vap-uh-RAY-shun). Most of the earth is covered with water. When liquid water takes in heat energy from the sun, it changes to a gas. This gas is called water vapor. The water vapor formed by evaporation goes into the air. Air always contains some water vapor.

Define: What is evaporation? changing of a liquid to a gas

Condensation The changing of a gas to a liquid is called **condensation** (kahn-dun-SAY-shun). When air containing water vapor is cooled, the water vapor loses heat. If the water vapor loses enough heat, it changes back to a liquid. The water vapor condenses into tiny water droplets. These water droplets form clouds. A cloud is a collection of water droplets.

Describe: What is a cloud? collection of water droplets

Precipitation Water that falls to the earth from the atmosphere is called **precipitation** (prih-sip-uh-TAY-shun). Rain and snow are the two main forms of precipitation. As the water droplets in a cloud get bigger, they become too heavy to stay in the air. Gravity pulls the water droplets toward the earth. The water falls to the earth as rain. If the air is very cold, the water may change to a solid. Then the water falls to the earth as snow, sleet, or hail.

Name: What are the two main forms of precipitation? rain and snow

The Water Cycle Water on the earth is always changing its state, or phase. As water evaporates from the earth's surface, the water changes from a liquid to a gas. In the atmosphere, the water condenses back to a liquid. This water forms clouds. Finally, the water falls to the earth as precipitation. These changes happen over and over. The repeated movement of water between the earth's surface and the atmosphere is called the **water cycle.**

State: What is the water cycle? repeated movement of water from the earth's surface to the atmosphere and back to the earth's surface

Name _____ Class _____ Date _____

10--1 What is the water cycle?

Lesson Review

Part A Complete the table by placing a check mark in the correct column.

Table 1 Phases of Water

Occurrence	Evaporation	Condensation
1. change of gas to a liquid		
2. change of liquid to a gas		
3. water vapor forms		
4. a cloud forms		
5. water vapor forms tiny droplets		
6. water vapor loses heat		
7. water takes in heat energy from the sun		

Part B *Use the terms below to complete each statement. Write your answer in the space provided.*

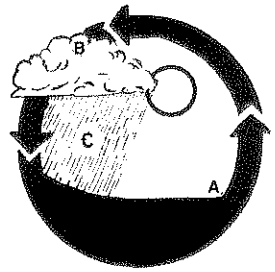
gravity hail cloud water vapor precipitation

1. Rain and snow are the two main forms of _____.
2. A _____ is a collection of water droplets.
3. Water droplets are pulled toward the earth by _____.
4. The gas form of water is _____.
5. A solid form of precipitation is _____.

Skill Challenge

Skills: *identifying; interpreting a diagram*

Answer the questions based on the diagram of the water cycle.



1. a. The process happening at A is _____.
   b. What is causing this change to occur? _____
2. a. The process happening at B is _____.
   b. What is causing this change to occur? _____
3. a. What is being produced at C? _____
   b. What causes this? _____

10-2 What is groundwater?

Objective ▸ Explain how groundwater collects in soil.

TechTerms

- **groundwater:** water that collects in pores in the soil
- **pores:** tiny holes or air spaces
- **water table:** upper layer of saturated rock

Groundwater Some of the rainwater that falls to the earth soaks into the soil. The water collects in the air spaces, or pores, between particles of rock and soil. Water that collects in the pores between rock and soil particles is called **groundwater.** About 90% of the earth's freshwater supply is stored as groundwater.

Identify: **What is groundwater?** water that collects in the pores between rock and soil particles

Properties Affecting Groundwater Different kinds of rock and soil can hold different amounts of groundwater. Loosely packed soil has many pores. It can hold a lot of groundwater. Tightly packed soil does not have many pores. It cannot hold much groundwater.

Soil in which the particles are all about the same size also can hold a lot of groundwater. Suppose the soil particles are all different sizes. Then, small particles can fill up some of the pores. As a result, the soil cannot hold much groundwater.

Explain: Why can loosely packed soil hold a lot of groundwater? because it has many pores

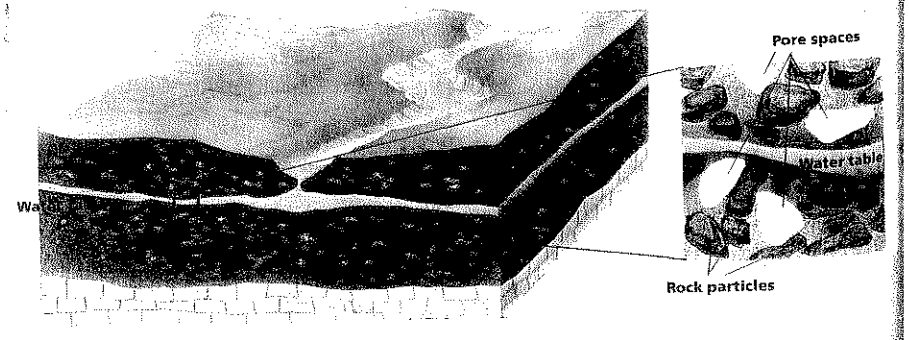
Movement of Groundwater Groundwater moves through the soil by means of the pores between soil particles. Groundwater easily moves through soil with large, interconnected pores. However, if the pores are not connected, the water cannot move through the soil. As a result, the groundwater cannot sink any deeper into the earth.

Describe: How does groundwater move through soil? by means of the pores between soil particles

The Water Table Groundwater eventually reaches a layer of rock through which it cannot pass. Then groundwater begins to fill up the pores in the rock above this layer. When the pores in the rock are completely filled with water, the rock is saturated (SACH-uh-ray-tid). As the rock becomes saturated, the water level underground rises. The upper level of the saturated rock is called the **water table.**

Not all of the water in soil sinks down to the water table. Some water stays near the surface. The roots of most plants cannot reach the water table. These plants get moisture from water in the upper levels of the soil.

Define: What is the water table? upper level of saturated rock



Name _____ Class _____ Date _____

10–2 What is groundwater?

Lesson Review

Part A *Decide whether each type of soil described can hold a little or a lot of groundwater. Write little or a lot in the space provided.*

_____ 1. loosely packed soil

_____ 2. tightly packed soil

_____ 3. soil with particles of equal size

_____ 4. soil with particles of different sizes

_____ 5. soil with many pores

_____ 6. soil with few pores

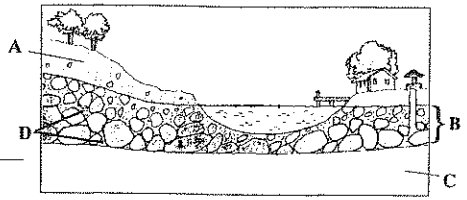
Part B *Complete the following. Write your answers in the spaces provided.*

1. Water that collects in the spaces between rock and soil particles is called _____.
2. The air spaces between rock and soil particles are called _____.
3. When rock particles hold as much water as they possibly can, the rock is _____.
4. The upper level of saturated rock is called the _____.
5. The _____ of most plants get water from the upper levels of the soil.

Skill Challenge

Skills: *interpreting a diagram, predicting*

Answer the questions based upon the diagram.



1. Which letter in the diagram indicates the water table? _____
2. Which letter indicates pores? _____
3. Which letter indicates solid rock? _____
4. Can layer B hold much groundwater?

   Why or Why not? _____

5. What would happen to the level of the water table if there were no rain for several months? _____

6. What would happen to the level of the water table if it rained continuously for several weeks? _____

10-3 What are wells, springs, and geysers?

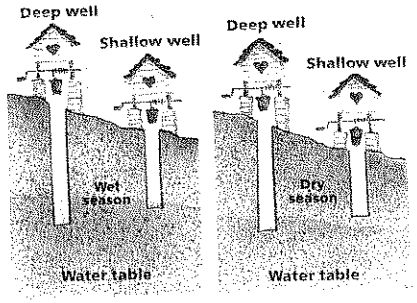
Objective ▸ Describe how groundwater reaches the earth's surface.

Key Terms

- **geyser** (GY-zur): heated groundwater that erupts onto the earth's surface
- **spring:** natural flow of groundwater to the earth's surface
- **well:** hole dug below the water table that fills with groundwater

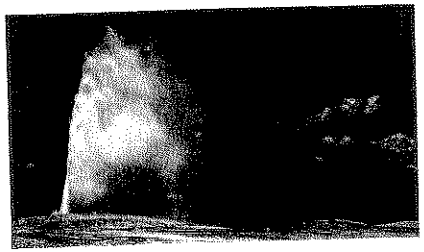
Wells In many communities, people get their fresh water from **wells.** A well is a hole dug below the water table that fills with water. The water in a well comes from the groundwater in the soil. When a well is dug, a pipe is set into a hole that reaches below the level of the water table. An opening in the pipe allows water to enter the pipe. The water can then be pumped to the surface.

The level of the water table changes from season to season. In dry weather, there is little rainfall. This causes the level of the water table to drop. The pipe for a well must be much deeper than the lowest level of the water table.



Infer: Why should a pipe for a well be deeper than the lowest level of the water table? so that the well does not dry up when the water table drops

Artesian Wells A pump is not necessary to get water out of artesian (ahr-TEE-zhun) wells. Water rises freely from these wells. The water source for



an artesian well is trapped between two layers of rock. The water trapped between the rock layers is under pressure. When a pipe is placed into the water, pressure forces the water to rise in the pipe. The water in an artesian well may come from many kilometers away from the well.

Explain: Why is it not necessary to pump water out of an artesian well? water in an artesian well is under pressure

Springs A **spring** is a natural flow of groundwater that reaches the earth's surface. The surface of a steep hill may drop below the water table. Water can then flow out of cracks in the rocks. If a pipe is driven into the rock, water will flow from the pipe. For this reason, springs usually are found on hillsides. Spring water usually is cold. However, if the water is near an underground heat source, warm or hot springs are formed.

Explain: When are hot springs formed? when water is near an underground heat source

Geysers Sometimes, steam and boiling water shoot into the air in a **geyser** (GY-zur). A geyser is heated groundwater that erupts onto the earth's surface. (See photo above.) What causes a geyser to erupt? The water in a deep hot spring may be heated above the normal boiling point of water. This superheated water is trapped by the weight of the water above it. The superheated water turns to steam. The pressure of the steam forces the water above it up and out into the air. Geysers are found only in Wyoming, New Zealand, and Iceland.

Locate: Where are geysers found? Wyoming, New Zealand, Iceland

Name _____ Class _____ Date _____

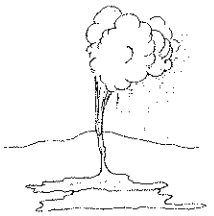
10–3 What are wells, springs, and geysers?

Lesson Review

Part A *Match each term in Column B with its description in Column A. Write the correct letter in the space provided.*

Column A	Column B
_____ 1. usually cold and located on hillsides	a. geyser
_____ 2. water that comes from wells	b. groundwater
_____ 3. erupting heated water	c. artesian well
_____ 4. does not need a pump	d. spring
_____ 5. formed when spring water is near an underground heat source	e. pressure
_____ 6. force that causes water to rise in artesian wells	f. hot spring

Part B *Answer the questions based upon the diagram.*

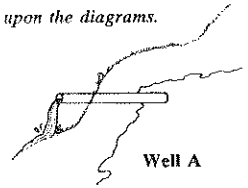


1. What does the diagram show? _____
2. What is erupting onto the earth? _____
3. What forces the groundwater to rise? _____
4. What was the steam before it became superheated? _____

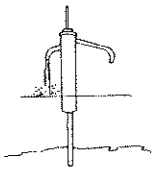
Skill Challenge

Skills: *identifying, inferring*

Answer the questions based upon the diagrams.



Well A



Well B

1. Which well is an artesian well? _____
2. Why must the pipe for well A go below the water table? _____
3. Which well pumps water from many kilometers away? _____
4. During a period of dry weather, which well would probably dry up first? Why? _____

10-4 What is oceanography?

Objectives ▸ Explain what is meant by oceanography. ▸ Describe the world ocean.

TechTerm

▸ **oceanography** (oh-shun-OG-ruh-fee): study of the earth's oceans

The Water Planet About three-quarters, or 75%, of the earth is covered with water. Most of this water is salt water. This large body of salt water is the world ocean. No other planet in the solar system has a covering of liquid water.

Analyze: What percentage of the earth is covered with land? 25%

The World Ocean The world ocean is divided into three major oceans. These oceans are the Atlantic Ocean, the Pacific Ocean, and the Indian Ocean. Geographers (jee-AHG-ruh-furz) are specialists who study the earth's surface. Geographers often name two more oceans. They use the names Arctic Ocean and Antarctic Ocean for areas of the Atlantic and Pacific oceans.

Identify: What are the names of the three major oceans? Atlantic, Pacific, and Indian

Size and Depth The Pacific Ocean covers the largest area of the world ocean. More than half of the earth's ocean water is in the Pacific Ocean. The Pacific Ocean also is the earth's deepest ocean. The average depth of the Pacific Ocean is 3.9 km.

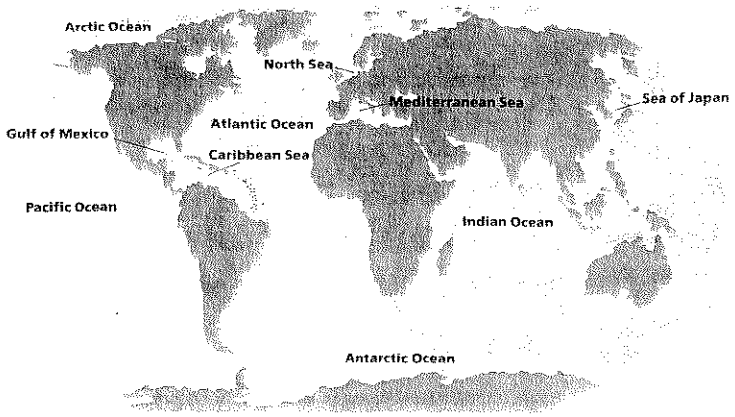
The Atlantic Ocean is the second largest ocean. Several seas and gulfs are part of the Atlantic Ocean. A sea is a small area of the ocean that is partly surrounded by land. The Atlantic Ocean has an average depth of 3.3 km.

The Indian Ocean is the smallest ocean. It is deeper than the Atlantic Ocean, but not as deep as the Pacific Ocean. The average depth of the Indian Ocean is 3.8 km.

Observe: Use the map to name two seas and a gulf that are part of the Atlantic Ocean. Accept all logical responses.

Oceanography The study of the earth's oceans is **oceanography** (oh-shun-OG-ruh-fee). Scientists who study the oceans are oceanographers. There are many kinds of oceanographers. An oceanographer might study the size and depth of the oceans, the living things in the ocean, or the geography of the ocean floor.

Define: What is oceanography? study of the earth's oceans



Name _____ Class _____ Date _____

10–4 What is oceanography?

Lesson Review

Write true if the statement is true. If the statement is false, change the underlined term to make the statement true.

_____ 1. The study of the earth's oceans is called geography.

_____ 2. Water covers about 25% of the earth.

_____ 3. The Atlantic Ocean contains more than half of the world's ocean water.

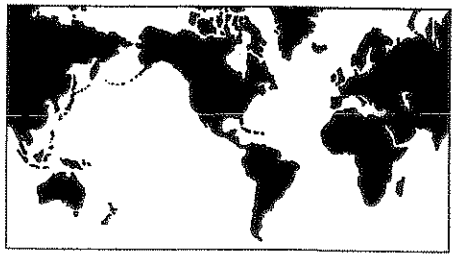
_____ 4. Scientists who study the oceans are oceanographers.

_____ 5. A small area of an ocean that is partly surrounded by land is a sea.

Skill Challenge

Skills: *reading maps, inferring*

Use the map to complete the following. Write your answers in the spaces provided.



1. Name the three main oceans. _____
2. Name two other oceans. _____
3. Name two continents that surround each of the following:

   Atlantic Ocean: _____

   Pacific Ocean: _____

   Indian Ocean: _____
4. Why do you think some oceanographers would want to study the Arctic and Antarctic Oceans separately? _____
5. a. Do the oceans have boundaries or do they run into each other? _____

   b. Given the idea of a world ocean, how many oceans does the earth have? _____

10-5 How do scientists explore the oceans?

Objective ▸ Describe three ways in which scientists explore the oceans.

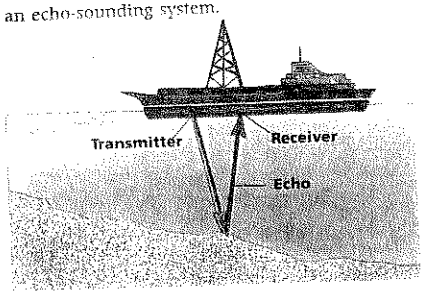
TechTerms

- **sonar:** system that bounces sound waves off the ocean floor
- **submersible** (sub-MUR-suh-bul): underwater research vessel

Deep-Sea Drilling Scientists can study the ocean floor by drilling into the crust beneath the ocean. The Deep Sea Drilling Project is an ocean research program. The Project has helped scientists learn about the ocean floor. The research ship *Glomar Challenger* was specially built for the Deep Sea Drilling Project. Equipment on the *Glomar Challenger* can drill into the ocean floor more than 4 km below the surface. Scientists study samples of rock taken from the ocean floor.

Identify: How do scientists get samples of rock from the ocean floor? by drilling into the ocean floor

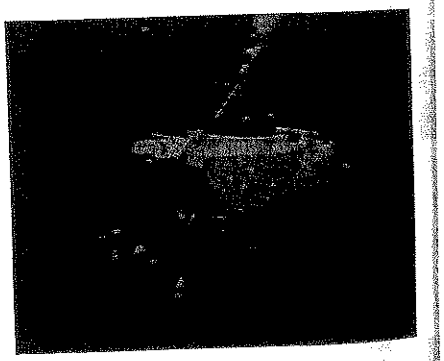
Sonar Scientists can map the ocean floor by using **sonar.** The word "sonar" comes from the letters in sound navigation and ranging. Sonar is an echo-sounding system.



Sonar is used to calculate the depth of the ocean. Sound waves travel through water at a speed of 1500 m/sec. A transmitter bounces a sound wave off the ocean floor. The returning sound wave, or echo, is picked up by a receiver. Scientists can measure the time it takes for the sound wave to return. This time can be used to calculate the depth to the ocean floor. Suppose a sound wave makes a round trip in 10 seconds. The sound wave takes 5 seconds to reach the ocean floor. It takes another 5 seconds to bounce back to the ship. The depth of the ocean floor is 1500 m/sec × 5 sec = 7500 m.

Calculate: A sonar signal is sent out and returns 5 seconds later. How deep is the ocean floor? 1500 m/sec × 2.5 sec = 3750 m

Submersibles Scientists also use underwater research vessels to study the oceans. These vessels are called **submersibles** (sub-MUR-suh-bulz). One of the first submersibles was a bathysphere (BATH-uh-sfir). A bathysphere is a round diving vessel. It is lowered into the ocean on a steel cable from a ship.



Another kind of submersible is called a bathyscaphe (BATH-ih-skaf). A bathyscaphe is a small submarine. In 1960, the bathyscaphe Trieste set a record by diving to a depth of almost 11,000 m. Scientists diving in the bathyscaphe *Alvin* have discovered many unusual forms of life deep in the ocean.

Identify: What is a bathyscaphe? a small submarine

Name _____ Class _____ Date _____

10–5 How do scientists explore the oceans?

Lesson Review

Complete each statement. Write your answers in the spaces provided.

1. Scientists can take samples of rock from the ocean floor by _____.
2. A system that bounces sound waves off the ocean floor is called _____.
3. Sound waves travel through water at a speed of _____.
4. A sound wave is sent out by a _____.
5. A returning sound wave is picked up by a _____.
6. Sonar is used to calculate the _____ of the ocean.
7. Sonar uses the travel time of _____ to map the ocean floor.
8. Underwater research vessels used to study the oceans are called _____.
9. A round diving vessel is a _____.
10. A small submarine is a _____.

Skill Challenge

Skills: *calculating, analyzing, making generalizations*

Complete the table. The first column gives the amount of time it takes for a sound wave to make a complete round trip using sonar. For each time, give the depth of the ocean floor in meters (m). Then answer the questions.

Table 1 Calculating Ocean Depth Using Sonar

	Length of time (seconds)	Depth of ocean floor (meters)
1.	2 sec	
2.	6 sec	
3.	9 sec	
4.	10 sec	

5. How long was the travel time for the greatest depth? _____
6. What was the depth for the shortest travel time? _____
7. Based on these results, what can you say about the relationship between the travel time of the sound waves and the depth of the ocean? _____

10-6 What are some properties of the ocean?

Objective ▷ Explain why different parts of the ocean have different temperatures and salinity.

TechTerms

- ▷ **salinity** (suh-LIN-uh-tee): amount of dissolved salts in ocean water
- ▷ **thermocline** (THUR-muh-klyn): layer of ocean water in which temperature drops sharply

Salinity The water in the earth's oceans is salt water. Unlike fresh water, salt water contains dissolved salts and other minerals. Figure 1 shows the percentages of salts in ocean water. The amount of dissolved salts in ocean water is called **salinity** (suh-LIN-uh-tee). Salinity is measured as the number of grams of dissolved salt in 1000 g of ocean water. Ocean water contains 33 to 37 grams of salt in every 1000 grams of water.

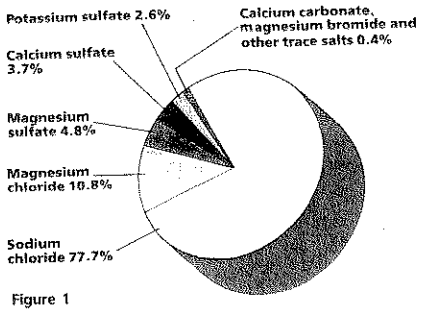


Figure 1

Analyze: Use Figure 1. Which salt is most common in ocean water? sodium chloride

Changing Salinity The salinity of ocean water differs slightly from place to place. The salinity is lowered when fresh water is added to ocean water. Fresh water from rivers, precipitation, and melting glaciers lowers the salinity of the oceans. During the water cycle, water evaporates from the ocean surface. Evaporation leaves behind dissolved salts and raises the salinity. Salinity varies more at the surface than in deeper ocean water.

Infer: Would an area of the ocean that receives a lot of rainfall have a high or low salinity? Explain. low, because rain adds fresh water to the ocean water

Temperature Heat from the sun warms the water in the oceans. The water is warmest at the surface and coldest at the bottom of the ocean. From top to bottom, there are three different temperature layers in the ocean. The surface layer is about 100 to 300 meters deep. Winds and waves keep the water in the surface layer well mixed. As a result, temperatures are about the same everywhere in the surface layer.

The layer of water below the surface layer is the **thermocline** (THUR-muh-klyn). The thermocline goes down to a depth of about 900 meters. In the thermocline, temperatures drop sharply as the water gets deeper. In the deep layer of the ocean below the thermocline, the water is very cold. The temperature in the deep layer remains constant between 0°C and 4°C.

Identify: What is the thermocline? layer of ocean water in which temperatures drop sharply

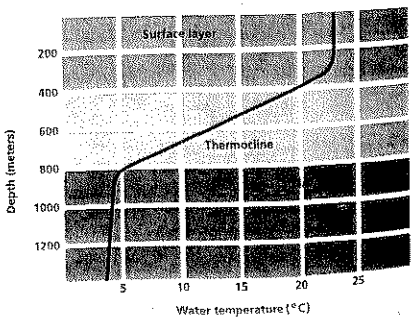


Figure 2

Name _____ Class _____ Date _____

10–6 What are some properties of ocean water?

Lesson Review

Part A *Decide whether each event listed causes the salinity of ocean water to increase or decrease. Complete the table by writing the term "increases" or "decreases" in the column on the right.*

Table 1 Changing the Ocean's Salinity

Event		Salinity
1.	River water pours into the ocean.	
2.	Water evaporates from the ocean.	
3.	Heavy rain falls on the ocean.	
4.	A glacier melts in the ocean.	

Part B *Match each term in Column B with its description in Column A. Write the correct letter in the space provided.*

Column A	Column B
_____ 1. contains dissolved salts and minerals	a. sodium chloride
_____ 2. coldest layer of the ocean	b. thermocline
_____ 3. most common salt in the ocean	c. surface layer
_____ 4. layer of ocean in which temperatures drop sharply	d. salt water
_____ 5. warmest ocean layer	e. deep layer

Skill Challenge

Skills: *interpreting, sequencing, inferring*

Use the diagram of the ocean layers to answer the questions.

1. Name the three ocean layers from warmest to coldest.

_____

2. Which layers have a fairly constant temperature?

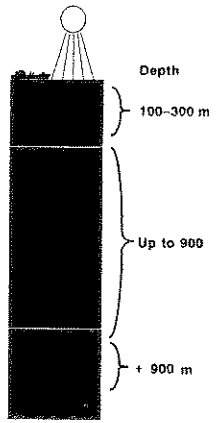
_____

3. a. Which layer do scientists call the "mixed layer?"

_____

b. Why? _____

_____



10-7 What are ocean currents?

Objectives ▸ Define current. ▸ Describe how surface currents and density currents are formed.

TechTerms

- **currents** (KUR-ents): streams of water flowing in the oceans
- **density currents:** streams of water that move up and down in the oceans

Ocean Currents The water in the earth's oceans is always moving. Have you ever heard of someone throwing a bottle containing a message into the ocean? Some time later, the bottle is found in a distant place. How did the bottle get there? It was carried by ocean **currents** (KUR-ents). Ocean currents are streams of water in the oceans. Currents flow through the ocean water around them. Some currents in the ocean flow along the surface. Some move along the ocean bottom. Currents also can move up and down within the ocean.

Define: What is a current? stream of water that flows in the ocean

Surface Currents Winds cause most surface currents. Winds near the equator blow mainly from east to west. In the Northern Hemisphere, winds blow from the northeast. In the Southern Hemisphere, winds blow from the southeast. The earth's rotation causes the winds in the Northern and Southern Hemispheres to curve in different directions. Continents and large islands also make ocean currents change direction. As a result, surface currents move in huge circles. The currents move clockwise in the Northern Hemisphere. They move counterclockwise in the Southern Hemisphere.

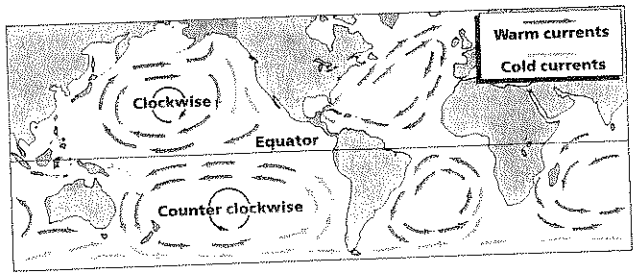
State: What causes most surface currents? wind

Warm and Cold Currents Ocean currents can be warm or cold. Currents flowing from areas near the equator are warm currents. They bring warm water into cooler regions. These warm currents tend to warm the air over nearby land areas. Currents coming from areas near the poles are cold currents. They bring cold water into warmer regions. These cold currents cool these areas.

Name: Where do warm currents come from? areas near the equator

Density Currents Differences in density can cause currents to move up and down in the ocean. Cold water is denser than warm water. Cold water around the poles sinks to the ocean bottom. Water around the equator is warm. Warm water rises up toward the ocean surface. This up and down movement of water causes **density currents.** Different amounts of salt in ocean water also cause density currents. Water with a lot of salt is more dense than water with a little salt. Dense, salty water sinks. Less salty water rises.

List: What causes density currents? different temperatures and amounts of salt



Name _____ Class _____ Date _____

10–7 What are ocean currents?

Lesson Review

Write true if the statement is true. If the statement is false, change the underlined term to make the statement true.

_____ 1. Most surface currents are caused by winds.

_____ 2. Winds near the equator blow mainly from east to north.

_____ 3. In the Southern Hemisphere, winds blow from the southwest.

_____ 4. Surface currents move counterclockwise in the Northern Hemisphere.

_____ 5. Surface currents move clockwise in the Southern Hemisphere.

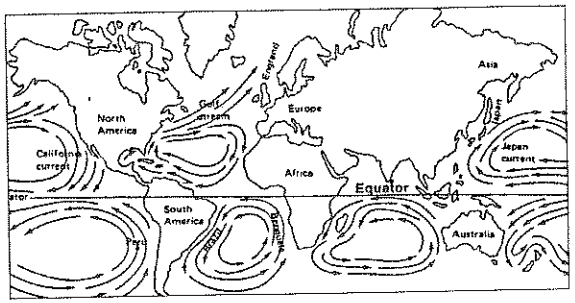
_____ 6. Currents flowing from areas near the equator are cold.

_____ 7. Currents coming from areas near the poles are warm.

_____ 8. Ocean currents that move up and down are called surface currents.

Skill Challenge

Skills: *map reading, inferring*



1. Is the Gulf Stream a warm current or a cold current? Explain your answer. _____

2. How do you think the Gulf Stream affects the weather in England? Explain your answer. _____

3. If you tossed a bottle into the Pacific Ocean from the west coast of North America, which two currents would carry it toward Japan? _____

4. How does the Benguela Current affect the climate of western Africa? Explain your answer. _____

10-8 What are ocean waves?

Objective ▸ Identify and describe the properties of an ocean wave.

TechTerms

- **crest:** highest point of a wave
- **trough** (TROFF): lowest point of a wave
- **wave:** regular up-and-down movement of water

Ocean Waves When wind blows across water, **waves** are formed. A wave is a regular up-and-down movement of water. On a windy day at the beach, the ocean water gets rough. The waves are high when the wind is strong. On a calm day, the waves are not as high.

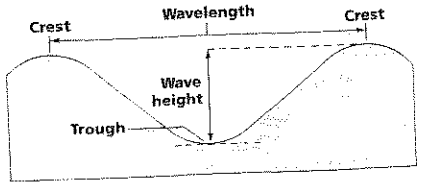
Define: What is a wave? regular up-and-down movement of water

Shape of a Wave A wave has a high point and a low point. The highest point, or top, of a wave is the **crest.** The lowest point of a wave is the **trough** (TROFF). The height of a wave is the distance measured from the crest to the trough. Waves can sometimes be more than 15 meters high. As you watch waves move across the water, you see one crest following another. The distance from one crest to another crest is the wavelength of the wave.

Explain: How is wave height measured? from the crest of a wave to the trough

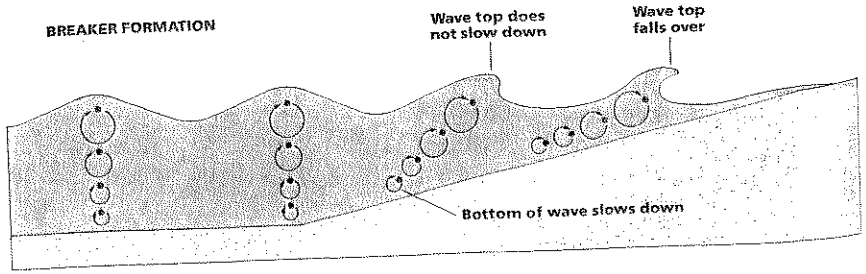
Water Movement in a Wave The water in a wave does not move forward as the wave moves. Only the energy in the wave moves forward. You can see the movement of water by watching a floating cork. As a wave moves by, the cork moves slightly forward. As the wave passes, the cork then falls back about the same distance. The cork appears to be moving up and down in the same place. As a wave moves across the ocean, water particles in the wave move in circles. At the surface, the size of the circles is the same as the height of the wave. The circles get smaller deeper below the surface.

Describe: What happens to a floating cork as a wave passes by? The cork moves forward slightly and then falls back.



Breaking Waves As waves move toward the shoreline, the trough of each wave touches the ocean bottom. Friction with the ocean bottom slows down the wave. The top, or crest, of the wave keeps moving at the same speed. The crest gets farther and farther ahead of the trough. The wave height increases. Finally, the crest falls over and forms a breaker.

Explain: What causes a wave to slow down in shallow water? friction with the ocean bottom



Name _____ Class _____ Date _____

10–8 What are ocean waves?

Lesson Review

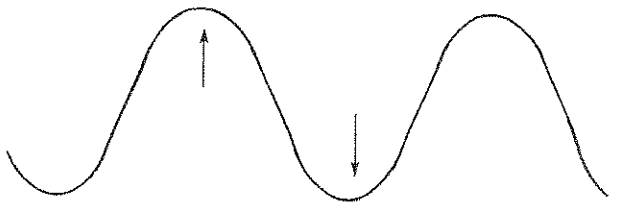
Match each term in Column B with its description in Column A. Write the correct letter in the space provided.

Column A	Column B
_____ 1. distance between two crests	a. wave
_____ 2. causes waves to form	b. crest
_____ 3. moves forward in a wave	c. trough
_____ 4. highest point in a wave	d. wave height
_____ 5. slows down a wave	e. wind
_____ 6. lowest point of a wave	f. wavelength
_____ 7. forms when a crest falls over	g. energy
_____ 8. up-and-down movement of water	h. breaker
_____ 9. distance between the crest and the trough	i. friction

Skill Challenge

Skills: *identifying, calculating, measuring*

Use the diagram to complete the following.



1. Label the crest and trough of the wave.
2. Label the wavelength of the wave.
3. If one centimeter is equal to one meter, what is the wavelength of this wave? _____
4. If one centimeter is equal to one meter, what is the wave height of this wave? _____