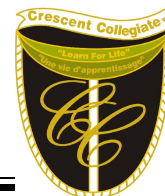


Science 8
Unit 1: Water Systems
Worksheet 7: Ocean Currents



Ocean Current refers to a large amount of ocean water that moves in a particular and unchanging direction

Two types of ocean currents:

1. **Surface Currents:** Flows in the top 100-200 m
2. **Deep Water Currents:** Flows below 200 m

Factors that influence surface currents are:

1. Wind

- Air movement caused by uneven heating
- The energy of the moving air is transferred by friction to the water molecules causing it to move.

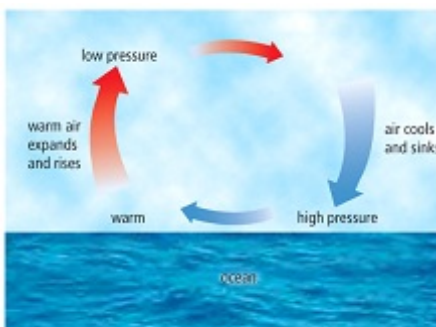


Figure 11.11 The movement of air causes winds.

2. Earth Rotation

- As wind and water flow over Earth's surface, Earth spins under them from west to east. This pushes currents in the northern hemisphere to the right (toward the east). In the southern hemisphere, currents are pushed to the left (toward the west).
- This alteration of direction is called the Coriolis effect. Clockwise in the Northern Hemisphere and Counter clockwise in the Southern Hemisphere



Figure 11.13 The Coriolis effect, caused by Earth's rotation, results in the path of air being directed clockwise in the northern hemisphere and counter clockwise in the southern hemisphere.

3. Shape of Continent

- Moving currents are forced to turn when they meet a solid surface.



Factors that affect Deep Water Currents:

1. Temperature

- Not the same at every depth
- **Thermocline** part of the ocean below the surface where the temperature drops sharply with depth.
- Cold water is also more dense than warmer water.

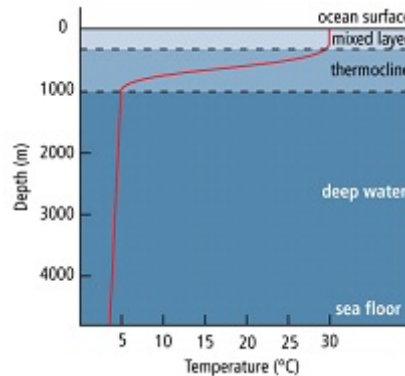
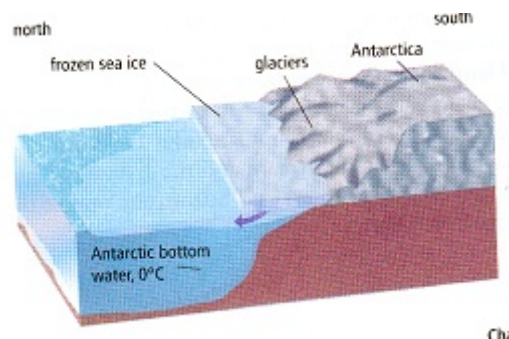


Figure 11.14 Ocean water has different temperature layers at different depths, as the red line here shows.

2. Salinity

- Density currents are produced by difference in salinity (Amount of Salt)
- are formed by sinking, dense water that flows along the ocean floor.



How does the salinity of the ocean water change from one place to another?

Lower Salinity:

- Seawater is less salty at the mouths of large rivers due to the fresh water entering the ocean.
- Fresh water also enters where glaciers and icebergs melt and areas of high precipitation

Increase Salinity:

High amounts of evaporation increases salinity as well as freezing.

Upwelling vertical movement of water from the ocean floor, often caused by wind blowing surface water away from a shore. Flow in opposite directions of density currents

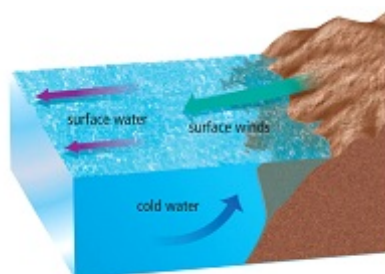


Figure 11.16 Surface winds can cause upwelling by pushing warmer surface waters away from the coast.

PART A: MULTIPLE CHOICE

1. Which of the following refers to is a continuous, directed movement of seawater?
 - (A) Ocean Currents
 - (B) Thermocline
 - (C) Salinity
 - (D) Wind

2. Which of the following refers to streamlike movements of the water that occur at or near the surface of the ocean?
 - (A) Surface currents
 - (B) Jet currents
 - (C) Coriolis currents
 - (D) Deep currents

3. Which of the following is true?

	Surface Currents	Deep Currents
(A)	Flows in the top 100-200 m	Flows in the top 100-200 m
(B)	Flows in the top 100-200 m	Flows below 200 m
(C)	Flows below 200 m	Flows in the top 100-200 m
(D)	Flows below 200 m	Flows below 200 m

4. What are surface currents formed by?
 - (A) Global winds
 - (B) Increased water density
 - (C) The moon's gravity
 - (D) The sun's gravity

5. Which of the following is not listed as a factor in affect surface currents in the ocean?
 - (A) Sediments
 - (B) Wind
 - (C) Earth's Rotation
 - (B) Distribution of land masses

6. Ocean currents in the Northern and Southern Hemispheres turn
 - (A) From west to east.
 - (B) In opposite directions.
 - (C) Clockwise.
 - (D) Against the Earth's rotation.

7. Which of the following refers to streamlike movements of ocean water far below the surface are called
 - (A) Surface currents
 - (B) Jet currents
 - (C) Coriolis currents
 - (D) Deep currents

8. The density of ocean water increases when it
 - (A) Joins the Gulf Stream
 - (B) Gets colder
 - (C) Gets warmer
 - (D) Turns to ice

9. As water gets denser, how does it move?
- (A) Expands toward warmer water
 - (B) Sinks toward the ocean floor
 - (C) Gets pushed toward the poles
 - (D) Gets pulled up by evaporation
10. Which currents carry warm water away from the equator?
- (A) Deep currents
 - (B) Evaporation
 - (C) Surface currents
 - (D) Freezing

Listed below are number of factors that affect ocean currents, use this information to answer questions 11 to 13.

- I) Wind
 - II) Shape of Continent
 - III) Earth Rotation
 - IV) Temperature
 - V) Salinity
11. Which of the following affects surface currents?
- (A) I and II
 - (B) I, II and III
 - (C) II, III and IV
 - (D) III, IV and V
12. Which of the following affects deep water currents?
- (A) I and II
 - (B) II and III
 - (C) III and IV
 - (D) IV and V
13. Which of the above factors would explain a surface current that changed direction upon hitting a continent?
- (A) I
 - (B) II
 - (C) III
 - (D) IV
14. The alteration of direction of a fluid in response to the spinning of Earth is known as the
- (A) Coriolis effect
 - (B) Spinning effect
 - (C) Upwelling effect
 - (D) Hemisphere effect
15. The rising of water from the deep is called
- (A) Upwelling.
 - (B) Swelling.
 - (C) A density current.
 - (D) A tsunami.

PART B : MATCHING

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

Term	Descriptor
16. _____ Deep Currents	A. Part of the ocean below the surface where the temperature drops sharply with depth
17. _____ Surface Currents	B. ocean water that moves in a particular and unchanging direction
18. _____ Coriolis Effect	C. Mainly caused by wind.
19. _____ Thermocline	D. Can be caused by temperature differences as well as differences in density
20. _____ Ocean Currents	E. Movement of air and water due to the rotation of the earth

PART C: WRITTEN RESPONSE

1. What is an ocean current?

2. Explain how wind influences ocean currents.

3. How does the spin of Earth affect ocean currents?

4. Explain how the shape of continents affects ocean currents

5. Explain the difference between a surface current and a deep current5.
