

Hydrosphere Worksheet

1. Which of the following statements describes the impact of thermohaline circulation on climate?

- A) It regulates the world's climate
- B) It decreases the world's average temperature
- C) It increases the world's average temperature
- D) It has no notable impact on the world's climate.

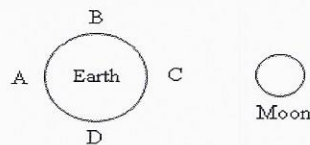
2. Tides are mostly caused by ...

- A) The spinning of the earth
- B) The orbiting of the earth around the sun
- C) The moon's pull of gravity on the earth
- D) The sun's pull of gravity on the earth

3. What is the role of thermohaline circulation?

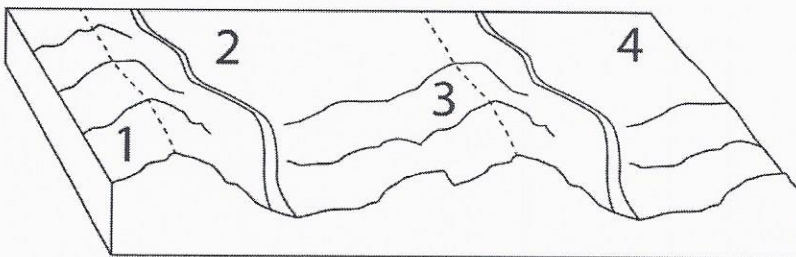
- A) It keeps the pH of oceans uniform.
- B) It captures atmospheric CO₂
- C) It transports heat from the equator toward the poles.
- D) It controls the tidal cycle.

4. Which points on the Earth diagram would have low tides?



- A) A and C
- B) A and C
- C) B and D
- D) B and C

5. Which location is in the same catchment area?



- A) 1 and 2
- B) 1 and 3
- C) 2 and 3
- D) 2 and 4

6. What are the characteristics of ocean water which has a tendency to sink?

- A) Low temperature and low density
- B) High temperature and low density
- C) Low temperature and high density
- D) High temperature and high density

7. The average salinity of the ocean is 35 g/L, but may vary from one area to another depending on certain conditions. The following table lists observations regarding four different areas of an ocean.

Area	Observation
1	Area that receives water from a melting coastal glacier
2	Tropical area with strong surface winds
3	Area with a large amount of water is lost through evaporation
4	Arctic area where pack ice is formed

Which area of this ocean has the lowest salinity level?

- (A) Area 1 B) Area 2 C) Area 3 D) Area 4

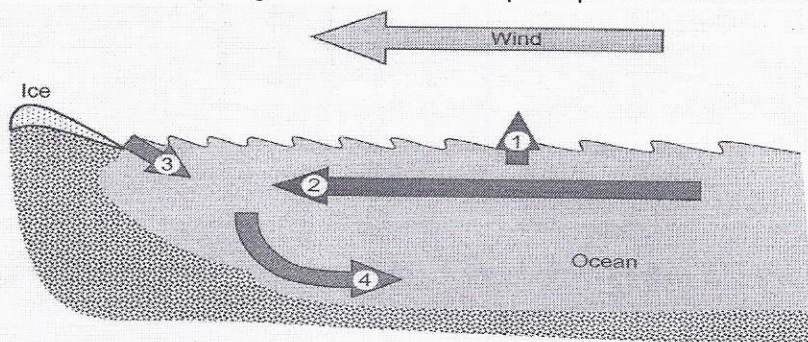
8. The following statements are related to ocean circulation.

- 1- The salinity of ocean water will decrease when neighboring coastal glaciers melt.
 2- Cold water near the poles will move toward the ocean floor.

Which of the following choices is correct?

- A) Only statement 1 is true. (C) Statements 1 and 2 are correct.
 B) Only statement 2 is true. D) Neither statements are correct.

9. The following diagram illustrates the principal of ocean circulation.



Which of these arrows represents the water with the greatest density?

- A) Arrow 1 B) Arrow 2 C) Arrow 3 (D) Arrow 4

10. From the statements below, choose two which will cause an increase in the salinity of ocean water.

1. increased erosion 3. ice floes and glaciers melt
 2. ocean water redirected to a tidal energy plant 4. water evaporates at the equator
 A) 1 and 3 (B) 1 and 4 C) 2 and 3 D) 2 and 4

11. Which of the following will increase the density of a solution?

1. Increasing the salinity 3. Adding water
 2. Decreasing the salinity 4. Allowing water to evaporate
 A) 1 B) 1 and 2 C) 1 and 3 (D) 1 and 4

12. Which of the following statements concerning thermohaline circulation is true?

- A) Thermohaline circulation allows for the heat accumulated in ocean water at the Polar Regions to circulate to the Equatorial Region.
- B) Thermohaline circulation allows for the heat accumulated in ocean water at the Equatorial Region to circulate to the Polar Regions.
- C) Thermohaline circulation can be compared to a conveyor belt which moves warm and cold air masses around the Earth.
- D) Thermohaline circulation can be compared to a conveyor belt which moves warm and cold freshwater systems around the Earth.

13. Four statements about glaciers or pack ice (ice floes) are provided below.

- 1- Glaciers and pack ice hold a large supply of salty water.
- 2- Melting glaciers and pack ice will increase the surface area that reflects sunlight.
- 3- Melting glaciers lead to rising sea levels.
- 4- Melting pack ice is one of the factors that slows down thermohaline circulation.

Which of these statements are true?

- A) 1 and 2
- B) 1 and 4
- C) 2 and 3
- D) 3 and 4

14. Oceanic circulation is simulated by pouring coloured salt water on the surface of distilled water in a beaker. The temperature of the salt water is the same as that of the distilled water. Which of the following choices provided the correct information on the density and the behavior of the salt water during this simulation?

	Density of the salt water compared with the density of the distilled water	Behaviour of the salt water when poured on the surface of the distilled water
A	Higher	Stays on the surface
B	Lower	Stays on the surface
<input checked="" type="radio"/> C	Higher	Sinks to the bottom
D	Lower	Sinks to the bottom

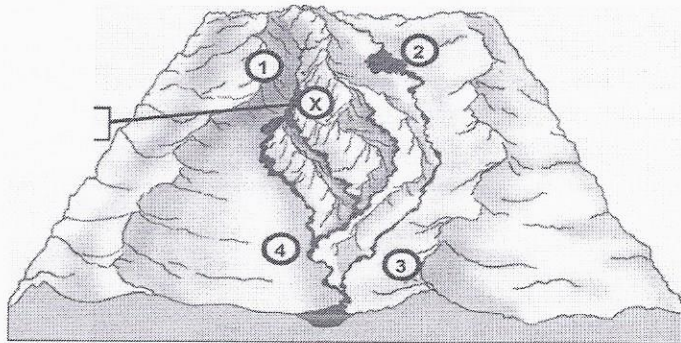
15. What do glaciers and pack ice have in common?

- A) They float on the ocean
- B) They are made up of water whose salinity level is below that of seawater
- C) They are always located near the poles
- D) When they melt, they do not affect the salinity of the oceans

16. Which of the following statements is true about pack ice?

- A) The melting of pack ice does not affect the temperature of the ocean water.
- B) The melting of pack ice affects the salinity of the ocean water.
- C) The melting of pack ice affects sea levels.
- D) The melting of pack ice does not affect oceans.

17. A pharmaceutical company is planning to build a factory where indicated by the letter X on the map below. Residents of towns 1, 2, 3 and 4 indicated on the map are concerned about the quality of their water in the event of a toxic spill. Which one of the 4 towns has a reason to be concerned about the quality of its water?



A) Town 1

B) Town 2

C) Town 3

D) Town 4

18. True or false?

- a) Pack ice is found on land and glaciers float on the sea.
- b) Watersheds will be more polluted towards the bottom of the drainage basin.
- c) Having a flat land will produce a good watershed.
- d) Icebergs are formed from pack ice
- e) Glaciers float on the sea
- f) Melting pack ice has no effect on sea level
- g) The Gulf Stream is a surface current
- h) Ocean salinity will decrease if glaciers continue to melt
- i) Surface currents can be driven by wind only

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19. Some scientists claim that global warming has caused Arctic pack ice (ice floes) and continental glaciers to melt more quickly. Answer the following three questions.

a- Explain if melting glaciers affect sea levels.

Yes, more water being added to the ocean
= ↑ in volume

b- Explain if melting pack ice (ice floes) affect sea levels.

No, volume was already there & no new water added

c- Explain how melting Arctic pack ice (ice floes) affects thermohaline circulation.

It reduces water's salinity which slows down thermohaline circulation because less dense water won't sink.

20. Will the meltwater eventually arrive at the equator? Explain your answer.

Yes because all ocean water are connected.