

Name _____

Score _____

Topic 8: Water Cycle and Climate

1) a) _____

b) _____

2) _____

3) _____

4) _____

5) _____ Air Pressure _____ Air Pressure

_____ Temperature _____ Temperature

OCEAN

LAND

6) WARM: _____

COOL: _____

7) _____

8) _____

9) _____

10) _____

11) _____

12) _____

13) _____

14) _____

15) _____

16) _____

17) _____

18) _____

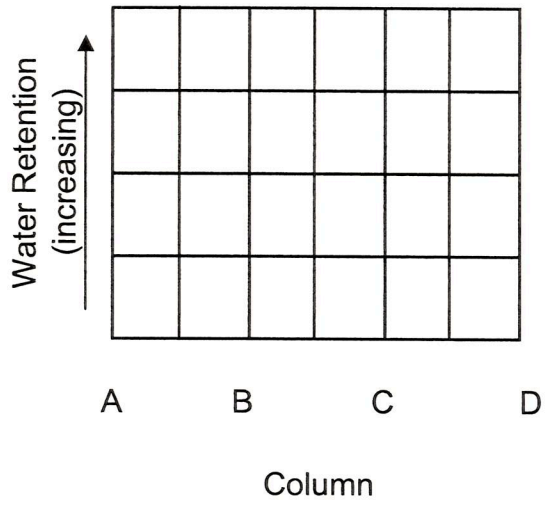
19) _____

20) _____

21) _____

22) _____

23)



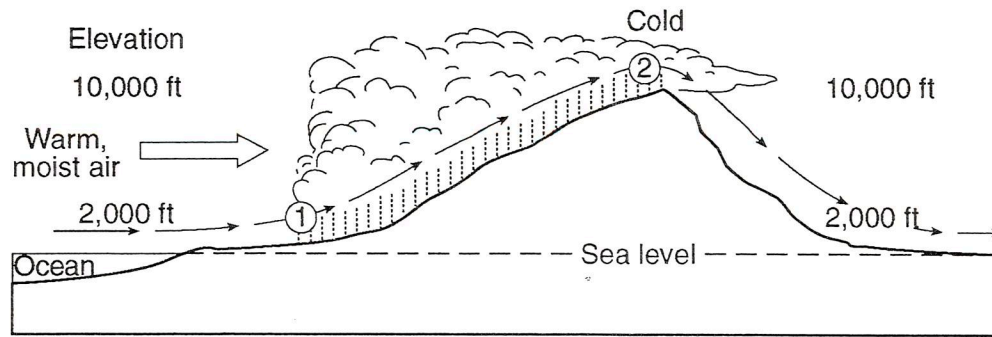
24) _____

25) _____

26)

Number	Water Cycle Process
1	
2	
3	
4	
5	
6	

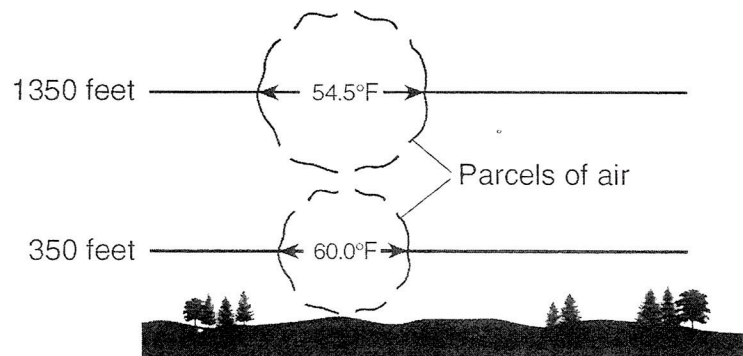
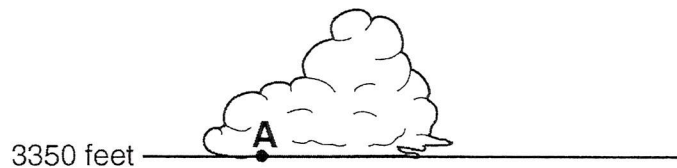
1. The diagram below shows warm, moist air moving off the ocean and over a mountain, causing precipitation between points 1 and 2.



Describe two changes that occur to the warm, moist air between points 1 and 2 that would cause cloud formation.

Base your answers to questions 2 through 4 on the diagram below, which shows the temperature change when a parcel of air warms, rises, and expands to form a cloud. Location *A* is at the base of the cloud.

Cloud Formation



2. Explain why the **warmer air rises**.

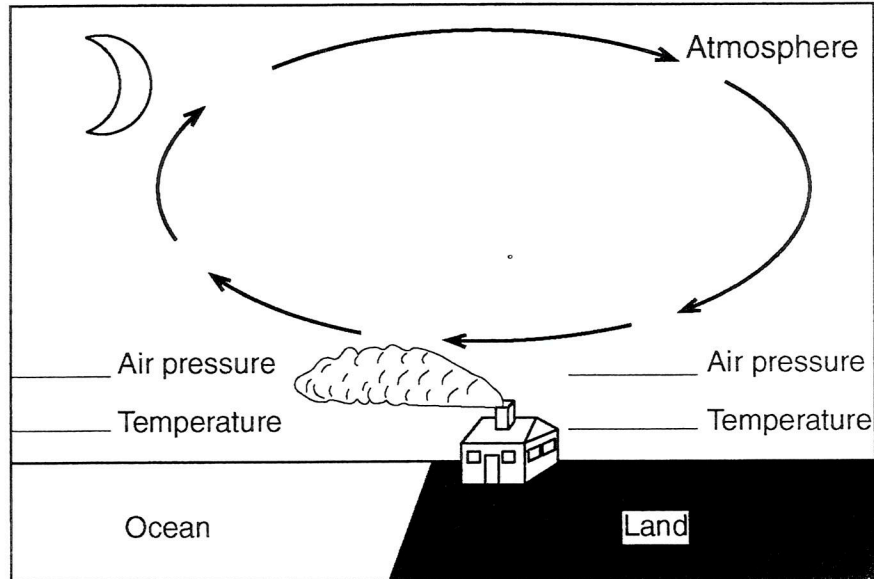
3. Assume the cooling rate of the rising parcel of air is constant. Determine the temperature of the air parcel at the 3350-foot altitude. Express your answer to the *nearest tenth of a degree*.

_____ °F

4. State the relative humidity of the air at location *A*.

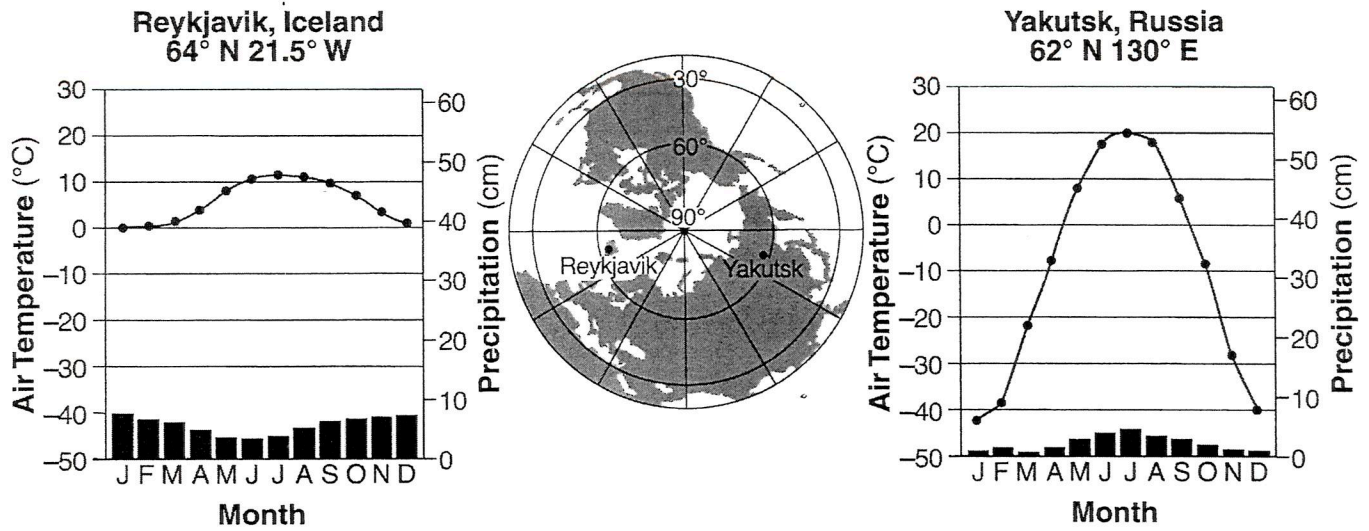
_____ %

5. Base your answer to the following question on the cross section provided below, which represents a house at an ocean shoreline at *night*. Smoke from the chimney is *blowing out to sea*.



- a* Label the *two* lines provided on the cross section above to show where air pressure is relatively “**high**” and where it is relatively “**low**.”
- b* Assume that the wind blowing out to sea on this night is caused by local air-temperature conditions. Label the *two* lines provided on the cross section above to show where Earth’s surface air temperature is relatively “**warm**” and where it is relatively “**cool**.”
-

Base your answers to questions 6 through 8 on the graphs and map below. The map shows a view of Earth from above the North Pole. Points on the map indicate the positions of Reykjavik, Iceland, and Yakutsk, Russia. The graphs show average monthly air temperature (line graphs) and amount of precipitation (bar graphs) for both locations.



6. Identify *one* warm and *one* cool ocean current that affect the climate of Iceland.

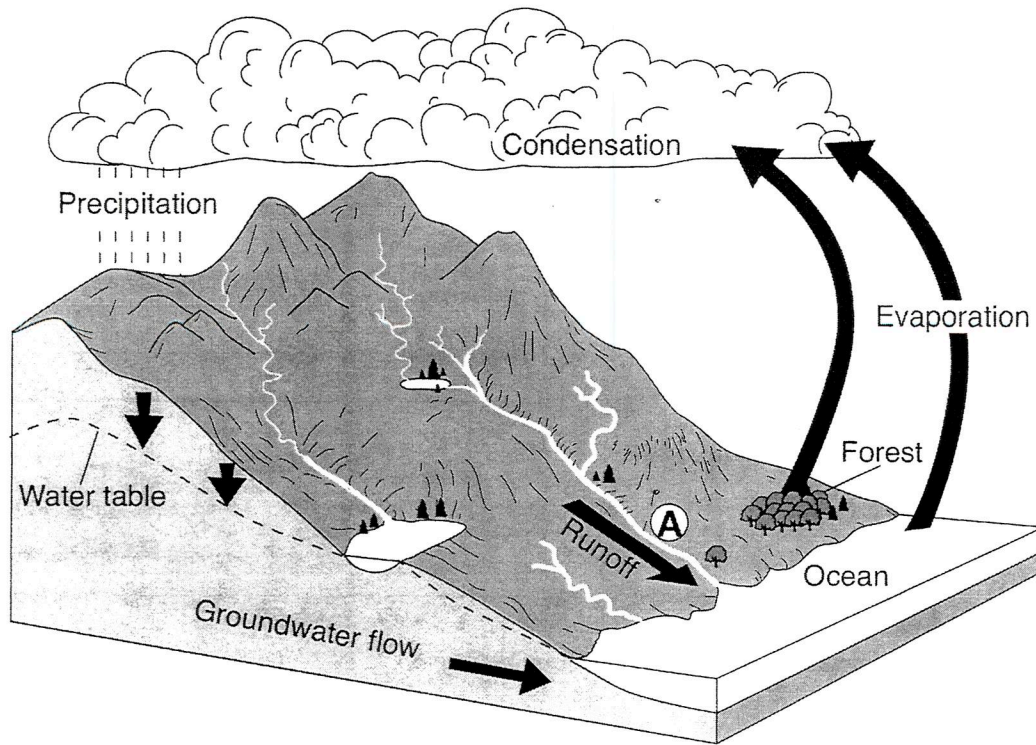
Warm: _____

Cool: _____

7. Describe *one* way the yearly precipitation in Yakutsk differs from that in Reykjavik.

8. Explain why Reykjavik has cooler summers and warmer winters than Yakutsk.

Base your answers to questions 9 through 11 on the diagram below, which represents Earth's water cycle. The arrows represent some water cycle processes. Letter *A* indicates a surface location on Earth.



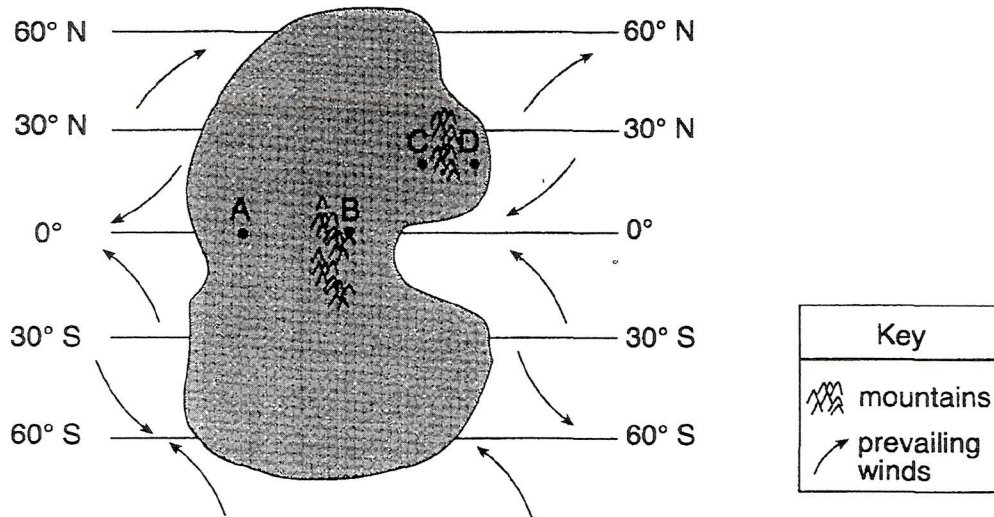
9. How many joules (J) of heat energy are released by each gram of water vapor that condenses to form cloud droplets?
10. Describe *one* surface condition change at location *A* that would *decrease* the rate of runoff.
11. Other than evaporation, which water cycle process transfers large amounts of water vapor into the atmosphere from the forest?

Base your answers to questions 12 and 13 on the passage below.

Average temperatures on Earth are primarily the result of the total amount of insolation absorbed by Earth's surface and atmosphere compared to the amount of long-wave energy radiated back into space. Scientists believe that the addition of greenhouse gases into Earth's atmosphere gradually increases global temperatures.

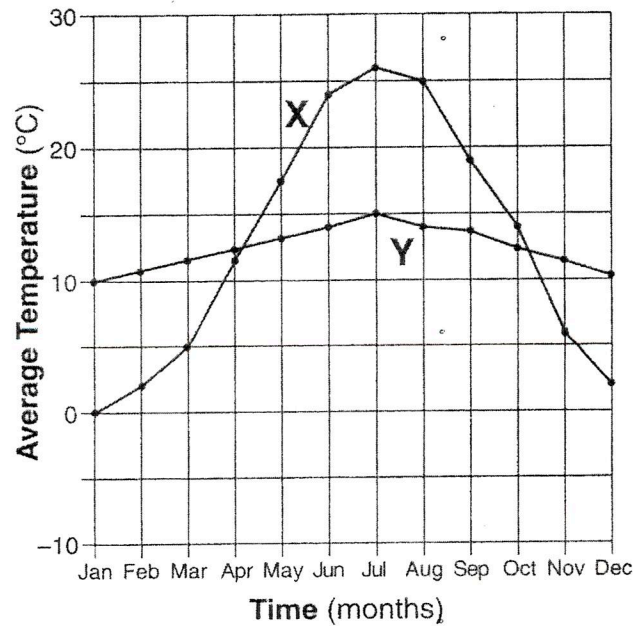
12. Explain how increasing the amount of greenhouse gases in Earth's atmosphere increases global temperatures.
 13. Identify *one* major greenhouse gas that contributes to global warming.
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Base your answers to questions 14 through 16 on the map below, which shows an imaginary continent on a planet that has climate conditions similar to Earth. The continent is surrounded by oceans. Two mountain ranges are shown. Points A through D represent locations on the continent.



14. Explain why location C has a warmer and drier climate than location D.
15. Identify *one* factor that causes a colder climate at location B than at location A
16. Identify *one* labeled latitude on this continent where a high-pressure zone exists and dry air is sinking to the surface. Include *both* the unit and compass direction in your answer.

Base your answers to questions 17 through 19 on the graph below, which shows the average monthly temperatures for a year for city X and city Y. Both cities are located at the same latitude.



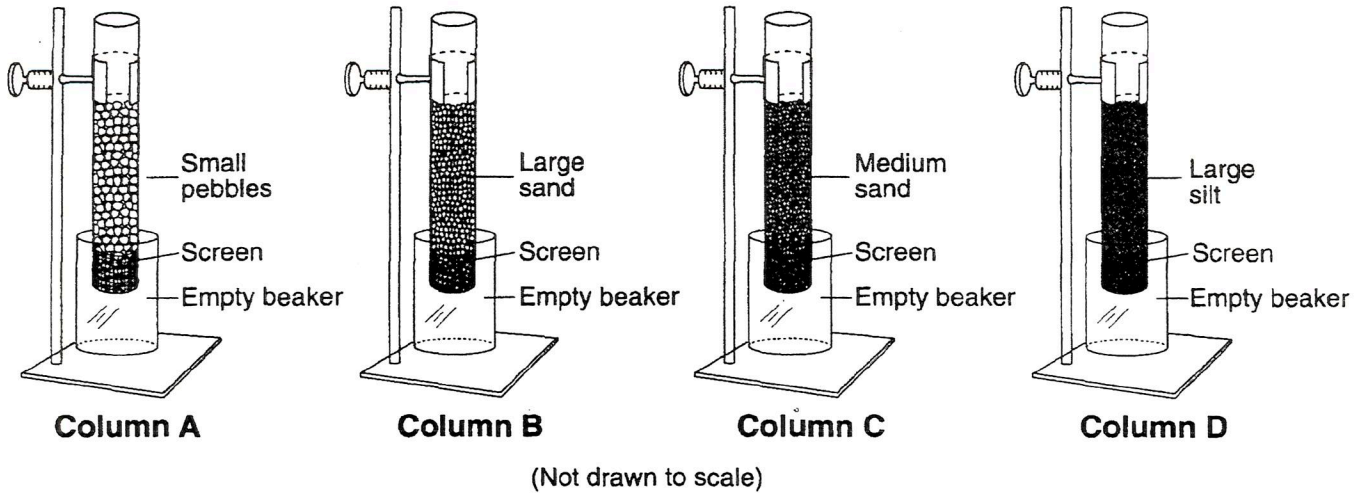
17. What evidence shown on the graph indicates that both cities, X and Y, are located in the Northern Hemisphere?
18. Explain why city X has a greater difference between summer and winter temperatures than city Y.
19. What was the range in the average monthly temperatures for city Y during the year?

Base your answers to questions 20 through 22 on the information below, which describes the past and present climate of Antarctica, and on your knowledge of Earth science.

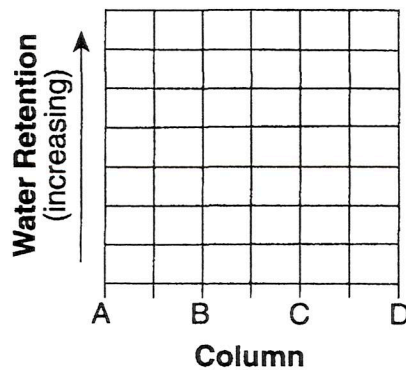
Antarctica's ice sheet has an average thickness of 6600 feet and holds approximately 70% of Earth's freshwater. Ice layers in Antarctica preserve information about Earth's history. Fossil evidence found in the bedrock of this continent shows that Antarctica was once tropical and is a potential source of untapped natural resources. Antarctica is now a frozen desert with very little snowfall.

20. Scientists are concerned that the Antarctic ice may melt as the result of global warming. State *one* effect that this melting would most likely have on Long Island, New York.
21. What evidence is preserved in Antarctica that provides information about Earth's past climates?
22. Explain why Antarctica's cold climate is responsible for its very low amount of yearly precipitation.

Base your answers to questions 23 through 25 on the diagram below, which shows laboratory materials used for an investigation of the effects of sediment size on permeability, porosity, and water retention. Four separate columns, labeled A through D, were filled to the same level with different sediments. The sediments within each column are of uniform size.



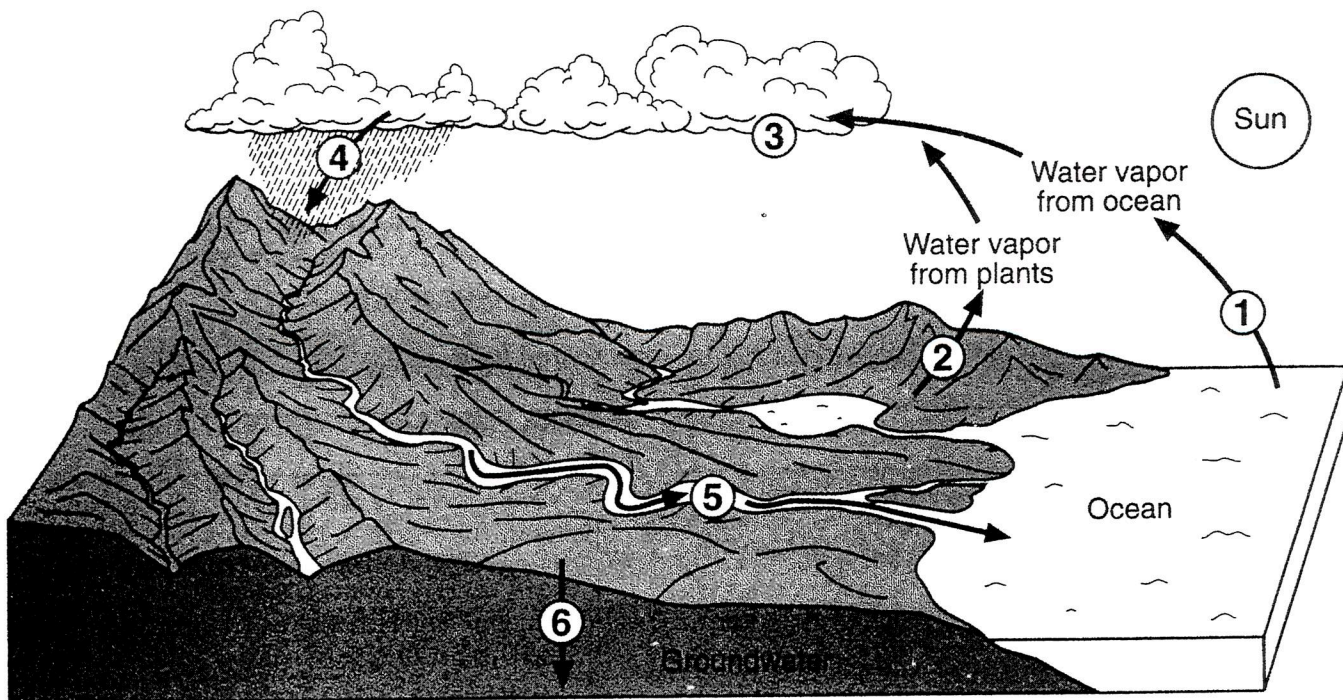
23. An equal amount of water is poured through each column. On the grid, draw a line to show the relative amount of water retained in the sediment after the water flows through each column.



24. Describe the relationship between the sediment size and the permeability that will be observed when water is poured through these sediments.

25. Which column contains particles with a diameter of 0.4 cm?

26. The diagram below shows a model of the water cycle. The arrows show the movement of water molecules through the water cycle. The circled numbers represent the processes that occur as the water molecules reach the different stages of the water cycle.



Complete the table by identifying the name of the water cycle process occurring at *each* number.

Number	Water Cycle Process
1	
2	
3	
4	
5	
6	