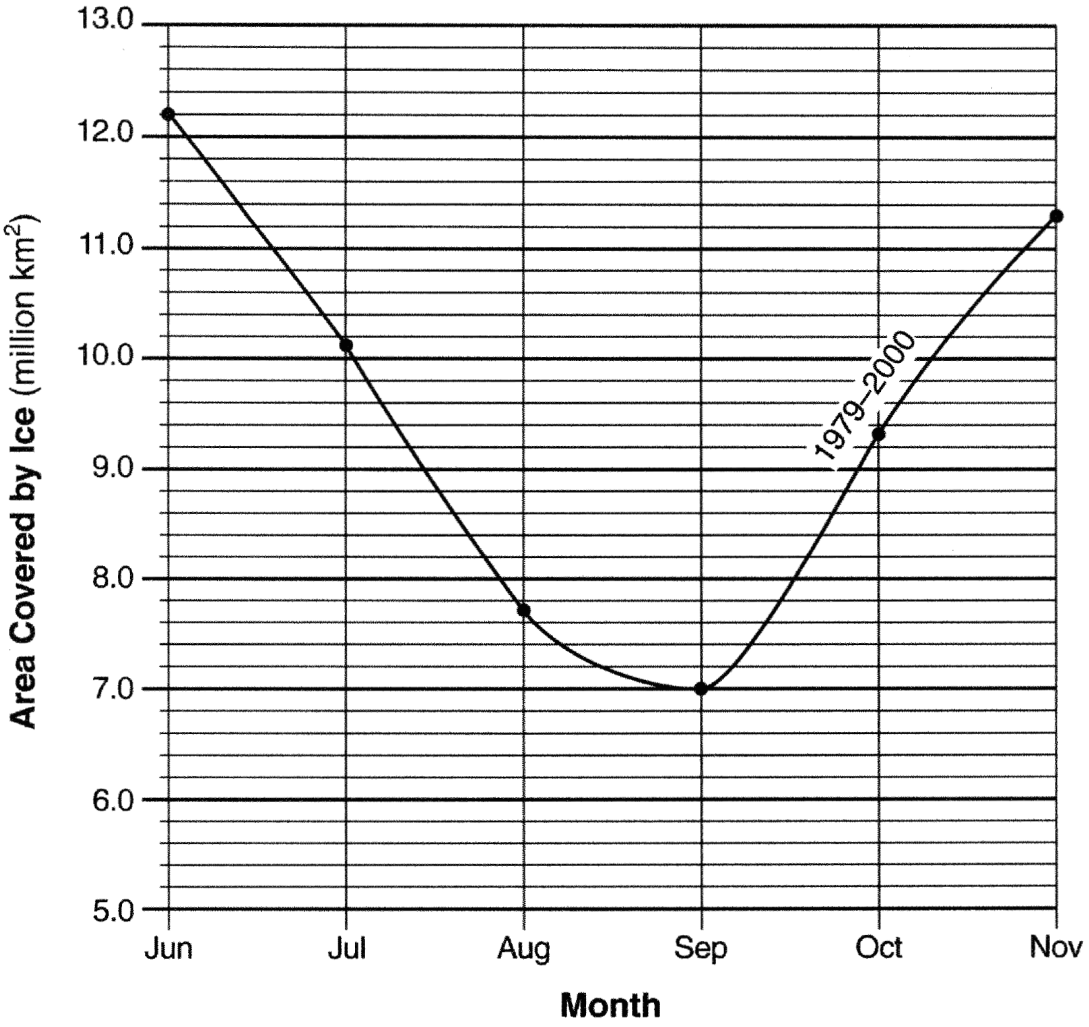
RR#5 - Free Response

Base your answers to questions **1** through **3** on
the data table below and on your knowledge of Earth Science. The table shows the area, in million square kilometers, of the Arctic Ocean covered by ice from June through November. The average area covered by ice from 1979 to 2000 from June to November is compared to the area covered by ice in 2005 for the same time period.

Data Table

Month	**Average Area Covered by Ice 1979 – 2000** (million km^2)	**Area Covered by Ice 2005** (million km^2)
June	12.2	11.3
July	10.1	8.9
August	7.7	6.3
September	7.0	5.6
October	9.3	8.5
November	11.3	10.5

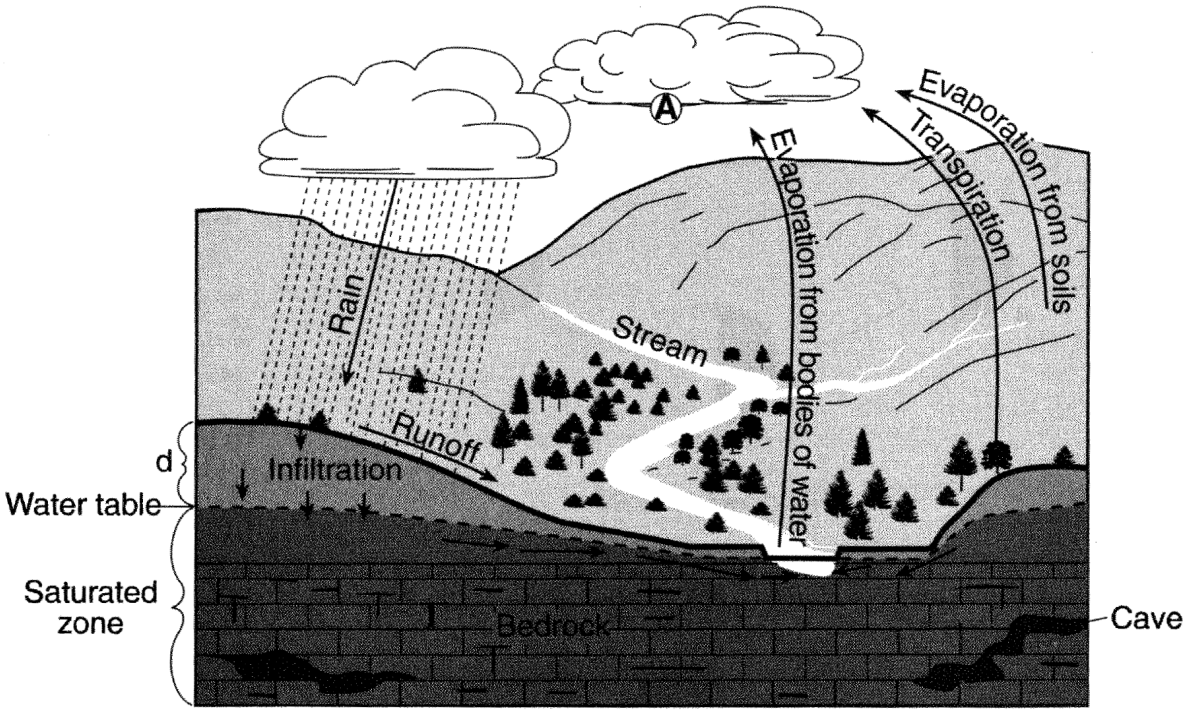


1. Identify *one* greenhouse gas that is believed to cause global warming.

2. Scientists have noted that since 2002, the area of the Arctic Ocean covered by ice during these warmer months has shown an overall decrease from the long-term average (1979-2000). State one way in which this ice coverage since 2002 and the ice coverage shown in the 2005 data above provide evidence of global warming, when compared to this long-term average.

3. Use the information in the data table to construct a line graph. On the grid, plot the data for the area covered by ice in 2005 for *each* month shown on the data table and connect the plots with a line. The average area covered by ice for 1979-2000 has been plotted and labeled on the grid.

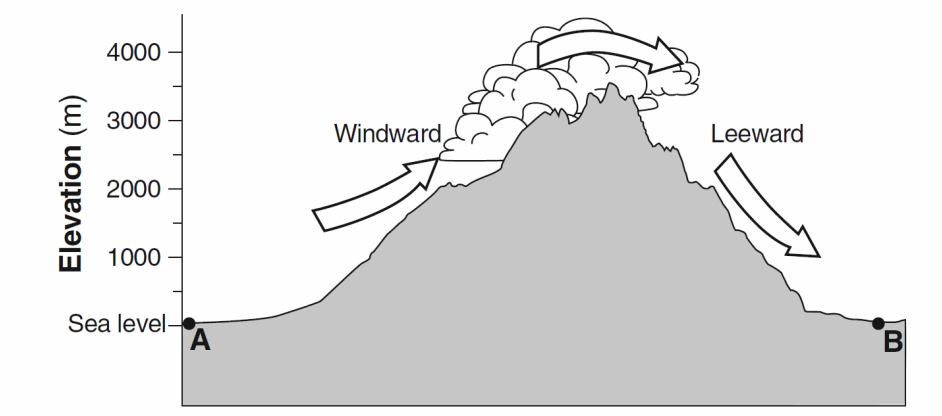
Base your answers to questions **4** and **5** on the diagram below and on your knowledge of Earth Science. The diagram represents a portion of a stream and its surrounding bedrock. The arrows represent the movement of water molecules by the processes of the water cycle. The water table is indicated by a dashed line. Letter *A* represents a water cycle process occurring at a specific location. Letter *d* represents the distance between the water table and the land surface.



4. Explain why the distance, *d*, from the water table to the land surface would *decrease* after several days of heavy rainfall.

5. Describe the soil permeability and the land surface slope that allow the most infiltration of rainwater and the *least* runoff.

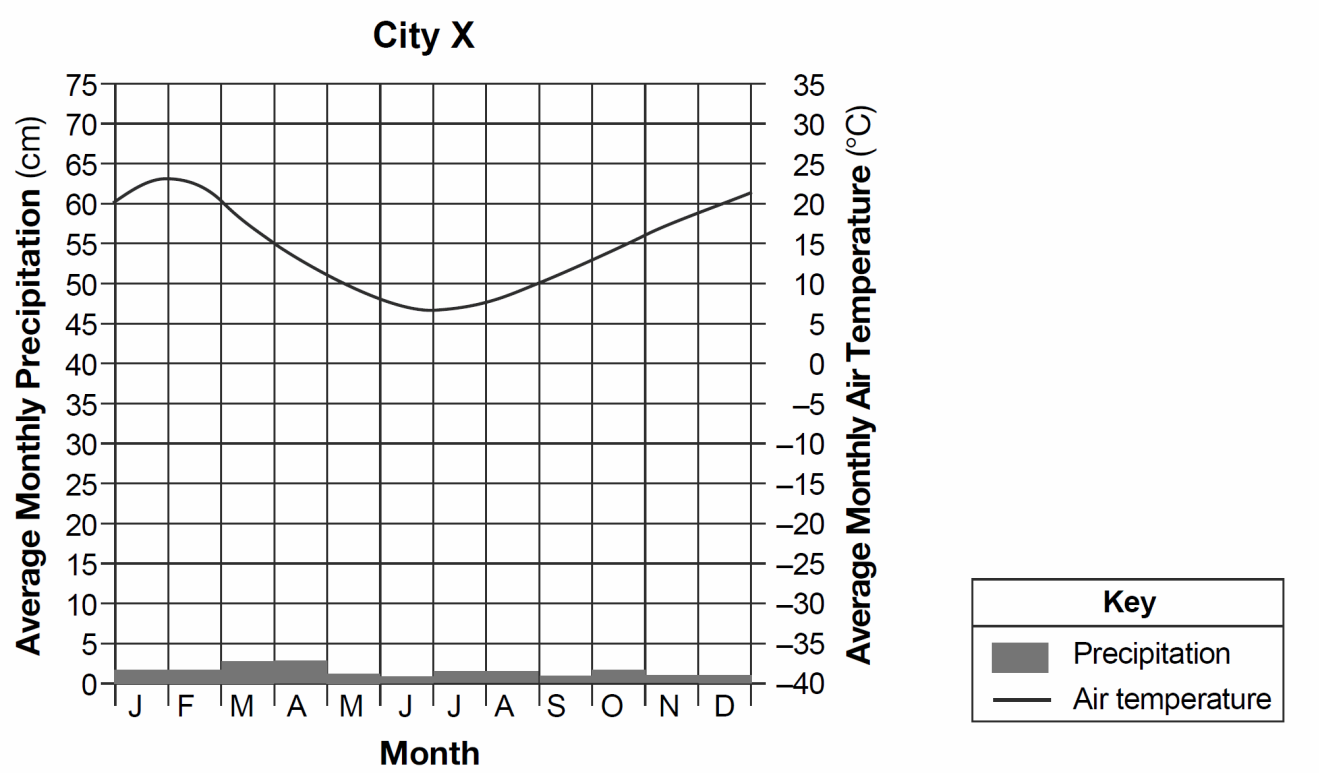
Base your answers to questions **6** and **7** on the diagram below, which shows the windward and leeward sides of a mountain range. Arrows show the movement of air over a mountain. Points *A* and *B* represent locations at sea level on Earth's surface.



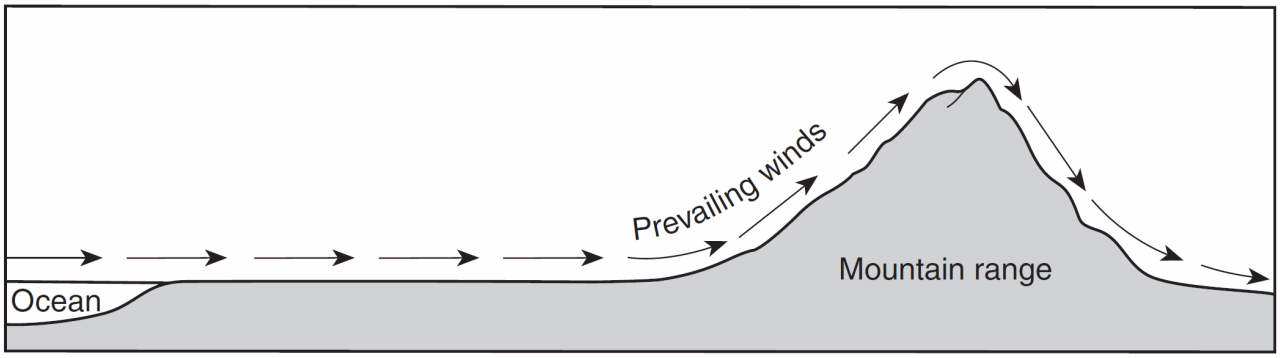
6. Compared to the temperature and relative humidity of the air at point *A*, describe how the temperature and relative humidity of the air are different as the air arrives at point *B*.

7. Explain why air cools as it rises up this mountain.

Base your answers to questions **8** and **9** on the climate graph below, which shows the average monthly precipitation and average monthly air temperatures at city *X*. City *X* is located near a mountain range in the Southern Hemisphere.



8. Below state whether the climate of city *X* is dry or wet. Then, on the cross section, place an **X** on Earth's surface to indicate the most likely location of city *X*.



9. What evidence shown on the graph indicates that city *X* is located in the Southern Hemisphere?

Base your answers to questions **10** through **12** on the paragraph below, which describes some factors that affect Earth's climate.

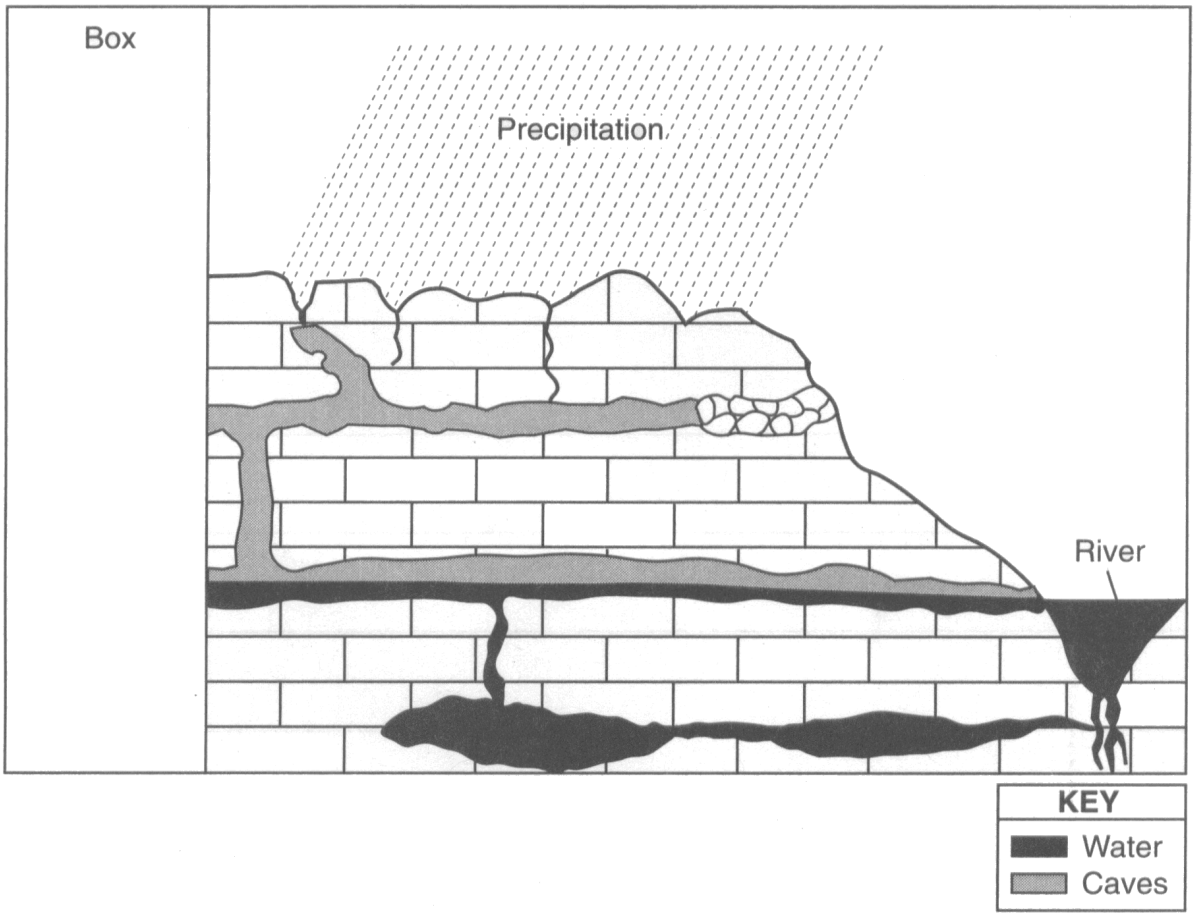
Earth's climate is in a delicate state of balance. Many factors affect climate. Any small change in the factors may lead to long-term cooling or warming of Earth's atmosphere. For example, during the last 100 years, measurements have shown a gradual increase in atmospheric carbon dioxide. This change has been linked to an increase in Earth's average atmospheric temperature. Variations in the tilt of Earth's axis have been similarly linked to the occurrence of ice ages. Both the increases in temperature and the occurrence of ice ages have been linked to changes in global sea level.

10. State what would happen to the average summer and winter temperatures in New York State if the tilt of Earth's axis were to decrease from $23\frac{1}{2}^{\circ}$ to 20°.

11. State *one* way that the recent increase in average global temperature can cause changes in ocean water level.

12. State *one* reason for the increase in the amount of carbon dioxide in Earth's atmosphere during the last 100 years.

Base your answers to questions **13** through **15** on the cross section below, which shows limestone bedrock with caves.



13. Identify *one* source of pollution caused by human activity that contributes to the precipitation becoming more acidic.

14. In the empty box on the left side of the cross section above, draw a horizontal line to indicate the level of the water table.

15. The precipitation in this area is becoming more acidic. Explain why acid rain weathers limestone bedrock.

Base your answers to questions **16** and **17** on the data table below and on your knowledge of Earth science. The data table shows the average monthly discharge, in cubic feet per second, for a stream in New York State.

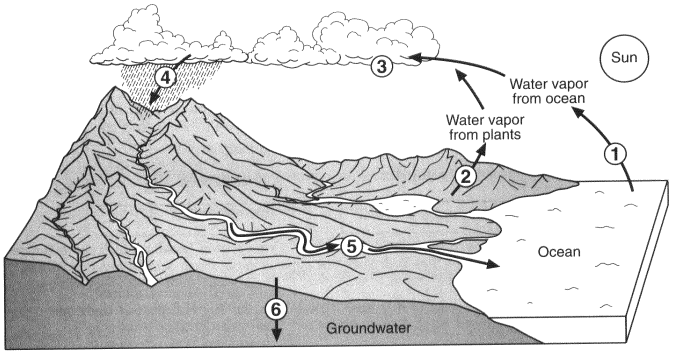
Data Table

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
Discharge (ft^3/sec)	48	52	59	66	62	70	72	59	55	42	47	53

16. Explain *one* possible reason why this stream's discharge in April is usually greater than this stream's discharge in January.

17. State the relationship between this stream's discharge and the amount of suspended sediment that can be carried by this stream.

18. 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	

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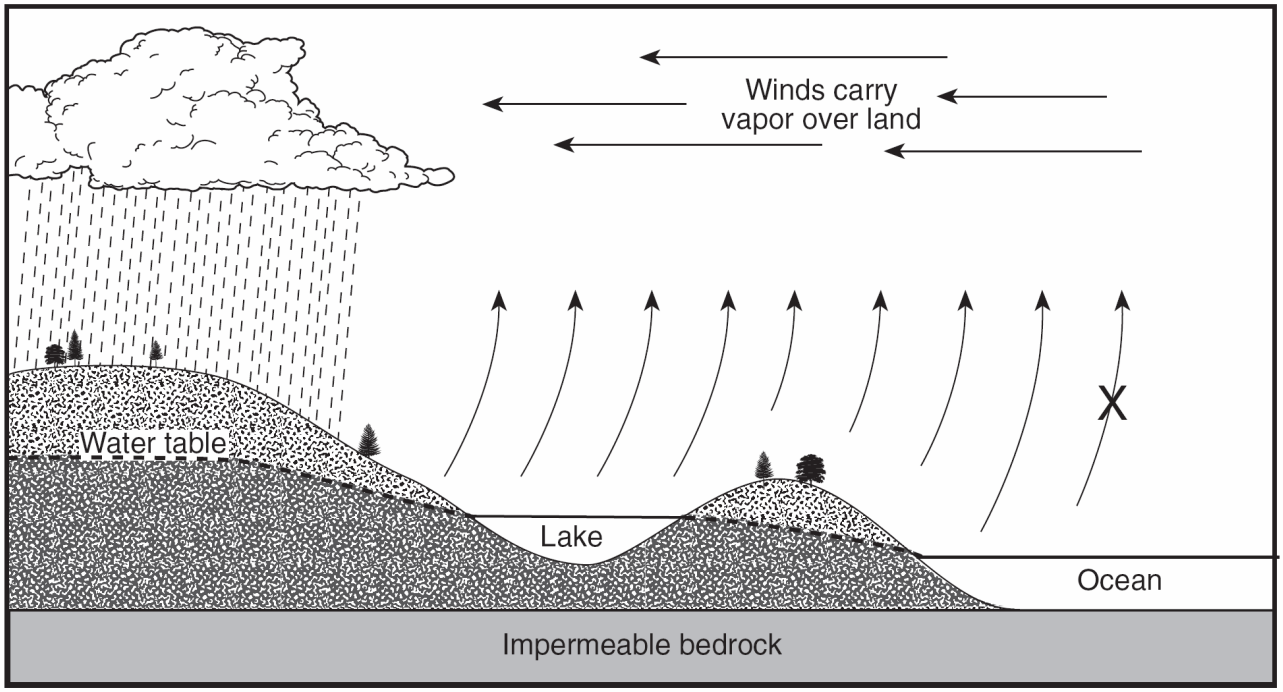
Base your answers to questions **19** and **20** on cross section below, which shows the general pattern of water movement in the water cycle. Letter **X** represents a water-cycle process.



19. Explain *one* role of plants in the water cycle.

20. Describe the process of condensation.