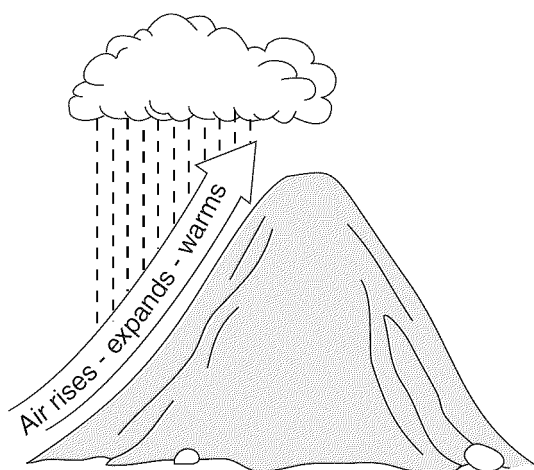


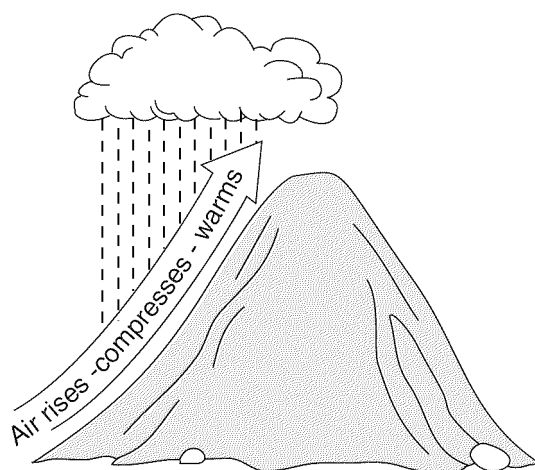
1. Which diagram best illustrates how air rising over a mountain produces precipitation?

(1)



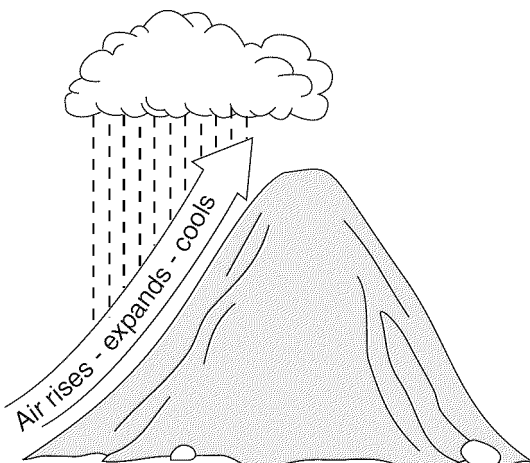
Mountain

(3)



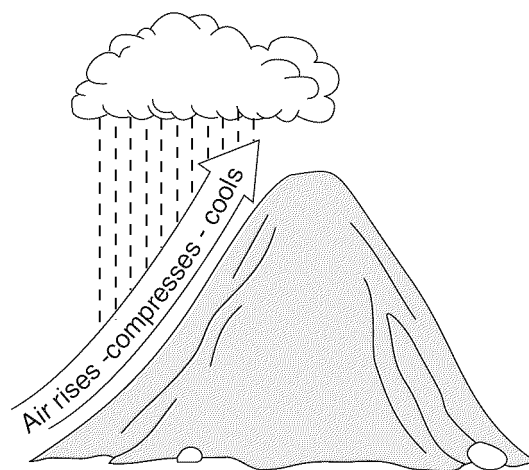
Mountain

(2)



Mountain

(4)

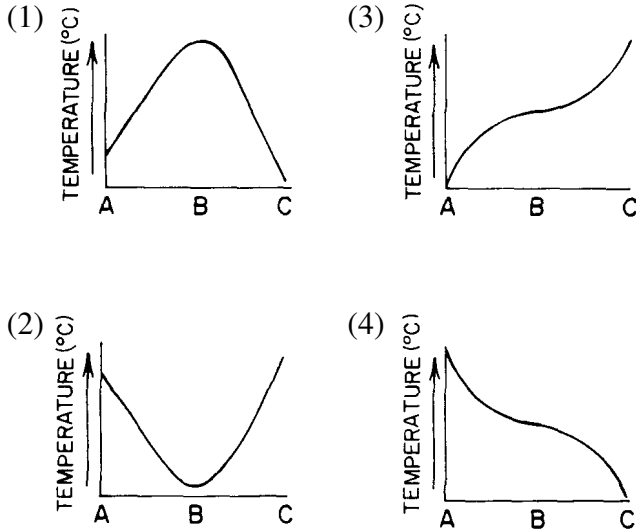
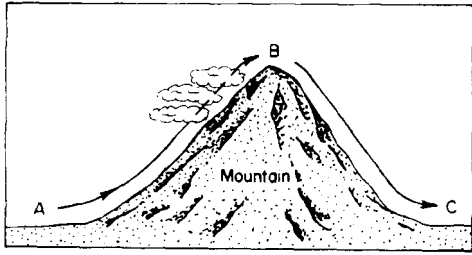


Mountain

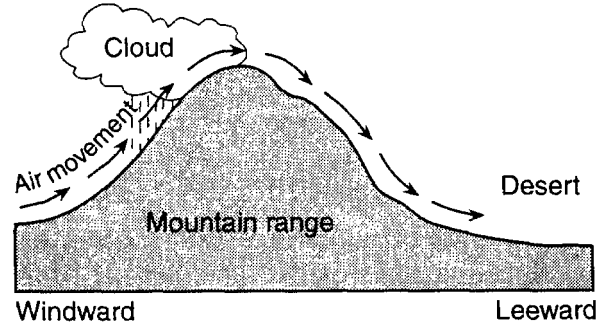
2. As a parcel of air rises, its temperature will

- (1) decrease due to expansion
- (2) decrease due to compression
- (3) increase due to expansion
- (4) increase due to compression

3. The diagram below shows the flow of air over a mountain from point A to point C. Which graph best shows the approximate temperature change of the rising and descending air due to the adiabatic process?



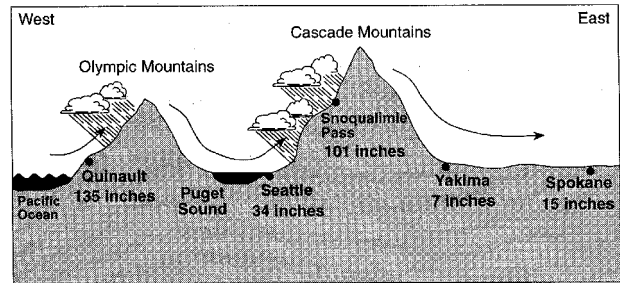
4. A desert often forms on the leeward side of a mountain range, as shown in the cross section below.



After most of the moisture is removed from the air on the windward side, deserts form on the leeward side because the sinking air

- (1) compresses and warms
- (2) compresses and cools
- (3) expands and warms
- (4) expands and cools

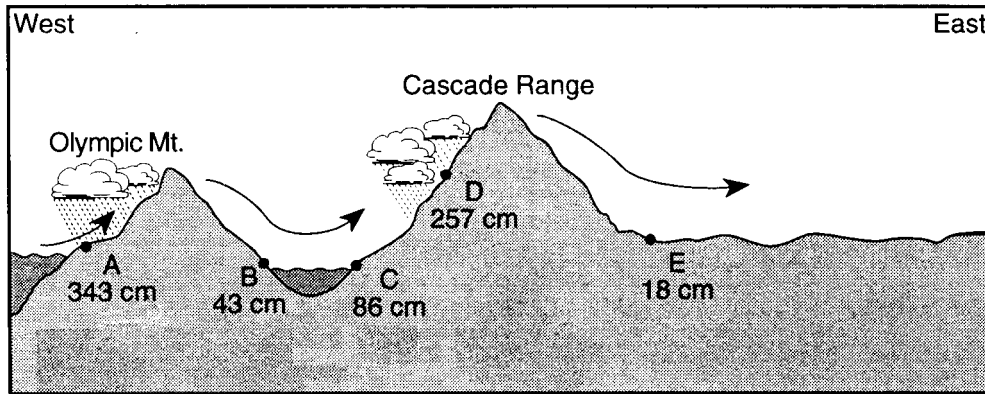
5. The cross section below shows several locations in the State of Washington and the annual precipitation at each location. The arrows represent the prevailing wind direction.



Why do the windward sides of these mountain ranges receive more precipitation than the leeward sides?

- (1) Sinking air compresses and cools.
- (2) Sinking air expands and cools.
- (3) Rising air compresses and cools.
- (4) Rising air expands and cools.

6. The diagram below shows the average yearly precipitation, in centimeters, at locations *A* through *E* across the State of Washington. Arrows indicate the direction of prevailing winds.

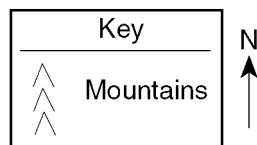
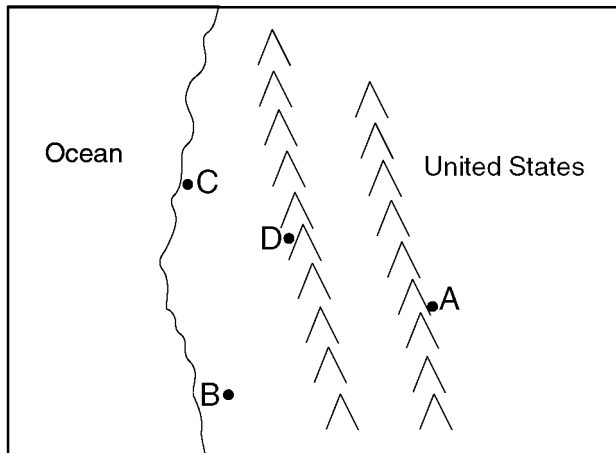


(Not drawn to scale)

Which statement best explains why location *B* and location *E* receive relatively low average yearly precipitation?

- (1) These locations are on the leeward side of mountain ranges.
- (2) These locations are on the windward side of mountain ranges.
- (3) These locations receive more insolation than the other locations.
- (4) These locations receive less insolation than the other locations.

7. The map below shows the location of four cities, *A*, *B*, *C*, and *D*, in the western United States where prevailing winds are from the southwest.



Which city most likely receives the *least* amount of average yearly precipitation?

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

Base your answers to questions 8 through 11 on the magazine article and diagram below.

Lake-Effect Snow

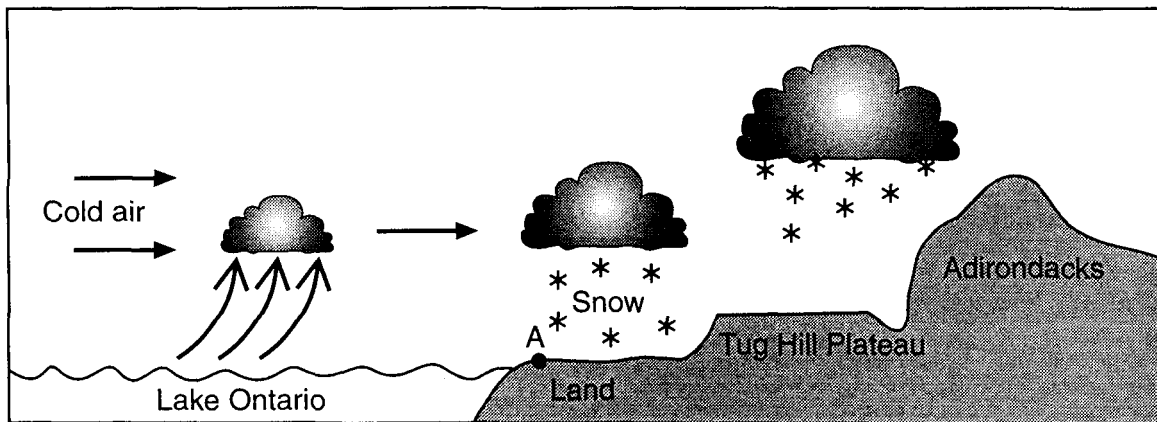
During the cold months of the year, the words "lake effect" are very much a part of the weather picture in many locations in New York State. Snow created by the lake effect may represent more than half the season's snowfall in some areas.

In order for heavy lake-effect snow to develop, the temperature of the water at the surface of the lake must be higher than the temperature of the air flowing over the water. The higher the water temperature and the lower the air temperature, the greater the potential for lake-effect snow.

A lake-effect storm begins when air flowing across the lake is warmed as it comes in close contact with the water. The warmed air rises and takes moisture along with it. This moisture, which is water vapor from the lake, is turned into clouds as it encounters much colder air above. When the clouds reach the shore of the lake, they deposit their snow on nearby land. A typical lake-effect storm is illustrated in the diagram below.

The area most likely to receive snow from a lake is called a "snowbelt." Lake Ontario's snowbelt includes the counties along the eastern and southeastern ends of the lake. Because the lake runs lengthwise from west to east, the prevailing westerly winds are able to gather the maximum amount of moisture as they flow across the entire length of the lake. There can be lake-effect snowfall anywhere around the lake, but the heaviest and most frequent snowfalls occur near the eastern shore.

In parts of the snowbelt, the lake effect combines with a phenomenon known as orographic lifting to produce some very heavy snowfalls. After cold air has streamed over the length of Lake Ontario, it moves inland and is forced to climb the slopes of the Tug Hill Plateau and the Adirondack Mountains, resulting in very heavy snowfall.

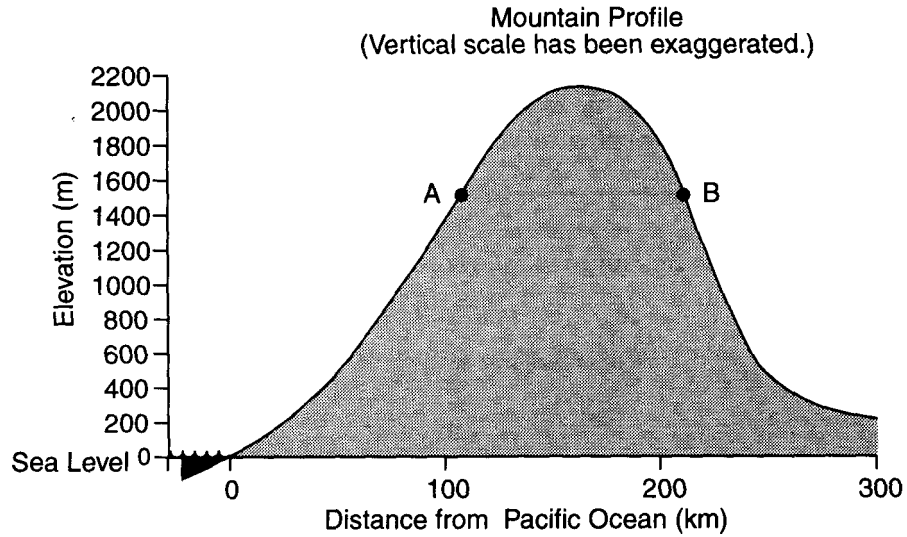


8. State why very heavy snowfall occurs in the Tug Hill Plateau region.
9. State the relationship that must exist between water temperature and air temperature for lake-effect snow to develop.
10. State why locations east and southeast of Lake Ontario are more likely to receive lake-effect snow than are locations west of the lake.
11. State the name of the New York State landscape region that includes location A shown in the diagram. (See page 2 of your Reference Tables!)

12. Base your answer to the following question on the data table and profile below. The data table gives the average annual precipitation for locations *A* and *B*. The profile represents a mountain in the western United States. Points *A* and *B* are locations on different sides of the mountain.

Data Table

Location	Average Annual Precipitation (cm)
<i>A</i>	120
<i>B</i>	35



State one probable reason for the difference in average annual precipitation between location *A* and location *B*.

Answer Key1. 2 2. 1 3. 2 4. 1 5. 4 6. 1 7. 1

8. rising or cooling air or increased condensation or orographic lifting

9. *Examples:* – The temperature of the lake water at the surface must be higher than the temperature of the air flowing over the water. – Water temperature is warmer than air temperature.

10. *Examples:* – prevailing winds – Lake Ontario runs lengthwise from west to east, and the prevailing winds pick up moisture as they flow across the entire length.

11. Erie-Ontario Lowlands

12. *Examples:* – Location A is on the windward side of the mountain – At location B, air is warming by compression.
