



## ANSWER KEY

### Exercise: 1

**Instructions:** Many forms of precipitation exist. In this exercise, you will learn about the mechanisms that produce the various types of precipitation. Specific conditions must exist in order for precipitation to occur; the presence of clouds does not guarantee precipitation. The conditions also determine which type of precipitation that may fall. By doing this exercise you will understand how conditions can influence precipitation.

1. In order for a cloud droplet to form and exist, \_\_\_\_\_ must exceed \_\_\_\_\_.  
In order for a cloud droplet to form and exist, condensation must exceed evaporation.
2. How can condensation occur when the relative humidity is below 100%? Condensation will occur on some condensation nuclei that have a higher attraction for water. As a result, condensation can occur below saturation.
3. What mechanisms beside condensation are important for precipitation to occur? The collision-coalescence process (occurs in warm clouds) is important, droplets can become electrically charged and stick together as a result of electrical attraction. The ice crystal process (occurs in cold clouds) is also important, water molecules bond to make a rigid form within supercooled liquid water droplets, which form ice embryos. These ice embryos enhance the freezing process.
4. What is “Cloud seeding” and how does this process influence clouds? Cloud seeding refers to an artificial method to enhance precipitation. Silver iodide is dropped in a cloud. The silver iodide acts as ice nuclei on which water then condenses. This process works on cold clouds that are deficient in ice crystals.
5. What is the difference between rain, snow, and hail? How do these types of precipitation form? (Click on links at very top of Precipitation Patterns page) Rain is liquid drop precipitation with a diameter of at least .5 mm. Snow consists of frozen ice crystals falling to the ground. Hail is produced when large frozen raindrops act as accretion nuclei that keep re-circulating in and out of a cloud.
6. How does sleet form? Sleet is melted snow that re-freezes into ice crystals.

Examine the map on the Precipitation Patterns page. Go up to the tool bar and click on “layers” (looks like a stack of papers). Remove all layers except ‘Idaho’ and then add them back one at a time, starting with 70-80 inches of rain, then 60-70 inches, and going all the way to zero.

7. Where does most of the precipitation occur in Idaho? Most of the precipitation occurs in the northern areas of Idaho.
8. Did you notice a pattern that developed with respect to how much rainfall there was? As higher levels of rainfall were clicked on, it can be observed that these higher levels occurred in the north.
9. Why is there more rain in some areas compared to other areas? The difference in rainfall is the result of the topography. High mountains can cause a rain shadow. This rain shadow effect is why there is so little rain in the southern parts of Idaho.