

SOLUTIONS TO THE MODULE #8 STUDY GUIDE

1. a. Updraft – A current of rising air
- b. Insulator – A substance that does not conduct electricity very well
2. The Bergeron process begins with cold clouds, while the collision-coalescence theory begins with warm clouds.
3. The Bergeron process describes precipitation from the top of cumulonimbus clouds, while the collision-coalescence theory describes precipitation from nimbostratus. Remember, the top of a cumulonimbus cloud is near the top of the troposphere, where water freezes. Nimbostratus clouds, however, are much lower, so they are the most likely to be warm.
4. Only the size of the raindrop. Drizzle has very small water droplets, while raindrops are bigger.
5. Sleet is much smaller than hail, but both of them are frozen before they hit the ground. Freezing rain, on the other hand, is liquid until it hits a cold surface. Hail and sleet also form differently, since hail is recycled through the cloud several times while sleet is not.
6. The dew point is coldest on the second morning. It takes a colder temperature to form dew from air that is less humid or is lower in pressure.
7. The first stage is the cumulus stage, where there is only an updraft and no precipitation. In the second stage, the mature stage, there are updrafts, downdrafts, and precipitation. The last stage, the dissipation stage, has only downdrafts and precipitation.
8. The thunderstorm is probably made up of several cells. The mature stage of a typical thunderstorm cell lasts no longer than 30 minutes.
9. The charge imbalance first forms in the cumulonimbus cloud, and it is due to water droplets or ice crystals rubbing against each other in glancing collisions.
10. The return stroke is responsible for the majority of light and sound in a lightning bolt.
11. Thunder is the result of superheated air traveling out from the lightning bolt in waves. When those waves hit our eardrum, we interpret them as sound. Since the waves are violent, the sound is loud.
12. Lightning strikes tall things because the positive charges in the ground tend to pile up in a tall object, since that's how they can get closest to the cloud.
13. Sheet lightning is cloud-to-cloud lightning while lightning bolts are cloud-to-ground lightning. The lightning bolts, therefore, hit the ground, while sheet lightning never does.
14. A cumulonimbus cloud must be present to form a tornado. The vortex will not form without the strong updraft of a thunderstorm cell that forms a cumulonimbus cloud.

15. The stages of a tornado are: the whirl stage, the organizing stage, the mature stage, the shrinking stage, and the decaying stage. The tornado is most destructive in its mature stage.
16. A hurricane starts out as a tropical disturbance, then becomes a tropical depression, then a tropical storm, and finally a tropical cyclone. The wind speeds in the storm determine in which classification a storm belongs.
17. Within the eye, a hurricane is calm. It is often sunny as well.
18. The Coriolis effect causes hurricanes in different hemispheres to rotate differently.
19. The atmospheric pressures are nearly equivalent. Even though they are far away from each other, they are very close to the same isobar, indicating nearly equal pressure.
20. The atmospheric pressure in Houston is lower. Houston is 3 isobars from the "L" symbol, while Atlanta is 4 isobars away. This means Atlanta's pressure is higher.
21. The occluded front has triangles and ovals on the same side. That's nearest San Francisco.
22. The warm front has only ovals on it, and the ovals point in the direction of travel. Thus, Indianapolis will get warmer weather soon.
23. Houston, TX is near a cold front, so it might have thunderstorms right now.
24. San Francisco, CA is behind an occluded front. Since the weather described is that of an occluded front, San Francisco might have just experienced such weather.