

Chapter 7 Review: Precipitation

- How do the sizes of a condensation nucleus, a cloud droplet, and a rain droplet compare?
- How does the volume of a raindrop compare to the volume of a cloud droplet?
- Why does water evaporate more easily from a curved surface than a flat surface?
- Why is a wettable condensation nucleus more effective than an unwettable nucleus?
- What is the "solute effect" as it applies to hygroscopic condensation nuclei?
- What is the collision-coalescence process for forming a raindrop? Why do we say "collision-coalescence" and not just "collision"?

Falling Raindrops

- What does "terminal velocity" mean?
- Which falls faster, little droplets or big droplets?
- How does a cloud droplet grow to raindrop size in a cloud when no ice is present?
- Sometimes a falling droplet does not collide with a droplet beneath it. What happens?
- Why doesn't every pair of droplets that collides coalesce? What maximizes the likelihood of merger?
- What kind of clouds produce the biggest raindrops? Why?
- What is the shape of a raindrop?

Freezing in the Air

- What substances act as ice nuclei?
- At what temperatures are ice nuclei effective?
- At what temperature are you sure to have ice in the atmosphere?
- Is evaporation easier from liquid water or from ice?
- Is saturation vapor pressure higher over liquid water or ice? Why?
- What is the "ice crystal process" for creating an ice crystal big enough to fall?
- For the ice crystal process to work well, how many liquid droplets should there be for each ice crystal?

Ice Crystals

- The ice crystal process was first suggested by Alfred Wegener. He is more famous for what other theory?
- Which theory of particle growth was proposed first, collision-coalescence or ice crystal process? Why?
- Which process is responsible for most of the precipitation occur in mid-latitudes?
- Why are 6-sided snowflakes (dendrites) the most common ice crystal in the atmosphere?
- How do falling ice crystals get bigger? Smaller?

Cloud Seeding and Miscellaneous

- "Cloud seeding" attempts to increase precipitation by what process?
- What would happen if you injected dry ice crystals (-78°C) into a cold cloud? What is the advantage of seeding clouds with silver iodide rather than dry ice?
- Is it ever too cold to snow?
- What is sleet? How does it form?
- What is freezing rain? How does it form?
- Why does hail, the biggest of all ice crystals, form in summer, not winter?
- What else do you know about hail?

Measuring Precipitation

- How much is a trace of precipitation?
- Describe a standard rain gauge.
- What is a tipping bucket rain gauge?
- Why is snow depth averaged across several measurements at nearby places rather than using a single depth measurement?
- If you melted an inch of snow, about how much liquid water would you get?
- How can rainfall/snowfall be estimated using radar?