How a Cloud Lets Go

Name: Date: Class:

Read the lesson at myweatherrock.com/journal/explainers/how-a-cloud-lets-go (or the printed copy), then answer below.

Remember

A cloud floats because its droplets are so small that the air wins: they sink slower than the gentlest rising air can lift them. Rain happens when droplets start colliding and merging, growing into drops heavy enough to fall out, and it takes roughly a million cloud droplets' worth of water to build one ordinary raindrop. Drop size is the whole difference between drizzle and a downpour, and drop size is set by how long the cloud can keep a drop up there growing.

Questions

1. A cloud is made of water, and water is heavy. Why does the cloud float?

- ☐ A. Clouds are lighter than air, like a balloon
- ☐ B. Its droplets are so small that air drag beats their weight, and rising air outruns their slow sink
- ☐ C. The wind holds clouds up

2. How does a cloud droplet become a raindrop?

- ☐ A. It swells up on its own like a sponge
- ☐ B. It collides with and swallows other droplets, roughly a million of them
- ☐ C. It freezes solid and drops

3. What is the real difference between drizzle and a downpour?

- ☐ A. The size of the drops
- ☐ B. The temperature of the rain
- ☐ C. The time of day

4. Why do thunderstorms drop the fattest rain?

- ☐ A. Lightning heats the drops and swells them
- ☐ B. Strong updrafts keep drops in the cloud longer, so they grow through more collisions before they fall
- ☐ C. Storm clouds hold saltier water

5. Why is there a biggest possible raindrop?

- ☐ A. Clouds run out of water
- ☐ B. Air flattens big drops and splits them in two around a few millimeters wide
- ☐ C. Gravity stops pulling on drops past a certain size

In your own words

Two rains fall on your street in one day: a morning drizzle and an afternoon downpour. Explain what was different about the drops before they ever left the cloud.

Answer key (for the teacher)

1. A cloud is made of water, and water is heavy. Why does the cloud float?

B. Its droplets are so small that air drag beats their weight, and rising air outruns their slow sink — Each droplet sinks slower than the gentle updrafts inside the cloud rise. The cloud is heavy in total, but it is made of pieces too small to fall.

2. How does a cloud droplet become a raindrop?

B. It collides with and swallows other droplets, roughly a million of them — Slightly bigger droplets fall slightly faster, overtake their neighbors, and merge. Every capture speeds the process up, and about a million droplets' worth of water makes one ordinary raindrop.

3. What is the real difference between drizzle and a downpour?

A. The size of the drops — Drizzle is drops under half a millimeter that left the cloud early. A downpour is fat, fast drops that spent a long time growing. Same water, different careers.

4. Why do thunderstorms drop the fattest rain?

B. Strong updrafts keep drops in the cloud longer, so they grow through more collisions before they fall — A strong updraft shoves growing drops back upstairs lap after lap. Whatever finally falls out had to get heavy enough to beat that elevator.

5. Why is there a biggest possible raindrop?

B. Air flattens big drops and splits them in two around a few millimeters wide — Falling drops flatten into a bun shape, and past a few millimeters the air tears them apart. Each half starts over, so the rain stays drop-sized.
