

The Layers of the Atmosphere

Name: _____

Date: _____

Class: _____

Read the lesson at myweatherrock.com/journal/explainers/layers-of-the-atmosphere (or the printed copy), then answer below.

Remember

The atmosphere is sorted into five layers by what the temperature does as you climb: troposphere, stratosphere, mesosphere, thermosphere, exosphere. Temperature falls, then rises, then falls, then rises again, and each reversal marks a boundary called a pause. Almost all weather happens in the troposphere, the thin bottom layer whose ceiling sits anywhere from just under four miles up at the poles to twelve miles up at the equator.

Questions

1. Which layer holds almost all of the weather?

- ☐ A. The stratosphere
- ☐ B. The troposphere
- ☐ C. The mesosphere

2. Why does a big thunderstorm spread out into a flat anvil instead of building higher?

- ☐ A. It runs out of water
- ☐ B. It reaches the tropopause, where temperature stops falling and rising air loses its push
- ☐ C. The jet stream flattens it from above

3. How high is the top of the troposphere?

- ☐ A. The same everywhere, about 7 miles
- ☐ B. From just under four miles at the poles to 11 or 12 miles at the equator
- ☐ C. Exactly 31 miles

4. The thermosphere can reach 3,600 F. What would it feel like to be there?

- ☐ A. Searing hot
- ☐ B. Bitterly cold
- ☐ C. About room temperature

5. What is a pause, in this context?

- ☐ A. A gap with no air in it
- ☐ B. A boundary between layers, where the thermal characteristics change fastest
- ☐ C. The moment a storm stops growing

In your own words

An airliner cruises near the top of the troposphere. Explain why the ride is usually smoother just above that boundary than just below it.

Answer key (for the teacher)

1. Which layer holds almost all of the weather?

B. The troposphere — The troposphere is the lower atmosphere, and almost all weather occurs in it. Its temperature falls with height, which is what lets air rise and build clouds.

2. Why does a big thunderstorm spread out into a flat anvil instead of building higher?

B. It reaches the tropopause, where temperature stops falling and rising air loses its push — Above the tropopause the temperature increases with height, putting warm air over cool. That kills vertical motion, so the updraft spreads sideways.

3. How high is the top of the troposphere?

B. From just under four miles at the poles to 11 or 12 miles at the equator — NOAA gives 11 to 12 miles at the equator, five and a half miles at 50 degrees north and south, and just under four miles at the poles.

4. The thermosphere can reach 3,600 F. What would it feel like to be there?

B. Bitterly cold — Temperature measures the energy of individual molecules, and up there the molecules are so scarce that the total heat delivered to your skin would be tiny. It would feel bitterly cold.

5. What is a pause, in this context?

B. A boundary between layers, where the thermal characteristics change fastest — Each layer is bounded by a pause: the tropopause, stratopause, mesopause, and thermopause, where the greatest changes in temperature, composition, movement, and density occur.