

Can you take a few minutes to answer a few questions about the AP Central website? This will give us the information we need to help give the AP community the support you need.

Sure, I will help

"Weather or Not": AP Environmental Science and the Atmosphere

Understanding the Basics of the Atmosphere

AP Environmental Science is a broad subject that involves the study of the interactions among the atmosphere, hydrosphere, biosphere, and lithosphere. Topics such as air pollution, the ozone hole, and climate change are important parts of any environmental science course. But in order to truly understand and appreciate these topics, students need to have a basic understanding of the atmosphere itself. So just how much do students need to know about the characteristics of the atmosphere as part of AP Environmental Science?

First, your students need to know the **basic composition and temperature structure of the atmosphere**. Having knowledge of the major gases and their relative abundance in the atmosphere will help them think through problems relating to topics such as air pollution, the ozone hole, and global warming. There are many books and websites with information on the origin, evolution, and current composition of the Earth's atmosphere. A good resource is maintained by Florida State University's Department of Meteorology as part of their Florida EXPLORES! (<http://www.met.fsu.edu/explores/skillmenu.html>) program. This resource has links to topics such as atmospheric composition and the hydrologic cycle, and even a little information about the history of meteorology.

Because the **layers of the atmosphere** are typically referred to by their names based on temperature structure (troposphere, stratosphere, mesosphere, and thermosphere), make sure your students are familiar with this terminology when it's time for the exam. Along with these terms, the general temperature trend in each layer is important to understand. That is, students should know that temperature generally decreases or increases in a given layer and why it does so. Professor Michael Ritter of the University of Wisconsin-Stevens Point has an online physical geography text (http://www.earthonlinemedia.com/ebooks/tpe_3e/contents.html) that you can access; the Earth System and Atmosphere Outline section has modules on atmospheric composition and structure. Students should also understand how and why the temperature in the atmosphere changes with height. This section (http://www4.uwsp.edu/geo/faculty/ritter/geog101/textbook/atmosphere/atmospheric_structure.html) of Ritter's online text has good graphics and is easy for students to understand.

Finally, your students need to be familiar with the **general circulation of the atmosphere** and **basic atmosphere–ocean interactions**. Knowledge of the large-scale motions of the atmosphere will help students understand issues such as why industrial activity in the central U.S. can result in acid precipitation in Northeastern U.S. and Canada, and why a warming of the waters in the central and eastern Pacific Ocean (the El Niño phenomenon) can affect weather patterns around the world. The fundamentals of global circulation can be found at PhysicalGeography.net (<http://www.physicalgeography.net/fundamentals/7p.html>).

Lab Exercises

The GLOBE (<http://www.globe.gov/>) (Global Learning and Observations to Benefit the Environment) program offers meteorological information and experiments, as well as information on soils, water, and the biosphere. The GLOBE program also provides professional development opportunities for teachers. You can access educational information such as the *GLOBE Teacher's Guide*, which has individual measurement protocols, learning activities, data sheets, and field guides.

Resources

A short list of topics and helpful websites:

Climate Change

- EPA's climate change site (<http://www.epa.gov/climatechange/>)
- NASA's climate change site (<http://climate.nasa.gov/>)

Stratospheric Ozone

- *USA TODAY* Article, "Understanding the Antarctic ozone hole" (<http://www.usatoday.com/weather/wozone0.htm>)
- United Nations Environment Programme (http://www.unep.org/ozone/Public_Information/index.asp)

Acid Deposition

- EPA's Acid Rain Site (<http://www.epa.gov/acidrain/>)
- EPA's Clean Air Markets—Acid Rain Program (<http://www.epa.gov/airmarkets/>)

El Niño (also known as El Niño–Southern Oscillation and ENSO)

- El Niño simulation (http://esminfo.prenhall.com/science/geoanimations/animations/26_NinoNina.html)
- CyberSleuth Kids

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