Planetary Atmospheres: Earth and the Other Terrestrial Worlds
What are the main constituents of Earth's atmosphere?

a) hydrogen and helium  
b) nitrogen and oxygen  
c) oxygen and carbon dioxide  
d) oxygen and carbon monoxide  
e) water vapor and oxygen
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Why is atmospheric pressure less on top of a mountain than at sea level?

a) It is cooler in the mountains.
b) Denser air sinks to sea level; the air on mountains is lighter.
c) The pressure at every height in the atmosphere equals the weight of the air above it.
d) none of the above
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If there was no greenhouse effect, Earth

a) would be warmer than it is today.
b) would have a thicker atmosphere.
c) would be colder than freezing.
d) would have no protection from ultraviolet radiation.
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b) It would go down.
c) It wouldn't change.
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If Earth didn't have an atmosphere, what would happen to its temperature?

a) It would go up a little.
b) It would go up a lot.
c) It would go down a little.
d) It would go down a lot.
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Which of the following correctly states the layers of Earth's atmosphere from closest to the surface to closest to space?

a) troposphere, stratosphere, exosphere, thermosphere
b) stratosphere, exosphere, thermosphere, troposphere
c) troposphere, stratosphere, thermosphere, exosphere
d) thermosphere, troposphere, stratosphere, exosphere
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Infrared radiation emitted by Earth's surface

a) heats the troposphere from below.
b) causes convection.
c) causes weather (storms).
d) all of the above
e) none of the above
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The stratosphere is heated by

a) warm air rising from the troposphere.
b) ultraviolet light from the Sun.
c) convection.
d) X-rays.
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Chapter 10

The sky is blue because

a) of the reflection of the oceans.
b) blue is the color of oxygen gas.
c) blue is the color of nitrogen gas.
d) the blue light in sunlight scatters more than the red light.
e) of clouds.
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What protects Earth from the high energy particles shot from the Sun (the solar wind)?

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d) the magnetosphere
e) the Van Allen radiation belts
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What affects the global circulation pattern of Earth's atmosphere?

a) hot air from the equator rising, cool air at the poles falling
b) Earth's rotation
c) convection
d) coriolis forces
e) all of the above
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What effects long-term climate change?

a) changes in the Sun's brightness
b) changes in Earth's reflectivity
c) change in the tilt of Earth's axis
d) changes is greenhouse gas abundance
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a) gas accreted from the solar nebula
b) comets
c) gas released from interior rocks (outgassing)
d) evaporation from ice
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Where did the hydrogen in Earth's atmosphere go?

a) We never had any.
b) It escaped into space.
c) It dissolved in the oceans and was incorporated into rocks.
d) none of the above
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Why do we think Mars was once warmer and wetter?

a) It has plenty of volcanoes to outgas an atmosphere.
b) It doesn't have strong magnetic field to protect from solar wind stripping.
c) There is evidence it once had liquid water. It is too cold for that now.
d) all of the above
e) A and C
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What is the main reason that Venus is warmer than Earth?

a) Venus is closer to the Sun than Earth.
b) Venus has a higher reflectivity than Earth.
c) Venus has a lower reflectivity than Earth.
d) The greenhouse effect is much higher on Venus than on Earth.
e) Human presence on Earth has led to declining temperatures.
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Suppose we could magically replace Venus' actual atmosphere with an atmosphere identical to Earth's. Could liquid water exist on its surface?

a) No, the runaway greenhouse effect would ensure that liquid water would immediately evaporate.

b) No, the low pressure would ensure that liquid water would immediately evaporate.

c) Yes, the surface temperature would be well below the boiling point of water.

d) Yes, the conditions would be exactly as on Earth.

e) Yes, but only at the poles.
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Suppose that, somehow, all plants died out. What would happen to the oxygen in our atmosphere?

a) The oxygen would eventually be used up in oxidation reactions with the surface.

b) The oxygen would initially decrease, but as greenhouse gases and temperature increased, it would recover to its normal value.

c) The oxygen would increase as plants would not exist to remove it from the atmosphere.

d) Plants grow by intaking carbon and therefore the oxygen content would be unaffected.
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Surprising discovery? - A planet in another solar system that has an Earth-like atmosphere with plentiful oxygen, but no life of any kind.

a) Plausible. Life requires far more than oxygen to exist.

b) Plausible. The oxygen may have been transported there by cometary impacts.

c) Implausible. Oxygen is highly reactive and its presence in an atmosphere suggests replenishment by a living organism of some sort.

d) Implausible. Oxygen is essential to life.
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