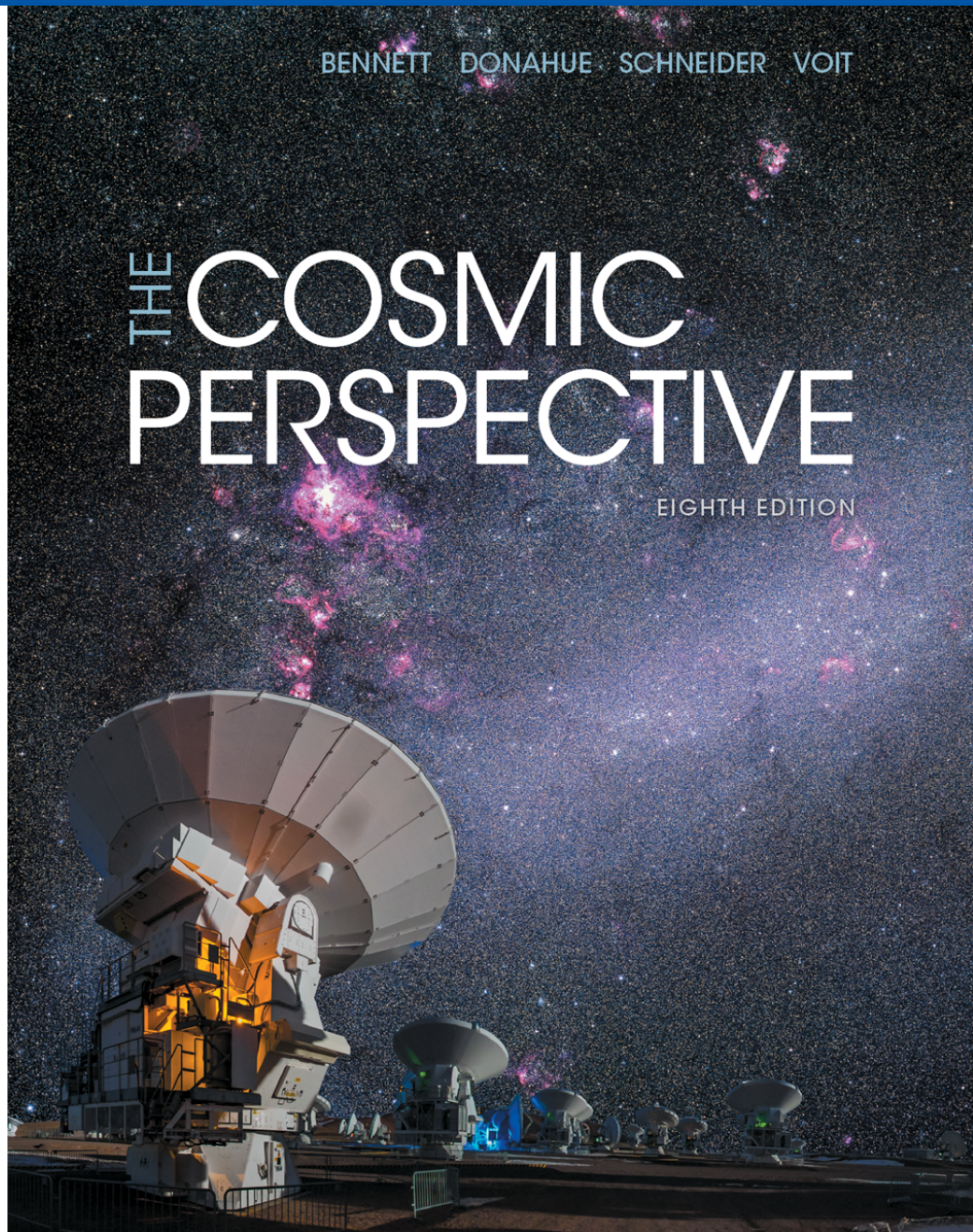
Reading Quiz Clickers

Chapter 10: Planetary Atmospheres: Earth and the Other Terrestrial Worlds



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10.1 Atmospheric Basics

- What is an atmosphere?
- How does the greenhouse effect warm a planet?
- Why do atmospheric properties vary with altitude?

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Which lists the planets in order of increasing atmospheric surface pressure?

a) Mars, Venus, Earth
b) Mars, Earth, Venus
c) Earth, Venus, Mars
d) Earth, Mars, Venus
e) none of the above

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Why does atmospheric pressure decrease with altitude?

a) The atmosphere gets thinner, so its weight decreases as altitude increases.
b) The temperature of the atmosphere decreases.
c) The temperature of the atmosphere increases.
d) The molecules in the upper atmosphere are lighter.

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How does the greenhouse effect work?

a) Greenhouse gases reflect light that reflects off the surface back toward the surface.
b) Greenhouse gases absorb light that reflects off the surface.
c) Greenhouse gases reflect thermal radiation that is emitted by the surface.
d) Greenhouse gases absorb thermal radiation that is emitted by the surface.
e) Greenhouse gases prevent convection, trapping heat near the surface.

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10.2 Weather and Climate

- What creates wind and weather?
- What factors can cause long-term climate change?
- How does a planet gain or lose atmospheric gases?

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What, primarily, heats the stratosphere?

a) ultraviolet light
b) X-rays
c) thermal radiation (infrared light)
d) convection from the troposphere
e) A and B

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Why is the sky blue?

a) Air molecules absorb red light and reflect blue light.
b) Air molecules absorb all wavelengths of light and emit blue light.
c) Air molecules scatter blue light more than they scatter red light.
d) The atmosphere is reflecting the blue color of the oceans.

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How does the Coriolis effect affect the circulation of a hurricane (low pressure system) in the northern hemisphere?

a) It causes inflowing air to deviate to the right, resulting in counterclockwise rotation.
b) It causes inflowing air to deviate to the right, resulting in clockwise rotation.
c) It causes inflowing air to deviate to the left, resulting in counterclockwise rotation.
d) It causes inflowing air to deviate to the left, resulting in clockwise rotation.
e) The Coriolis effect has no effect on the circulation of a hurricane.

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Which of the following is *not* a factor in producing long-term climate change?

a) The brightness of the Sun slowly changes.
b) The distances of the planets from the Sun slowly change.
c) The axis tilts of planets slowly change.
d) The abundance of greenhouse gas in the atmosphere changes.
e) The reflectivity of a planet may change.

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What is the primary source of gas for thick terrestrial planet atmospheres?

a) evaporation and sublimation from surface ices and liquids
b) impacts on the surface by the solar wind
c) meteoroid impacts on the surface
d) volcanic outgassing

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Which of the following increases atmospheric loss by thermal escape?

a) increasing the mass of the gas particles
b) increasing the temperature of the atmosphere
c) increasing the escape velocity of the planet
d) all of the above

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10.3 Atmospheres of the Moon and Mercury

- Do the Moon and Mercury have any atmosphere?

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What is the source of the exospheres of the Moon and Mercury?

a) evaporation and sublimation from surface ices and liquids
b) impacts on the surface by solar wind particles
c) meteoroid impacts on the surface
d) volcanic outgassing
e) B and C

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10.4 Atmospheric History of Mars

- What is Mars like today?
- Why did Mars change?

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How do seasons on Mars differ from seasons on Earth?

a) They are less extreme because of Mars's smaller axis tilt.
b) They are more extreme because of Mars's greater axis tilt.
c) They are less extreme because of Mars's larger orbit.
d) Martian seasons are significantly impacted by its orbital eccentricity.
e) Seasons on Earth and Mars are basically the same.

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If all the ice in Mars's polar caps were melted, how deep an ocean would it make?

a) about 1 cm
b) about 10 cm
c) about 1 m
d) about 10 m
e) about 100 m

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How does a magnetosphere affect a terrestrial planet atmosphere?

a) It protects the upper atmosphere from the solar wind.
b) It protects the upper atmosphere from X-rays.
c) It redistributes energy from the poles to the equator.
d) all of the above
e) It has no effect on the atmosphere.

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What is the primary reason why Mars lost most of its atmosphere?

a) Its atmosphere condensed onto the poles and froze into the soil because Mars is farther from the Sun.
b) It lost its atmosphere to space after losing its magnetic field.
c) Its small size prevented it from holding onto its atmosphere.
d) Its interior cooled so volcanic outgassing stopped.
e) all of the above

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10.5 Atmospheric History of Venus

- What is Venus like today?
- How did Venus get so hot?

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What is the primary constituent of Venus's atmosphere?

a) nitrogen (N_2)
b) oxygen (O_2)
c) water (H_2O)
d) carbon monoxide (CO)
e) carbon dioxide (CO_2)

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Which of the following did not contribute to Venus's runaway greenhouse effect?

a) Venus is closer to the Sun leading to higher temperatures.
b) Water evaporated, leading to higher temperatures and more evaporation.
c) Due to its slow rotation, its magnetic field failed to prevent heating of the atmosphere by the solar wind.
d) High temperatures and the absence of water caused carbon dioxide to outgas from rocks and enter the atmosphere, leading to higher temperatures.

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10.6 Earth's Unique Atmosphere

- How did Earth's atmosphere end up so different?
- Why does Earth's climate stay relatively stable?
- How is human activity changing our planet?

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Where is most of the Earth's carbon dioxide?

a) in the atmosphere
b) in the oceans
c) in the rainforests
d) in rocks

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What happens to CO_2 in the Earth's atmosphere during "snowball Earth" periods?

a) The amount of CO_2 increases because of the large amount of CO_2 present in the global ice sheets.
b) The amount of CO_2 increases because outgassed CO_2 cannot be dissolved in the frozen oceans.
c) The amount of CO_2 decreases because the cold temperatures cause CO_2 to condense out into the ice.
d) The amount of CO_2 decreases because there is less volcanic activity during the cold "snowball Earth" periods.

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How does the current level of atmospheric CO_2 compare to historic levels?

a) It is 30% higher than it has been anytime in the last 100 years.
b) It is 30% higher than it has been anytime in the last 10,000 years.
c) It is 30% higher than it has been anytime in the last million years.
d) it is 30% higher than it has been anytime in the last 4 billion years.

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How do computer models demonstrate that human activity is affecting the global climate?

a) Models that include increases in greenhouse gases due to human activity match observed global temperature changes.

b) Models of CO_2 production by burning of fossil fuels match the observed increases in atmospheric CO_2.

c) Models that include increases in greenhouse gases due to human activity match observed changes in arctic sea ice.

d) Models of CO_2 production by burning of fossil fuels match observed changes in CO_2 dissolved in the ocean.

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