***Understanding Weather and Climate, 7e* (Aguado)**
Chapter 2 Solar Radiation and the Seasons

1) Power is
A) the same as energy.
B) the rate at which energy is released.
C) measured in joules.
D) the ability to do work.
Answer: B
Diff: 1
Section: 2.1 Energy
Bloom's Taxonomy: Knowledge
Learning Outcome: 2.1 Identify the types of energy and how they can be transmitted.
National Geo Std: 7
Glob Sci Outcome: G1

2) This method of energy transfer does not involve the net movement of particles or waves in the direction of energy transfer:
A) conduction.
B) convection.
C) radiation.
D) All three of the above involve the movement of particles.
Answer: A
Diff: 1
Section: 2.1 Energy
Bloom's Taxonomy: Knowledge
Learning Outcome: 2.1 Identify the types of energy and how they can be transmitted.
National Geo Std: 7
Glob Sci Outcome: G1

3) Convection
A) does not involve an actual transfer of energy.
B) involves potential energy only.
C) involves mixing in a fluid.
D) is another term for conduction.
Answer: C
Diff: 1
Section: 2.1 Energy
Bloom's Taxonomy: Knowledge
Learning Outcome: 2.1 Identify the types of energy and how they can be transmitted.
National Geo Std: 7
Glob Sci Outcome: G1

4) Radiation
A) is more like conduction than like convection.
B) supplies only a minute portion of the earth's energy.
C) cannot be thought of as consisting of particles.
D) can be transferred through a vacuum.
Answer: D
Diff: 1
Section: 2.1 Energy
Bloom's Taxonomy: Knowledge
Learning Outcome: 2.1 Identify the types of energy and how they can be transmitted.
National Geo Std: 7
Glob Sci Outcome: G1

5) Energy
A) occurs at only one scale.
B) occurs at more than one scale.
C) occurs only at scales that are very small.
D) occurs only at scales that are very large.
Answer: B
Diff: 1
Section: 2.1 Energy
Bloom's Taxonomy: Knowledge
Learning Outcome: 2.1 Identify the types of energy and how they can be transmitted.
National Geo Std: 7
Glob Sci Outcome: G1

6) Energy transfer processes include
A) only those processes that can be seen.
B) energy that is transferred at the molecular level only.
C) conduction, convection, and radiation.
D) only the energy interactions between the earth and the atmosphere.
Answer: C
Diff: 1
Section: 2.1 Energy
Bloom's Taxonomy: Knowledge
Learning Outcome: 2.1 Identify the types of energy and how they can be transmitted.
National Geo Std: 7
Glob Sci Outcome: G1

7) Energy is traditionally defined as the ability to
A) do work.
B) create movement.
C) cause acceleration.
D) none of the above
Answer: A
Diff: 1
Section: 2.1 Energy
Bloom's Taxonomy: Knowledge
Learning Outcome: 2.1 Identify the types of energy and how they can be transmitted.
National Geo Std: 7
Glob Sci Outcome: G1

8) About one part in _____ of the Sun's total energy is transferred to Earth.
A) one hundred
B) one million
C) one billion
D) two billion
Answer: D
Diff: 1
Section: 2.1 Energy
Bloom's Taxonomy: Knowledge
Learning Outcome: 2.1 Identify the types of energy and how they can be transmitted.
National Geo Std: 7
Glob Sci Outcome: G1

9) The standard unit of energy in the International System (SI) used in scientific applications is the
A) Watt.
B) Ampere.
C) Joule.
D) Ohm.
Answer: C
Diff: 1
Section: 2.1 Energy
Bloom's Taxonomy: Knowledge
Learning Outcome: 2.1 Identify the types of energy and how they can be transmitted.
National Geo Std: 7
Glob Sci Outcome: G1

10) An electron orbiting a hydrogen atom
A) is restricted to a single energy state.
B) cannot be removed from that atom unless that atom combines with another hydrogen atom to form a hydrogen molecule.
C) has greater energy when it is further away from the nucleus.
D) can absorb and emit photons of nearly any wavelength.
Answer: C
Diff: 1
Section: 2.1 Energy
Bloom's Taxonomy: Knowledge; Comprehension
Learning Outcome: 2.1 Identify the types of energy and how they can be transmitted.
National Geo Std: 7
Glob Sci Outcome: G1; G2

11) The relationship between kinetic energy and potential energy is
A) one must have potential energy before kinetic energy can be realized.
B) kinetic energy is proportional to the potential energy.
C) potential energy is the storage state of kinetic energy.
D) in practice, all of a potential energy source is never fully transformed to usable kinetic energy.
E) All of the above are true.
Answer: E
Diff: 1
Section: 2.1 Energy
Bloom's Taxonomy: Knowledge; Comprehension
Learning Outcome: 2.1 Identify the types of energy and how they can be transmitted.
National Geo Std: 7
Glob Sci Outcome: G1; G2

12) Radiation, as an energy transfer mechanism, is especially important because
A) radiation energy can travel without an intervening medium.
B) everything radiates.
C) radiation provides us with visible light.
D) all of the above
Answer: D
Diff: 1
Section: 2.1 Energy
Bloom's Taxonomy: Knowledge; Comprehension
Learning Outcome: 2.2 Explain the laws governing the amount and type of radiation emitted by objects.
National Geo Std: 7
Glob Sci Outcome: G1; G2

13) Heat transfer through fluid mixing is called _____.
Answer: convection
Diff: 1
Section: 2.1 Energy
Bloom's Taxonomy: Knowledge
Learning Outcome: 2.1 Identify the types of energy and how they can be transmitted.
National Geo Std: 7
Glob Sci Outcome: G1

14) Nearly all of the energy available on Earth comes from the _____.
Answer: Sun
Diff: 1
Section: 2.1 Energy
Bloom's Taxonomy: Knowledge
Learning Outcome: 2.1 Identify the types of energy and how they can be transmitted.
National Geo Std: 7
Glob Sci Outcome: G1

15) List three forms of kinetic energy and five forms of potential energy.
Answer: Kinetic energy: light and other forms of radiation; heat, motion, electrical power.
Potential energy: food, firewood, explosives, gasoline, batteries, high pressure, reservoir behind hydroelectric dam.
Diff: 1
Section: 2.1 Energy
Bloom's Taxonomy: Knowledge; Comprehension
Learning Outcome: 2.1 Identify the types of energy and how they can be transmitted.
National Geo Std: 7
Glob Sci Outcome: G1; G2

16) Describe the three processes of energy transfer.
Answer: Conduction: movement of heat through a substance without appreciable movement of molecules. Convection: The transfer of heat by the mixing of a fluid. Radiation: Propogation of energy through empty space.
Diff: 1
Section: 2.1 Energy
Bloom's Taxonomy: Knowledge; Comprehension
Learning Outcome: 2.1 Identify the types of energy and how they can be transmitted.
National Geo Std: 7
Glob Sci Outcome: G1; G2

17) This is a form of kinetic energy:
A) a charged battery not in use.
B) firewood.
C) water behind a dam.
D) electrical power.
Answer: D
Diff: 2
Section: 2.1 Energy
Bloom's Taxonomy: Knowledge; Comprehension; Application
Learning Outcome: 2.1 Identify the types of energy and how they can be transmitted.
National Geo Std: 7
Glob Sci Outcome: G1; G2; G7

18) This is a form of potential energy:
A) electromagnetic radiation.
B) boiling water.
C) food.
D) a water wheel in motion.
Answer: C
Diff: 2
Section: 2.1 Energy
Bloom's Taxonomy: Knowledge; Comprehension; Application
Learning Outcome: 2.1 Identify the types of energy and how they can be transmitted.
National Geo Std: 7
Glob Sci Outcome: G1; G2; G7

18) Your hand feels cold when you hold a cold can of soda. Energy is being transferred from your hand to the can by
A) convection.
B) conduction.
C) radiation.
Answer: B
Diff: 2
Section: 2.1 Energy
Bloom's Taxonomy: Application
Learning Outcome: 2.1 Identify the types of energy and how they can be transmitted.
National Geo Std: 7
Glob Sci Outcome: G1; G2; G9

19) Warm air rises. This is an example of energy transfer by
A) convection.
B) conduction.
C) radiation.
Answer: A
Diff: 2
Section: 2.1 Energy
Bloom's Taxonomy: Analysis

Learning Outcome: 2.1 Identify the types of energy and how they can be transmitted.
National Geo Std: 7
Glob Sci Outcome: G1; G2

20) Ultraviolet, visible, and infrared are all types of radiation with different
A) gravity.
B) wavelengths.
C) potential energy.
D) latent heat.
Answer: B
Diff: 2
Section: 2.1 Energy
Bloom's Taxonomy: Analysis
Learning Outcome: 2.2 Explain the laws governing the amount and type of radiation emitted by objects.
National Geo Std: 7
Glob Sci Outcome: G1; G2

21) A heavy winter coat keeps you warm by
A) conducting heat to your body.
B) preventing your body from losing energy by radiation.
C) preventing your body from losing energy by conduction.
Answer: B
Diff: 3
Section: 2.1 Energy
Bloom's Taxonomy: Synthesis
Learning Outcome: 2.2 Explain the laws governing the amount and type of radiation emitted by objects.
National Geo Std: 7
Glob Sci Outcome: G1; G2; G9

22) Object A is twice as warm as object B. Object A
A) emits twice as much energy as object B.
B) emits half as much energy as object B.
C) emits four times as much energy as object B.
D) emits 16 times as much energy as object B.
Answer: D
Diff: 3
Section: 2.1 Energy
Bloom's Taxonomy: Synthesis
Learning Outcome: 2.2 Explain the laws governing the amount and type of radiation emitted by objects.
National Geo Std: 7
Glob Sci Outcome: G1; G2

23) The measurement used to specify wavelengths is called the
A) micrometer.
B) macrometer.
C) nanometer.
D) decameter.
Answer: A
Diff: 1
Section: 2.2 Characteristics of Radiation
Bloom's Taxonomy: Knowledge
Learning Outcome: 2.2 Explain the laws governing the amount and type of radiation emitted by objects.
National Geo Std: 7
Glob Sci Outcome: G1

24) Black bodies
A) can only approximate the Stefan-Boltzmann law.
B) are hypothetical; they don't actually exist.
C) emit the same amount of energy regardless of their temperatures.
D) do not emit radiation as well as gray bodies do.
Answer: B
Diff: 1
Section: 2.2 Characteristics of Radiation
Bloom's Taxonomy: Knowledge
Learning Outcome: 2.2 Explain the laws governing the amount and type of radiation emitted by objects.
National Geo Std: 7
Glob Sci Outcome: G1

25) The Stefan-Boltzmann law
A) gives energy intensities in watts per square meter.
B) demonstrates that a cooler body will radiate with greater intensity than will a hotter body.
C) does not apply to black bodies.
D) is derived from Wien's law.
Answer: A
Diff: 1
Section: 2.2 Characteristics of Radiation
Bloom's Taxonomy: Knowledge
Learning Outcome: 2.2 Explain the laws governing the amount and type of radiation emitted by objects.
National Geo Std: 7
Glob Sci Outcome: G1

26) Emissivity
A) can have values greater than one.
B) will always be less than one for any object that is not a black body.
C) is typically .1 or below for most natural surfaces encountered on Earth.
D) is constant for the atmosphere.
Answer: B
Diff: 1
Section: 2.2 Characteristics of Radiation
Bloom's Taxonomy: Knowledge
Learning Outcome: 2.2 Explain the laws governing the amount and type of radiation emitted by objects.
National Geo Std: 7
Glob Sci Outcome: G1

27) The largest energy transfer in the solar spectrum occurs in the
A) x-ray part of the spectrum.
B) ultraviolet part of the spectrum.
C) visible part of the spectrum.
D) infrared part of the spectrum.
E) radio wave part of the spectrum.
Answer: C
Diff: 1
Section: 2.2 Characteristics of Radiation
Bloom's Taxonomy: Knowledge
Learning Outcome: 2.2 Explain the laws governing the amount and type of radiation emitted by objects.
National Geo Std: 7
Glob Sci Outcome: G1

28) Bodies that emit some percentage of the maximum amount of radiation possible at a given temperature are called
A) blackbodies.
B) black holes.
C) graybodies.
D) partials.
Answer: C
Diff: 1
Section: 2.2 Characteristics of Radiation
Bloom's Taxonomy: Knowledge
Learning Outcome: 2.2 Explain the laws governing the amount and type of radiation emitted by objects.
National Geo Std: 7
Glob Sci Outcome: G1

29) At the speed of light, energy from the sun takes how much time to reach the Earth?
A) 1 second
B) 30 seconds
C) 8 minutes
D) 24 minutes
Answer: C
Diff: 1
Section: 2.2 Characteristics of Radiation
Bloom's Taxonomy: Knowledge
Learning Outcome: 2.2 Explain the laws governing the amount and type of radiation emitted by objects.
National Geo Std: 7
Glob Sci Outcome: G1

30) The single factor that determines how much energy a blackbody radiates is its
A) temperature.
B) mass.
C) volume.
D) density.
Answer: A
Diff: 1
Section: 2.2 Characteristics of Radiation
Bloom's Taxonomy: Knowledge
Learning Outcome: 2.2 Explain the laws governing the amount and type of radiation emitted by objects.
National Geo Std: 7
Glob Sci Outcome: G1

31) The single factor that determines how much energy a blackbody radiates is its
A) size.
B) distance.
C) diameter.
D) temperature.
Answer: D
Diff: 1
Section: 2.2 Characteristics of Radiation
Bloom's Taxonomy: Knowledge
Learning Outcome: 2.2 Explain the laws governing the amount and type of radiation emitted by objects.
National Geo Std: 7
Glob Sci Outcome: G1

32) Which of the following orbit the nuclei of the atom in "shells"?
A) protons
B) photons
C) electrons
D) neutrons
Answer: C
Diff: 1
Section: 2.2 Characteristics of Radiation
Bloom's Taxonomy: Knowledge; Comprehension
Learning Outcome: 2.2 Explain the laws governing the amount and type of radiation emitted by objects.
National Geo Std: 7
Glob Sci Outcome: G1; G2

33) Electromagnetic radiation
A) consists of waves that can vary in amplitude.
B) is relatively rare in the universe.
C) consists of two waves that are 90 degrees out of phase with each other.
D) does not create an electric field.
Answer: A
Diff: 1
Section: 2.2 Characteristics of Radiation
Bloom's Taxonomy: Knowledge; Comprehension
Learning Outcome: 2.2 Explain the laws governing the amount and type of radiation emitted by objects.
National Geo Std: 7
Glob Sci Outcome: G1; G2

34) All of the following are true statements about electromagnetic radiation, except
A) it moves at the speed of light.
B) it is often measured in micrometers.
C) its energy is inversely proportional to its amplitude.
D) its energy does not decrease with distance.
Answer: C
Diff: 1
Section: 2.2 Characteristics of Radiation
Bloom's Taxonomy: Knowledge; Comprehension
Learning Outcome: 2.2 Explain the laws governing the amount and type of radiation emitted by objects.
National Geo Std: 7
Glob Sci Outcome: G1; G2

35) The visible light spectrum is bounded by these two types of radiation:
A) x-ray and thermal infrared.
B) x-ray and radio wave.
C) microwave and gamma ray.
D) ultraviolet and near infrared.
Answer: D
Diff: 1
Section: 2.2 Characteristics of Radiation
Bloom's Taxonomy: Knowledge; Comprehension
Learning Outcome: 2.2 Explain the laws governing the amount and type of radiation emitted by objects.
National Geo Std: 7
Glob Sci Outcome: G1

36) According to Wien's law
A) the wavelength of peak radiation is proportional to the amount of radiation.
B) the Sun's energy intensity peaks in the visible portion of the electromagnetic spectrum.
C) the radiation emitted from Earth must be 4 micrometers or longer.
D) wavelength is proportional to the fourth power of the intensity of radiation.
Answer: B
Diff: 1
Section: 2.2 Characteristics of Radiation
Bloom's Taxonomy: Knowledge; Comprehension
Learning Outcome: 2.2 Explain the laws governing the amount and type of radiation emitted by objects.
National Geo Std: 7
Glob Sci Outcome: G1; G2; G4

37) The Stefan-Boltzmann Law gives the relationship between
A) solar energy and temperature.
B) temperature and long-wave radiation.
C) the intensity of radiation and the temperature of an object.
D) emissivity and wavelength.
Answer: C
Diff: 1
Section: 2.2 Characteristics of Radiation
Bloom's Taxonomy: Knowledge; Comprehension
Learning Outcome: 2.2 Explain the laws governing the amount and type of radiation emitted by objects.
National Geo Std: 7
Glob Sci Outcome: G1; G2; G4

38) Electromagnetic radiation provides energy for
A) the movement of the atmosphere.
B) the growth of plants.
C) the evaporation of water.
D) all of the above
Answer: D
Diff: 1
Section: 2.2 Characteristics of Radiation
Bloom's Taxonomy: Knowledge; Comprehension
Learning Outcome: 2.2 Explain the laws governing the amount and type of radiation emitted by objects.
National Geo Std: 7
Glob Sci Outcome: G1; G2

39) The peak of the Earth's emission is _____, while the sun's peak is 0.5 microns.
A) 0.1 microns
B) 1 micron
C) 10 microns
D) 100 microns
Answer: C
Diff: 1
Section: 2.2 Characteristics of Radiation
Bloom's Taxonomy: Knowledge; Comprehension
Learning Outcome: 2.2 Explain the laws governing the amount and type of radiation emitted by objects.
National Geo Std: 7
Glob Sci Outcome: G1; G2

40) _____ radiation is used to cook food and _____ radiation causes sunburn.
A) Infrared; ultraviolet
B) Microwave; ultraviolet
C) X-ray; infrared
D) Ultraviolet; infrared
Answer: B
Diff: 1
Section: 2.2 Characteristics of Radiation
Bloom's Taxonomy: Knowledge; Comprehension
Learning Outcome: 2.2 Explain the laws governing the amount and type of radiation emitted by objects.
National Geo Std: 7
Glob Sci Outcome: G1; G2

41) A _____ is a perfect emitter of radiation.
Answer: blackbody
Diff: 1
Section: 2.2 Characteristics of Radiation
Bloom's Taxonomy: Knowledge
Learning Outcome: 2.2 Explain the laws governing the amount and type of radiation emitted by objects.
National Geo Std: 7
Glob Sci Outcome: G1

42) The earth's radiation is strongest in this portion of the spectrum, the _____.
Answer: longwave (or infrared) portion
Diff: 1
Section: 2.2 Characteristics of Radiation
Bloom's Taxonomy: Knowledge
Learning Outcome: 2.2 Explain the laws governing the amount and type of radiation emitted by objects.
National Geo Std: 7
Glob Sci Outcome: G1

43) The solar constant is measured in _____.
Answer: watts per square meter
Diff: 1
Section: 2.2 Characteristics of Radiation
Bloom's Taxonomy: Knowledge
Learning Outcome: 2.2 Explain the laws governing the amount and type of radiation emitted by objects.
National Geo Std: 7
Glob Sci Outcome: G1

44) Differences in emissivity of a substance are governed by differences in
A) moisture.
B) pressure.
C) temperature.
D) wind speed.
Answer: C
Diff: 2
Section: 2.2 Characteristics of Radiation
Bloom's Taxonomy: Knowledge; Comprehension; Analysis
Learning Outcome: 2.2 Explain the laws governing the amount and type of radiation emitted by objects.
National Geo Std: 7
Glob Sci Outcome: G1; G2

45) Which of the following has the longest wavelength?
A) thermal infrared
B) radio
C) gamma
D) ultraviolet
Answer: B
Diff: 2
Section: 2.2 Characteristics of Radiation
Bloom's Taxonomy: Knowledge; Comprehension; Analysis
Learning Outcome: 2.2 Explain the laws governing the amount and type of radiation emitted by objects.
National Geo Std: 7
Glob Sci Outcome: G1; G2; G4

46) If object A is at 400 K and object B is at 800 K, then the radiation intensity of object A will be this amount of that the radiation intensity of object B:
A) one-half.
B) one-fourth.
C) one-eighth.
D) one-sixteenth.
Answer: D
Diff: 2
Section: 2.2 Characteristics of Radiation
Bloom's Taxonomy: Knowledge; Comprehension; Analysis; Application
Learning Outcome: 2.2 Explain the laws governing the amount and type of radiation emitted by objects.
National Geo Std: 7
Glob Sci Outcome: G1; G2; G3; G4

47) Define and discuss the following terms involving radiation: electric wave, magnetic wave, wavelength, wave amplitude, wave speed, black body, Stefan-Boltzmann law, Wien's law, electromagnetic bands.
Answer: Electric wave: the electric component of an electromagnetic wave. magnetic wave: the magnetic component of an electromagnetic wave. wavelength: distance between wave crests. wave amplitude: the height of a wave. wave speed: the speed of light. black body: a hypothetical object that emits the maximum possible radiation at every wavelength. Stefan-Boltzmann law: the intensity of energy radiated by a blackbody increases according to the fourth power of its absolute temperature. Wien's law: hotter objects radiate energy at shorter wavelengths than do cooler bodies. electromagnetic bands: a grouping of wavelength rangesranges.
Diff: 2
Section: 2.2 Characteristics of Radiation
Bloom's Taxonomy: Knowledge; Comprehension; Analysis
Learning Outcome: 2.2 Explain the laws governing the amount and type of radiation emitted by objects.
National Geo Std: 7
Glob Sci Outcome: G1; G2

48) Discuss the various factors which affect the absorption and emission of photons by a hydrogen atom.
Answer: Electrons orbit the nucleus of atoms in prescribed zones called shells. Upon receiving energy in the form of a photon, the electron is in an excited state and jumps to its next shell. When the electron returns to its ground state, it releases energy in the form of a photon. The energy emitted by such atoms must occur in discrete packets; at the atomic scale, units of energy are divided into individual parcels.
Diff: 2
Section: 2.2 Characteristics of Radiation
Bloom's Taxonomy: Knowledge; Comprehension; Analysis
Learning Outcome: 2.2 Explain the laws governing the amount and type of radiation emitted by objects.
National Geo Std: 7
Glob Sci Outcome: G1; G2

49) Describe the sections of the Sun and the important activities that happen in each.
Answer: In the innermost portion of the Sun consists of its core, the radiation zone, and the con- vection zone. The core, is characterized by extremely high temperatures (about 15 million °C, or 27 million °F) and high densi- ties lead to the energy-generating process of nuclear fusion. Energy initially travels outward from the core as electromagnetic energy through the radiation zone and into the base of the convection zone, where upwelling of the solar gases transfers the energy to the relatively thin solar surface. The layer of the Sun that radi- ates most of the energy away from the Sun is called the photosphere. It is the layer of the Sun we actually see as the solar disk.
Diff: 2
Section: 2.2 Characteristics of Radiation
Bloom's Taxonomy: Knowledge; Comprehension; Analysis
Learning Outcome: 2.2 Explain the laws governing the amount and type of radiation emitted by objects.
National Geo Std: 7
Glob Sci Outcome: G1; G2

50) Why is it not completely accurate to describe the energy coming from the Sun as visible radiation?
Answer: Although the peak emission of solar radiation is in the visible portion of the spectrum, the Sun emits radiation across the full range of the spectrum from gamma rays to radio waves.
Diff: 2
Section: 2.2 Characteristics of Radiation
Bloom's Taxonomy: Knowledge; Comprehension; Analysis; Application
Learning Outcome: 2.2 Explain the laws governing the amount and type of radiation emitted by objects.
National Geo Std: 7
Glob Sci Outcome: G1; G2; G7

51) Explain why ultraviolet (UV) radiation causes sunburn and infrared (IR) radiation does not.
Answer: The amount of energy delivered is determined by wavelength; shorter wavelengths are more energetic. Ultraviolet radiation is associated with shorter wavelengths and can deliver more energy to exposed skin than can infrared radiation.
Diff: 2
Section: 2.2 Characteristics of Radiation
Bloom's Taxonomy: Knowledge; Comprehension; Application
Learning Outcome: 2.2 Explain the laws governing the amount and type of radiation emitted by objects.
National Geo Std: 7
Glob Sci Outcome: G1; G2; G5

52) Choose the correct listing of radiation from the LONGEST wavelengths to the shortest wavelengths:
A) radio, gamma rays, ultraviolet, visible, infrared, x-rays.
B) gamma rays, radio, ultraviolet, infrared, visible, x-rays.
C) x-rays, ultraviolet, infrared, gamma rays, visible, radio.
D) radio, infrared, visible, ultraviolet, x-rays, gamma rays.
Answer: D
Diff: 3
Section: 2.2 Characteristics of Radiation
Bloom's Taxonomy: Knowledge; Comprehension; Analysis; Evaluation
Learning Outcome: 2.2 Explain the laws governing the amount and type of radiation emitted by objects.
National Geo Std: 7
Glob Sci Outcome: G1; G2; G3

53) Describe how Wien's law has been applied to the understanding of satellite images that you see on television weather broadcasts.
Answer: The color enhanced satellite images depict the height of cloud tops, which can be used as an indicator of the intensity of precipitation. The images are obtained by measuring the intensity of IR radiation emitted by the cloud tops. Colder surfaces radiate less energy than do warmer objects. Higher clouds tend to be colder than lower level clouds because the temperature in the troposphere decreases with height. The colder cloud tops imply thicker clouds and therefore identify areas with significant weather.
Diff: 3
Section: 2.2 Characteristics of Radiation
Bloom's Taxonomy: Knowledge; Comprehension; Analysis; Application; Synthesis
Learning Outcome: 2.2 Explain the laws governing the amount and type of radiation emitted by objects.
National Geo Std: 7
Glob Sci Outcome: G1; G2; G5; G7

54) How long does it take for energy generated near the core of the sun by fusion to reach the Earth-atmosphere system as solar radiation?
A) immediately
B) 8 minutes
C) 1 century
D) 1 million years
Answer: D
Diff: 1
Section: 2.3 The Solar Constant
Bloom's Taxonomy: Knowledge
Learning Outcome: 2.3 Identify the solar constant and explain how much energy Earth receives from the Sun.
National Geo Std: 7
Glob Sci Outcome: G1

55) Sunspots
A) are caused by locally intense magnetic fields.
B) appear in the chromosphere.
C) are warmer than the material surrounding them.
D) tend to be less than 100 miles in diameter.
Answer: A
Diff: 1
Section: 2.3 The Solar Constant
Bloom's Taxonomy: Knowledge
Learning Outcome: 2.3 Identify the solar constant and explain how much energy Earth receives from the Sun.
National Geo Std: 7
Glob Sci Outcome: G1

56) Sunspot activity
A) typically varies in number on a roughly eleven-year cycle.
B) was first observed in the late nineteenth century.
C) typically has the same number of sunspots per year.
D) has been conclusively linked to climate changes.
Answer: A
Diff: 1
Section: 2.3 The Solar Constant
Bloom's Taxonomy: Knowledge
Learning Outcome: 2.3 Identify the solar constant and explain how much energy Earth receives from the Sun.
National Geo Std: 7
Glob Sci Outcome: G1

57) Sunspot numbers were lowest in this century:
A) seventeenth century.
B) eighteenth century.
C) nineteenth century.
D) twentieth century.
Answer: A
Diff: 1
Section: 2.3 The Solar Constant
Bloom's Taxonomy: Knowledge
Learning Outcome: 2.3 Identify the solar constant and explain how much energy Earth receives from the Sun.
National Geo Std: 7
Glob Sci Outcome: G1

58) In the innermost portion of the Sun, the core, extremely high temperatures and high densities lead to the energy-creating process of
A) nuclear fission.
B) nuclear fusion.
C) the big bang.
D) nuclear differentiation.
Answer: B
Diff: 1
Section: 2.3 The Solar Constant
Bloom's Taxonomy: Knowledge
Learning Outcome: 2.3 Identify the solar constant and explain how much energy Earth receives from the Sun.
National Geo Std: 7
Glob Sci Outcome: G1

59) Sunspots are associated with the solar
A) core.
B) corona.
C) photosphere.
D) chromosphere.
Answer: C
Diff: 1
Section: 2.3 The Solar Constant
Bloom's Taxonomy: Knowledge
Learning Outcome: 2.3 Identify the solar constant and explain how much energy Earth receives from the Sun.
National Geo Std: 7
Glob Sci Outcome: G1

60) Energy created by the sun travels from the
A) core.
B) corona.
C) photosphere.
D) chromosphere.
Answer: A
Diff: 1
Section: 2.3 The Solar Constant
Bloom's Taxonomy: Knowledge
Learning Outcome: 2.3 Identify the solar constant and explain how much energy Earth receives from the Sun.
National Geo Std: 7
Glob Sci Outcome: G1

61) Temperatures within these features can reach 100 million degrees Kelvin:
A) granules.
B) flares.
C) sunspots.
D) the solar wind.
Answer: B
Diff: 1
Section: 2.3 The Solar Constant
Bloom's Taxonomy: Knowledge
Learning Outcome: 2.3 Identify the solar constant and explain how much energy Earth receives from the Sun.
National Geo Std: 7
Glob Sci Outcome: G1

62) Which of these features are likely to have the highest solar temperatures?
A) sunspots
B) solar flares
C) chromosphere
D) core
Answer: B
Diff: 1
Section: 2.3 The Solar Constant
Bloom's Taxonomy: Knowledge; Comprehension
Learning Outcome: 2.3 Identify the solar constant and explain how much energy Earth receives from the Sun.
National Geo Std: 7
Glob Sci Outcome: G1; G2

63) The Sun's photosphere
A) receives the energy from the Sun's core in a matter of minutes.
B) radiates much of the energy the earth receives.
C) decreases in density closer to the Sun's core.
D) lies above the chromosphere.
Answer: B
Diff: 1
Section: 2.3 The Solar Constant
Bloom's Taxonomy: Knowledge; Comprehension
Learning Outcome: 2.3 Identify the solar constant and explain how much energy Earth receives from the Sun.
National Geo Std: 7
Glob Sci Outcome: G1; G2

64) The Sun's photosphere
A) lies above the Sun's core.
B) lies above the Sun's atmosphere.
C) cannot be viewed by Earth-based observers.
D) affects the earth's hydrosphere.
Answer: D
Diff: 1
Section: 2.3 The Solar Constant
Bloom's Taxonomy: Knowledge; Comprehension
Learning Outcome: 2.3 Identify the solar constant and explain how much energy Earth receives from the Sun.
National Geo Std: 7
Glob Sci Outcome: G1; G2

65) _____ have a fairly regular period of maxima, but the maxima themselves can vary significantly.
Answer: Sunspots
Diff: 1
Section: 2.3 The Solar Constant
Bloom's Taxonomy: Knowledge
Learning Outcome: 2.3 Identify the solar constant and explain how much energy Earth receives from the Sun.
National Geo Std: 7
Glob Sci Outcome: G1

66) The _____ is the upper part of the Sun's atmosphere.
Answer: Corona
Diff: 1
Section: 2.3 The Solar Constant
Bloom's Taxonomy: Knowledge
Learning Outcome: 2.3 Identify the solar constant and explain how much energy Earth receives from the Sun.
National Geo Std: 7
Glob Sci Outcome: G1

67) Explain why the solar "constant" actually varies over time.
Answer: The Sun "flickers" as it burns, so very small variations in solar output occur.
Diff: 1
Section: 2.3 The Solar Constant
Bloom's Taxonomy: Knowledge; Comprehension
Learning Outcome: 2.3 Identify the solar constant and explain how much energy Earth receives from the Sun.
National Geo Std: 7
Glob Sci Outcome: G1; G2

68) The solar constant
A) is the same throughout the solar system.
B) varies inversely with the fourth power of an object's distance from the Sun's surface.
C) is independent of the Stefan-Boltzmann law.
D) is higher for Earth than for Mars.
Answer: D
Diff: 2
Section: 2.3 The Solar Constant
Bloom's Taxonomy: Knowledge; Comprehension; Analysis
Learning Outcome: 2.3 Identify the solar constant and explain how much energy Earth receives from the Sun.
National Geo Std: 7
Glob Sci Outcome: G1; G2; G4; G7

69) The Northern Hemisphere has its maximum tilt toward the Sun on the
A) December solstice.
B) March equinox.
C) September equinox.
D) June solstice.
Answer: D
Diff: 1
Section: 2.4 The Causes of Earth's Seasons
Bloom's Taxonomy: Knowledge
Learning Outcome: 2.4 Recognize the characteristics of Earth’s orbit around the Sun and how they create the seasons.
National Geo Std: 7
Glob Sci Outcome: G1

70) The Tropic of Capricorn is directly under the Sun during the
A) December solstice.
B) June solstice.
C) March equinox.
D) September equinox.
Answer: A
Diff: 1
Section: 2.4 The Causes of Earth's Seasons
Bloom's Taxonomy: Knowledge
Learning Outcome: 2.4 Recognize the characteristics of Earth’s orbit around the Sun and how they create the seasons.
National Geo Std: 7
Glob Sci Outcome: G1

71) The Antarctic Circle has 24 hours of daylight on the
A) March equinox.
B) June solstice.
C) September equinox.
D) December solstice.
Answer: D
Diff: 1
Section: 2.4 The Causes of Earth's Seasons
Bloom's Taxonomy: Knowledge
Learning Outcome: 2.4 Recognize the characteristics of Earth’s orbit around the Sun and how they create the seasons.
National Geo Std: 7
Glob Sci Outcome: G1

72) The Earth is actually the farthest from the sun on
A) January 3rd.
B) April 1st.
C) July 4th.
D) December 25th.
Answer: C
Diff: 1
Section: 2.4 The Causes of Earth's Seasons
Bloom's Taxonomy: Knowledge
Learning Outcome: 2.4 Recognize the characteristics of Earth’s orbit around the Sun and how they create the seasons.
National Geo Std: 7
Glob Sci Outcome: G1

73) Incoming solar radiation is often referred to as
A) conduction.
B) diffused radiation.
C) insolation.
D) albedo.
Answer: C
Diff: 1
Section: 2.4 The Causes of Earth's Seasons
Bloom's Taxonomy: Knowledge
Learning Outcome: 2.4 Recognize the characteristics of Earth's orbit around the Sun and how they create the seasons.
National Geo Std: 7
Glob Sci Outcome: G1

74) At which point during the year can we have 24 hours of daylight and 1 day of 24 of darkness in the northern hemisphere?
A) Arctic Circle
B) North Pole
C) Antarctic Circle
D) Tropic of Capricorn
Answer: A
Diff: 1
Section: 2.4 The Causes of Earth's Seasons
Bloom's Taxonomy: Knowledge
Learning Outcome: 2.4 Recognize the characteristics of Earth's orbit around the Sun and how they create the seasons.
National Geo Std: 7
Glob Sci Outcome: G1

75) Which of the following statements about Earth is NOT true?
A) It has an elliptical orbit.
B) Its rotational axis is pointed toward Polaris.
C) It is closest to the Sun in July.
D) It is closest to the Sun at perihelion.
Answer: C
Diff: 1
Section: 2.4 The Causes of Earth's Seasons
Bloom's Taxonomy: Knowledge; Comprehension
Learning Outcome: 2.4 Recognize the characteristics of Earth's orbit around the Sun and how they create the seasons.
National Geo Std: 7
Glob Sci Outcome: G1; G2

76) The earth's axis of rotation is tilted roughly this number of degrees away from a line perpendicular to the plane of the earth's orbit:
A) 5.3.
B) 11.2.
C) 23.5.
D) 90.
Answer: C
Diff: 1
Section: 2.4 The Causes of Earth's Seasons
Bloom's Taxonomy: Knowledge; Comprehension
Learning Outcome: 2.4 Recognize the characteristics of Earth’s orbit around the Sun and how they create the seasons.
National Geo Std: 7
Glob Sci Outcome: G1; G2

77) If the earth's axis were parallel with its orbital plane around the Sun
A) there would be no significant weather.
B) the South Pole would always be in darkness.
C) the North Pole would always be in darkness.
D) there would be at least one day a year when every spot on Earth would receive 12 hours of daylight.
Answer: D
Diff: 1
Section: 2.4 The Causes of Earth's Seasons
Bloom's Taxonomy: Knowledge; Comprehension
Learning Outcome: 2.4 Recognize the characteristics of Earth’s orbit around the Sun and how they create the seasons.
National Geo Std: 7
Glob Sci Outcome: G1; G2

78) The subsolar point
A) never moves more than 23.5 degrees in a year.
B) is at the Tropic of Cancer on the June solstice.
C) reaches above the Arctic Circle only in summer.
D) is independent of the solar declination.
Answer: B
Diff: 1
Section: 2.4 The Causes of Earth's Seasons
Bloom's Taxonomy: Knowledge; Comprehension
Learning Outcome: 2.4 Recognize the characteristics of Earth’s orbit around the Sun and how they create the seasons.
National Geo Std: 7
Glob Sci Outcome: G1; G2

79) The solar angle
A) is the same at the Arctic Circle and at the equator on the solstices.
B) affects the degree of beam spreading.
C) is lowest in the Northern Hemisphere during its winter.
D) is lowest at the North Pole during its summer.
Answer: B
Diff: 1
Section: 2.4 The Causes of Earth's Seasons
Bloom's Taxonomy: Knowledge; Comprehension
Learning Outcome: 2.4 Recognize the characteristics of Earth's orbit around the Sun and how they create the seasons.
National Geo Std: 7
Glob Sci Outcome: G1; G2

80) On the June solstice
A) the solar declination is 23.5 degrees North.
B) the Southern Hemisphere overall receives more energy than does the Northern Hemisphere.
C) the South Pole experiences 24 hours of daylight.
D) the subsolar point is on the Tropic of Capricorn.
Answer: A
Diff: 1
Section: 2.4 The Causes of Earth's Seasons
Bloom's Taxonomy: Knowledge; Comprehension
Learning Outcome: 2.4 Recognize the characteristics of Earth's orbit around the Sun and how they create the seasons.
National Geo Std: 7
Glob Sci Outcome: G1; G2

81) All of the following about equinoxes is true, except
A) the solar declination is zero degrees.
B) both hemispheres receive the same amount of insolation.
C) every place has 12 hours of daylight.
D) the solar angle at the North Pole is 90 degrees.
Answer: D
Diff: 1
Section: 2.4 The Causes of Earth's Seasons
Bloom's Taxonomy: Knowledge; Comprehension
Learning Outcome: 2.4 Recognize the characteristics of Earth's orbit around the Sun and how they create the seasons.
National Geo Std: 7
Glob Sci Outcome: G1; G2

82) The solar declination angle
A) changes daily.
B) moves from north to south and back again.
C) has a northern most and southern most limit of 23.5 degrees.
D) all of the above
Answer: D
Diff: 1
Section: 2.4 The Causes of Earth's Seasons
Bloom's Taxonomy: Knowledge; Comprehension
Learning Outcome: 2.4 Recognize the characteristics of Earth's orbit around the Sun and how they create the seasons.
National Geo Std: 7
Glob Sci Outcome: G1; G2

83) Define beam depletion.
Answer: A high solar angle allows sunlight to pass through the atmosphere with a relatively short path. Lower sun angles such as those near sunrise and sunset require that the energy pass through more of the atmosphere. This increase in atmospheric mass results in a greater depletion of energy.
Diff: 1
Section: 2.4 The Causes of Earth's Seasons
Bloom's Taxonomy: Knowledge
Learning Outcome: 2.5 Explain three ways in which Earth's changing orientation with respect to the Sun affects the receipt of solar radiation.
National Geo Std: 7
Glob Sci Outcome: G1

84) Day and night have an equal length during a(n) _____.
Answer: equinox
Diff: 1
Section: 2.4 The Causes of Earth's Seasons
Bloom's Taxonomy: Knowledge
Learning Outcome: 2.4 Recognize the characteristics of Earth's orbit around the Sun and how they create the seasons.
National Geo Std: 7
Glob Sci Outcome: G1

85) At the December solstice, the subsolar point is on the _____.
Answer: Tropic of Capricorn
Diff: 1
Section: 2.4 The Causes of Earth's Seasons
Bloom's Taxonomy: Knowledge
Learning Outcome: 2.4 Recognize the characteristics of Earth's orbit around the Sun and how they create the seasons.
National Geo Std: 7
Glob Sci Outcome: G1

86) On the June solstice, the area poleward of the _____ experiences 24 hours of darkness.
Answer: Antarctic Circle
Diff: 1
Section: 2.4 The Causes of Earth's Seasons
Bloom's Taxonomy: Knowledge
Learning Outcome: 2.4 Recognize the characteristics of Earth’s orbit around the Sun and how they create the seasons.
National Geo Std: 7
Glob Sci Outcome: G1

87) Earth's annual trip around the Sun is called _____.
Answer: revolution
Diff: 1
Section: 2.4 The Causes of Earth's Seasons
Bloom's Taxonomy: Knowledge
Learning Outcome: 2.4 Recognize the characteristics of Earth’s orbit around the Sun and how they create the seasons.
National Geo Std: 7
Glob Sci Outcome: G1

88) Explain why it is cold in the Northern Hemisphere when the Earth is closest to the Sun.
Answer: The orientation of the hemisphere with regard to the Sun is the main cause of the seasons, not the varying Earth-Sun distance
Diff: 1
Section: 2.4 The Causes of Earth's Seasons
Bloom's Taxonomy: Knowledge; Comprehension
Learning Outcome: 2.4 Recognize the characteristics of Earth’s orbit around the Sun and how they create the seasons.
National Geo Std: 7
Glob Sci Outcome: G1; G2

89) What are the characteristics of the earth's orbit around the Sun and Earth's rotation on its axis?
Answer: Earth orbits the Sun once every 365¼ days as if it were riding along a flat plane. This is called revolution. In addition to its revolution, Earth also undergoes a spinning motion called rotation. Rotation occurs every 24 hours (23 hours and 56 minutes, to be exact) around an imaginary line, called Earth’s axis, connecting the North and South Poles. The axis is not perpendicular to the plane of the orbit of Earth around the Sun but is tilted 23.5° from it.
Diff: 1
Section: 2.4 The Causes of Earth's Seasons
Bloom's Taxonomy: Knowledge; Comprehension; Analysis
Learning Outcome: 2.4 Recognize the characteristics of Earth’s orbit around the Sun and how they create the seasons.
National Geo Std: 7
Glob Sci Outcome: G1; G2

90) Which of these cities is likely to see its coldest temperatures in July?
A) London, England
B) New York, New York
C) Buenos Aires, Argentina
D) Moscow, Russia
Answer: C
Diff: 2
Section: 2.4 The Causes of Earth's Seasons
Bloom's Taxonomy: Knowledge; Comprehension; Analysis
Learning Outcome: 2.4 Recognize the characteristics of Earth’s orbit around the Sun and how they create the seasons.
National Geo Std: 7
Glob Sci Outcome: G1; G2; G7

91) The greatest seasonal change in the period of daylight is experienced at the
A) Equator.
B) Tropic of Capricorn.
C) North and South Poles.
D) Tropic of Cancer.
Answer: C
Diff: 2
Section: 2.4 The Causes of Earth's Seasons
Bloom's Taxonomy: Knowledge; Comprehension; Analysis
Learning Outcome: 2.4 Recognize the characteristics of Earth’s orbit around the Sun and how they create the seasons.
National Geo Std: 7
Glob Sci Outcome: G1; G2

92) On which of the following holidays is Earth closest to the Sun?
A) New Year's Day
B) Fourth of July
C) Thanksgiving
D) Labor Day
Answer: A
Diff: 2
Section: 2.4 The Causes of Earth's Seasons
Bloom's Taxonomy: Knowledge; Comprehension; Analysis
Learning Outcome: 2.4 Recognize the characteristics of Earth’s orbit around the Sun and how they create the seasons.
National Geo Std: 7
Glob Sci Outcome: G1; G2; G5

93) Discuss the angle of the Sun and the position of the earth at both equinoxes and both solstices.
Answer: On June 21-22, the Northern Hemisphere has its maximum tilt toward the Sun (the summer solstice for that hemisphere). The Northern Hemisphere will then have a stronger orientation toward the Sun than will the Southern Hemisphere. The opposite situation exists on December 21-22 .In between these dates, on March 21-22 and September 21-22, are the equinoxes, in which neither hemisphere has a stronger orientation toward the Sun.
Diff: 2
Section: 2.4 The Causes of Earth's Seasons
Bloom's Taxonomy: Knowledge; Comprehension; Analysis
Learning Outcome: 2.4 Recognize the characteristics of Earth’s orbit around the Sun and how they create the seasons.
National Geo Std: 7
Glob Sci Outcome: G1; G2

94) What is the difference between beam spreading and beam depletion? Which one is the most important cause of seasonal change?
Answer: Beam depletion is the depth of atmosphere sunlight must penetrate before reaching the surface. Beam spreading is the increase in the surface area over which sunlight is distributed in response to a decrease in solar angle. The beam spreading contributes more to causing Earth's seasons.
Diff: 2
Section: 2.4 The Causes of Earth's Seasons
Bloom's Taxonomy: Knowledge; Comprehension; Analysis
Learning Outcome: 2.4 Recognize the characteristics of Earth’s orbit around the Sun and how they create the seasons.
National Geo Std: 7
Glob Sci Outcome: G1; G2

95) Winnipeg, Canada, is located near latitude 50N and Austin, Texas, is located near 30N, but Winnipeg receives slightly more solar radiation on the June solstice. Explain this apparent paradox.
Answer: The period of daylight at Winnipeg is over two hours longer and this compensates for the lower midday solar angle.
Diff: 2
Section: 2.4 The Causes of Earth's Seasons
Bloom's Taxonomy: Knowledge; Comprehension; Analysis; Application
Learning Outcome: 2.4 Recognize the characteristics of Earth’s orbit around the Sun and how they create the seasons.
National Geo Std: 7
Glob Sci Outcome: G1; G2; G7

96) Winnipeg, Canada, receives slightly more solar radiation on the June solstice than Austin, Texas; yet summers at Austin are hotter. Explain this apparent paradox.
Answer: Solar radiation is not the only influence on seasonal temperatures; other factors such as clouds, atmospheric conditions, wind, precipitation, and the type of surface all play a role as well.

Diff: 2
Section: 2.4 The Causes of Earth's Seasons
Bloom's Taxonomy: Knowledge; Comprehension; Analysis; Application
Learning Outcome: 2.4 Recognize the characteristics of Earth's orbit around the Sun and how they create the seasons.
National Geo Std: 7
Glob Sci Outcome: G1; G2; G7

97) If the tilt of the earth's axis were to increase from 23.5° to 33.5°,
A) summers would get cooler and winters would get warmer.
B) both summers and winters would get warmer.
C) summers would get warmer and winters would get colder.
D) both summers and winters would get cooler.
Answer: C
Diff: 3
Section: 2.4 The Causes of Earth's Seasons
Bloom's Taxonomy: Synthesis
Learning Outcome: 2.4 Recognize the characteristics of Earth's orbit around the Sun and how they create the seasons.
National Geo Std: 7
Glob Sci Outcome: G1; G2

98) If the tilt of the earth's axis were to decrease from 23.5° to 13.5°,
A) summers would get cooler and winters would get warmer.
B) both summers and winters would get warmer.
C) summers would get warmer and winters would get colder.
D) both summers and winters would get cooler.
Answer: A
Diff: 3
Section: 2.4 The Causes of Earth's Seasons
Bloom's Taxonomy: Synthesis
Learning Outcome: 2.4 Recognize the characteristics of Earth's orbit around the Sun and how they create the seasons.
National Geo Std: 7
Glob Sci Outcome: G1; G2

99) At perihelion the earth is _____ closer to the sun than at Aphelion.
A) 30%
B) 3%
C) 0.3%
D) 0.000003%
Answer: D
Diff: 3
Section: 2.4 The Causes of Earth's Seasons
Bloom's Taxonomy: Synthesis
Learning Outcome: 2.4 Recognize the characteristics of Earth's orbit around the Sun and how they create the seasons.

National Geo Std: 7
Glob Sci Outcome: G1; G2

100) Which of the following is the tilt of the earth's axis NOT responsible for?
A) the seasons
B) different sun angles at different latitudes
C) different lengths of day at different latitudes
D) length of a day
Answer: D
Diff: 2
Section: 2.5 Effects of Earth's Changing Orientation
Bloom's Taxonomy: Analysis
Learning Outcome: 2.5 Explain three ways in which Earth’s changing orientation with respect to the Sun affects the receipt of solar radiation.
National Geo Std: 7
Glob Sci Outcome: G2; G4

101) The noontime sun angle is greatest
A) near the equator at the spring equinox.
B) near the equator at the summer solstice.
C) in the Arctic during the northern hemisphere summer.
D) in the Arctic during the northern hemisphere winter.
Answer: A
Diff: 2
Section: 2.5 Effects of Earth's Changing Orientation
Bloom's Taxonomy: Analysis
Learning Outcome: 2.5 Explain three ways in which Earth’s changing orientation with respect to the Sun affects the receipt of solar radiation.
National Geo Std: 7
Glob Sci Outcome: G1; G2

102) Beam spreading is a result of
A) cloud cover.
B) solar angle.
C) beam depletion.
D) the electromagnetic spectrum.
Answer: B
Diff: 2
Section: 2.5 Effects of Earth's Changing Orientation
Bloom's Taxonomy: Analysis
Learning Outcome: 2.5 Explain three ways in which Earth’s changing orientation with respect to the Sun affects the receipt of solar radiation.
National Geo Std: 7
Glob Sci Outcome: G1; G2

103) If the earth stopped rotating about its axis but continued to revolve around the sun,
A) temperatures across the earth would become much more uniform.
B) half of the earth would become much warmer and half would become much colder.
C) summers would get warmer everywhere on earth.
D) winters would get colder everywhere on earth.
Answer: B
Diff: 3
Section: 2.5 Effects of Earth's Changing Orientation
Bloom's Taxonomy: Synthesis
Learning Outcome: 2.4 Recognize the characteristics of Earth's orbit around the Sun and how they create the seasons.
National Geo Std: 7
Glob Sci Outcome: G1; G2

104) In the North Polar region the sun shines for 24 hours per day during the summer, but receives less insolation than other areas because
A) the sun is at a very low altitude.
B) the sun doesn't shine very much at night.
C) the solar beam is much more direct at polar latitudes.
D) the air is too cold.
Answer: A
Diff: 3
Section: 2.5 Effects of Earth's Changing Orientation
Bloom's Taxonomy: Synthesis
Learning Outcome: 2.5 Explain three ways in which Earth's changing orientation with respect to the Sun affects the receipt of solar radiation.
National Geo Std: 7
Glob Sci Outcome: G1; G2

105) Which of the following DOES NOT contribute to a reduction in the intensity of solar radiation reaching the earth's surface?
A) solar angle
B) atmospheric path length
C) clouds
Answer: C
Diff: 3
Section: 2.5 Effects of Earth's Changing Orientation
Bloom's Taxonomy: Synthesis
Learning Outcome: 2.5 Explain three ways in which Earth's changing orientation with respect to the Sun affects the receipt of solar radiation.
National Geo Std: 7
Glob Sci Outcome: G1; G2

106) During clear sky conditions, the sky is normally blue in the middle of the day, and some combination of red, yellow and orange at sunrise and sunset. This suggests that
A) the sun is close to perihelion.
B) atmospheric path length is related to sky color.
C) the date is close to one of the solstices.
D) the date is close to one of the equinoxes.
Answer: B
Diff: 3
Section: 2.5 Effects of Earth's Changing Orientation
Bloom's Taxonomy: Synthesis
Learning Outcome: 2.5 Explain three ways in which Earth's changing orientation with respect to the Sun affects the receipt of solar radiation.
National Geo Std: 7
Glob Sci Outcome: G1; G2; G4

107) At a latitude of 35°N, the noontime sun is _____ directly overhead.
A) often
B) sometimes
C) never
Answer: C
Diff: 3
Section: 2.5 Effects of Earth's Changing Orientation
Bloom's Taxonomy: Synthesis
Learning Outcome: 2.5 Explain three ways in which Earth's changing orientation with respect to the Sun affects the receipt of solar radiation.
National Geo Std: 7
Glob Sci Outcome: G1; G2