**APES Study Guide**

**Unit 2: EARTH’S SYSTEMS**

**Answers to Study Guide Questions & Case Studies are due the day before the unit test.**

**Textbook Reference:**

Chapter 2 Sections 1-5: Matter, Energy, and Systems (pg. 35-47)

Chapter 4 Section 3: Geological Process & Climate Change (pg. 84-86)

Chapter 7 Section 1: Factors that Influence Climate (pg. 141-145)

Chapter 8 Section 1: Nature of Aquatic Systems (pg. 163-165)

Chapter 14 Sections 1-2: Earth’s Geological Processes & Hazards/Earth’s Rocks Recycled (pg. 345-354)

Supplement 6: Some Basic Chemistry (pg. S39-S45)

Supplement 8: Weather Basics: El Nino, Tornados, Tropical Cyclones (pg. S47-S52)

Blowing in the Wind: Connections between Wind, Climate, & Biomes (pg. 140)

**Outside Reading:**

Yellowstone Hot Spot Case Study (PDF)

2011 Japan Tsunami Case Study (PDF)

Of Silt and Ancient Voices: Water and the Zuni Land and People Case Study (PDF pg. 1-4 & 11-13 ONLY)

Ogallala Aquifer Case Study (PDF)

**Study Guide Questions (SGQ):**

*Directions:**Answer each question in your own words as you read through the text.*

Chapter 2

1. What is matter? Distinguish between high- quality matter and low- quality matter and give an example of each.
2. Distinguish between a physical change and a chemical change (chemical reaction) and give an example of each.
3. What is a nuclear change?
4. What is energy? Distinguish between kinetic energy and potential energy and give an example of each.
5. What are fossil fuels and what three fossil fuels do we use most to supplement energy from the sun?
6. What is energy quality? Distinguish between high- quality energy and low- quality energy and give an example of each.
7. What is the first law of thermodynamics (law of conservation of energy) and why is it important?
8. What is the second law of thermodynamics and why is it important? Explain why the second law means that we can never recycle or reuse high- quality energy.
9. Define and give an example of a system
10. What is a feedback loop? Distinguish between a positive feedback loop and a negative (corrective) feedback loop in a system, and give an example of each.

Chapter 4

1. Explain how tectonic plate movement has influenced evolution and location of life on Earth.
2. What features make Earth adaptable for millions of species to survive on the planet?

Chapter 7

1. Distinguish between weather and climate.
2. What factors influence climate systems?
3. Define ocean currents and list the factors that influence their formation.
4. Explain why ocean currents and air circulations change their rotational pattern from the northern hemisphere to the southern hemisphere.
5. What are the four main greenhouse gases?
6. What is the greenhouse effect, where does it occur, and why is it important to the earth’s life and climate?
7. What is the rain shadow effect and how can it lead to the formation of deserts?

Chapter 8

1. Distinguish between a saltwater (marine) life zone and a freshwater life zone and give two examples of each.
2. List five factors that determine the types and numbers of organisms found in the three layers of aquatic life zones?
3. What is turbidity, and how does it occur? Describe one of its harmful impacts.

Chapter 14

* 1. Distinguish between the main layers of Earth, including: *core, mantle, lithosphere, asthenosphere, continental crust, and oceanic crust.*
  2. Explain the processes that allow for plate movement.
  3. What conditions are necessary for subduction to take place? What landform is created from this process? Explain why.
  4. How do internal and external geological processes differ and give an example of each.
  5. How does glacial movement influence weathering?
  6. Differentiate between weathering and erosion.
  7. Explain how earthquakes form, how humans determine their magnitude and intensity, and what preventative measures can be put into place to minimize damage to the environment.
  8. Explain the formation of tsunamis as they relate to plate tectonics and their impact to humans and other living organisms.
  9. Describe mass wasting and the factors that increase the likelihood of mass wasting to occur.
  10. Compare and contrast minerals and rocks.
  11. Draw and label the rock cycle. Distinguish the three main types of rock by formation.

Supplement 8

* 1. Explain the difference between a warm front and cold front and how they interact.
  2. Describe how a high pressure and low pressure center form.
  3. How does upwelling impact marine life?
  4. Distinguish between El Niño and La Niña and the environmental impacts caused by both climate systems.
  5. How and why do intense low-pressure systems form? Give examples of weather extremes that form over land and that form over water.

Additional Questions

1. Describe the formation of soil and differentiate between the four main soil types.
2. Be able to use a soil triangle to determine type of soil.
3. Determine soil health through physical, chemical, and biological testing.
4. Explain the difference between porosity and permeability and how they relate to one another.
5. Differentiate each soil horizon.
6. Describe the different components of soil composition.
7. Explain the factors that impact Earth’s unequal heat distribution.
8. Describe each layer of the atmosphere and the major components of each.
9. How does the Coriolis effect impact atmospheric circulation?
10. Describe a Hadley Circulation Cell.
11. List issues for both surface and groundwater in relation to domestic and global use.

**Case Studies:**

*Directions: For each of the case studies, answer the following:*

1. *What is the author's main idea? Support with two specific examples.*
2. *Summarize the case study in three sentences.*
3. *What ecological lesson can we learn from the case study?*
4. *What is your opinion? Do you agree or disagree?*
5. Yellowstone Hot Spot Case Study (PDF)
6. 2011 Japan Tsunami Case Study (PDF)
7. Blowing in the Wind: Connections between Wind, Climate, & Biomes (Textbook Pg.
8. Of Silt and Ancient Voices: Water and the Zuni Land and People Case Study (PDF Pg 1-4 & 11-13 only)
9. Ogallala Aquifer Case Study (PDF)

**Vocabulary:**

*Directions: Review key vocabulary, words may appear in quizzes and/or tests. You are not required to write the definitions but are encouraged to review them.*

Chapter 2 Sections 2-5

* + acidity
  + chemical change
  + electromagnetic radiation
  + energy
  + energy quality
  + feedback loop
  + first law of thermodynamics
  + fossil fuels
  + heat
  + high-quality energy
  + high-quality matter
  + inorganic compounds
  + ion
  + isotopes
  + kinetic energy
  + law of conservation of energy
  + law of conservation of matter
  + low-quality energy
  + low-quality matter
  + matter quality
  + negative feedback loop
  + nuclear change
  + organic compounds
  + pH
  + physical change
  + positive feedback loop
  + potential energy
  + second law of thermodynamics
  + synergistic interaction
  + synergy
  + throughputs
  + time delay
  + tipping point

Chapter 7 Section 1

* biomes
* climate
* convection
* currents
* easterlies
* greenhouse effect
* greenhouse gases
* high pressure system
* human-enhanced global warming
* leeward side
* low pressure system
* ocean currents
* permafrost
* rain shadow effect
* trade winds
* weather
* westerlies
* windward side

Chapter 8 Section 1

* Aquatic life zones
* Benthos
* Decomposers
* Dissolved oxygen content
* Eutrophic zone
* Freshwater
* Marine
* Nekton
* Photic zone
* Plankton
* Phytoplankton
* Salinity
* Saltwater
* Turbidity
* Zooplankton

Chapter 4 Section 3

* Earthquakes
* Laurasia
* Gondwanaland
* Pangea
* Tectonic plates
* Volcanic eruptions

Chapter 14 Section 1-2

* Aftershocks
* Amplitude
* Asthenosphere
* Continental crust
* Continental glaciers
* Convergent plates
* Core
* Crust
* Divergent plates
* Epicenter
* Erosion
* External geologic processes
* Fissure
* Focus
* Foreshocks
* Geology
* Glaciers
* Igneous rock
* Internal geologic processes
* Lava
* Lithosphere
* Magnitude
* Mantle
* Mass wasting
* Metamorphic rock
* Mineral
* Oceanic crust
* Richter scale
* Rock
* Rock cycle
* Sedimentary rock
* Sediments
* Seismic waves
* Seismograph
* Subduction
* Subduction zone
* Transform fault
* Tsunami
* Volcano
* Weathering

Supplement 8

* Atmospheric pressure
* Cold front
* Condensation nuclei
* El Niño
* Front
* Hurricane
* Jet stream
* La Niña
* Thermocline
* Thunderheads
* Tornado
* Tropical cyclone
* Typhoon
* Upwelling
* Warm front

Other Vocabulary Terms to Know

* Alluvium
* Bed load
* Bedrock
* Clay
* Cold currents
* Cones of depression
* Coriolis Effect
* Deep water currents
* Discharge
* Drainage basin
* Groundwater
* Humus
* Infiltration
* Lake
* Loam
* Meander
* Permeability
* Porosity
* Recharge
* River
* Runoff
* Sand
* Silt
* Soil
* Soil Horizon
* Stream
* Subsoil
* Surface currents
* Surface water
* Topsoil
* Warm currents
* Watershed
* Water table
* Well
* Zone of saturation
* Zone of aeration