HPS Geo Energy Q’s 2021 Name \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Per \_\_\_\_

Directions: Use the Geo Energy Q’s Slides with excerpts from the Earth Science textbook to answer the following questions. We will discuss as a large group halfway through the class period. For additional information on these objectives, visit the links on the title slide.

Objectives:

3. Compare and contrast the relationship between temperature, thermal energy, and heat.

4. Describe how thermal energy is transferred by conduction, convection and radiation.

5. Identify internal and external sources of heat energy in Earth’s systems.

7. Apply how differential heating of the earth’s surface & atmosphere drives convection within the earth’s system.

Questions:

1. Compare and contrast the GS and Physical Science definitions of temperature and heat.  
PS: Avg KE, thermal E from high Temps à low Temps; GS: how rapidly/slowly molecules move around

Heat is transfer of E because of a diff in Temp

2. List and describe the Earth’s three sources of heat outlined in the text.  
1. Decay of radioisotopes releases energy which generates heat 2. Impact of asteroids and meteorites generated tremendous amounts of thermal energy 3. Gravitational contraction: as Earth increased in mass, gravitational contraction increased. E of the contraction was converted to thermal energy.

3. What is radiation?   
Transfer of E through space by EM waves

4. How does radiation differ from convection and conduction?  
Radiation does not need a medium

5. How does the air become warm?  
Atm doesn’t absorb short wavelength radiation from the Sun. Earth absorbs the short wave radiation and re-emits it as long wave radiation. Long wave radiation is absorbed by atm.

6. What is conduction?   
Transfer of E when molecules collide

7. What conditions are necessary for conduction to occur?  
direct contact of particles  
  
8. What is convection?   
Transfer of E by flow of a heated substance

9. Describe in detail the process of convection  
Fluid is heated, particles move faster and spread out becoming less dense and rise. Fluid cools as it is farther away from the heat source, particles slow down, condense, and sink.

10. Convection currents are among the main mechanisms responsible for the vertical motions of air, which in turn cause the different types of weather.

11. What happens to the area illuminated by sunlight as the rays strike the ground at a lower angle? (at the poles)  
Area increases

12. What happens to the relative intensity of the sunlight as it strikes a lower (smaller) angle? (at the poles)  
Intensity decreases (cooler)

13. How is this different from what occurs at the equator? (impact angle and relative intensity)  
Less area at the equator which results in greater intensity (warmer)  
  
14. How do regions manage to maintain fairly constant average temperatures?

Heat energy is redistributed around the world. The continual motion of air and water reallocates heat energy among Earth’s surface, oceans, and atmosphere and brings it into balance.