Name \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Hour \_\_\_\_\_\_\_

**Unit 2 - Activity 2.4 Reading Questions**

Read through the provided article and answer the following questions.

1. What 2 things are evidence of an energy transfer?
2. The first thing needed for lightning to form is a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
3. Heat from Earth’s surface rises and warms up the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ above it. This causes them to also \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
4. As you increase the distance from Earth’s surface, the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ decreases.
5. As the air temperature cools, some of the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ to form small \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and form a cloud.
6. Sometimes \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ also form in the cloud.
7. These water drops and/or crystals \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ with each other inside the cloud.
8. Initially, the particles in the drops and/or crystals are \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, which means they have an equal amount of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ charges.
9. Multiple collisions between the water drop and/or crystals can cause \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ charged electrons to be knocked off the neutral particles, producing \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ charged particles.
10. Using the information from the next paragraph, draw a model of a thunderstorm cloud which can lead to lightning. Make sure to include the charge location and arrows of charge movement within the cloud.
11. As the charges build up, the electric potential energy in the electric field \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
12. Why can’t the separation within the cloud exist forever?
13. Explain how a Van de Graaff generator shows a similar thing on a smaller scale when it creates a spark. If necessary, draw a model to help explain.
14. The flash of light is evidence of energy \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
15. As the air around the flash heats up, the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ energy of the molecules in the air \_\_\_\_\_\_\_\_\_\_\_\_\_\_. The increase in the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of the air molecules can create \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ waves.
16. Is it possible to have lightning without thunder? Explain your answer using the concepts of energy and the particle nature of matter.
17. Although lightning happens mostly in clouds, sometimes lighting strikes Earth’s surface too. Explain why this happens.
18. Do you think more energy is released when lightning strikes inside a cloud or when lightning strikes the ground? Use your understanding of electric potential energy to support your answer.