

Student Discussion Worksheet

Directions: Read the *Science News* article "[Insect swarms might generate as much electric charge as storm clouds](#)" and answer the following questions as instructed by your teacher. A version of the article, "Insect swarms might electrify the sky," appears in the December 3, 2022 issue of *Science News*.

Static electricity explained

Before diving into the fascinating world of electrically charged insects, let's review some basic science concepts and discuss how we experience the concepts in our daily lives.

Static electricity occurs when a stationary electric charge builds up on the surface of a substance. When two objects have opposite charges (positive and negative), the objects attract. When two objects have the same charge (positive and positive; negative and negative), the objects repel. The force of attraction or repulsion between two charged objects is called Coulomb force, or the electrostatic force.

1. Think of a time when you've experienced static electricity. How did you know you experienced it? What action caused it to happen?
2. Based on your knowledge of the particles that make up atoms and molecules, explain how charges can build up on surfaces.
3. Explain the science behind your experience of static electricity. Why did your hair stand up or your freshly clean clothes stick to your body? Why did you see a spark when you touched a doorknob, for example?

Electric charge in the atmosphere

1. Describe how flying insects generate static electricity. How does this electricity contribute to the electric field of the atmosphere?
2. What is the relationship between the density of an insect swarm and the change in the atmosphere's electric charge? Based on what you've learned so far from this discussion, explain the science behind this relationship. Optional: Explain how this relationship relates to Coulomb's law.

3. How does the atmosphere's electric field impact weather?

4. Using the example from the *Science News* article and your answers above, explain how static electricity helps produce lightning. Tip: If you need more information, use [this article](#) from *Science News Explores*.

5. Why do you think physicist Joseph Dwyer says that electrically charged flying animals are unlikely to ever reach the density required to produce lightning like storm clouds do?