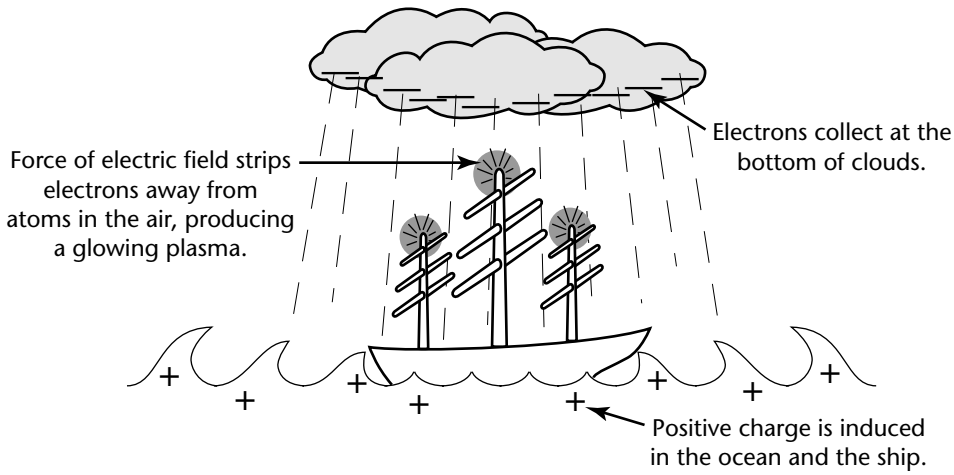
Name _____ Date _____ Class _____

St. Elmo's Fire

St. Elmo's fire is a bluish glow sometimes seen during stormy weather on the tops of the masts of ships, church steeples, and other tall pointed objects. Despite its name, St. Elmo's fire is not a flame and does not burn the objects on which it appears. It is a type of electric discharge, like lightning. St. Elmo's fire can last for several minutes.

You know that electrons accumulate on the bottoms of clouds during thunderstorms and induce a positive charge in the ground. If sufficient charge builds up in this way, atoms in the air can be stripped of their electrons, producing a plasma. A *plasma* is a glowing gas with no net charge. It contains positive ions and free electrons. St. Elmo's fire is a plasma. The color of light given off by a plasma depends on the gas involved. The air in Earth's atmosphere is mostly a mixture of oxygen and nitrogen gas. As a plasma, this mixture gives off a bluish glow.



Answer the following questions on a separate sheet of paper.

1. An electric field tends to be strongest at the ends of pointed objects. How does this explain the fact that St. Elmo's fire appears on pointed objects such as the masts of ships?
2. Compare and contrast St. Elmo's fire with lightning.
3. The red glow of a neon light is also produced by a plasma. How might the glow of the light change if the neon gas inside it were replaced by air?
4. Why does St. Elmo's fire occur only during thunderstorms?
5. Based on what you have learned about lightning and St. Elmo's fire, do you think air is a good conductor of electric charge?