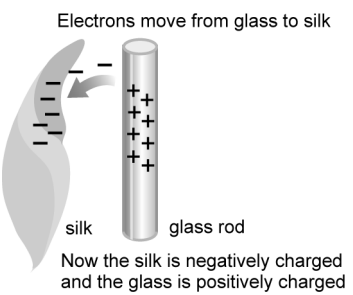
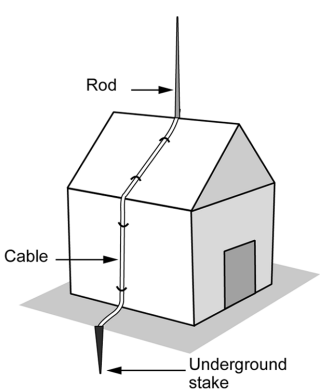
Skill and Practice Sheet Answer Key

14A Benjamin Franklin

1. Franklin learned through reading, writing, discussing, and experimenting.
2. Franklin's hypothesis was that lightning is an example of a large-scale discharge of static electricity.
3. Franklin's reported results were that the loose threads of the hemp stood up and that touching the key resulted in a static electric shock. He concluded that the results were consistent with other demonstrations of static electricity; therefore, lightning was a large-scale example of the same phenomenon.
4. If the kite had been struck by lightning, the amount of charge coming down the hemp string would most likely have electrocuted Franklin.
5. The diagram shows electrons moving from the glass rod to the silk so that the silk becomes negatively charged and the glass becomes positively charged.



6. A lightning rod is a metal rod attached to the roof of a building. A thick cable stretches from the rod to a metal stake buried in the ground. When lightning strikes the rod, it follows the path of least resistance-from the rod, through the cable, into the ground, where the charge can safely dissipate.



14B Coulomb's Law

Practice set 1:

1. The force becomes $^1/_9$ as strong.
2. The force becomes $^1/_{16}$ as strong.
3. The force quadruples.
4. The force doubles.
5. The force quadruples.
6. The force does not change.
7. The forces becomes 16 times as large.

Practice set 2:

1. 9×10^9 N
2. 2.16×10^9 N
3. 3375 N
4. 3.38×10^6 N
5. 5.63 N
6. 0.00556 C
7. 3.33×10^{-4} C
8. 6.7 m
9. 0.03 m
10. 2.96×10^{-12} C