**Investigation 15**

**Electromagnetism**

1. A long, straight wire that carries an electron current to the right produces a magnetic field that surrounds the wire. The direction of the magnetic field above the wire points into the page and below the wire points out of the page.

electron

current

a. If a compass is placed above the wire, then in what direction will the north-seeking end of the compass point?

electron

current

POINTS INTO THE PAPER

b. Suppose the wire is bent into the form of a loop. Use the information in the above diagram to determine the direction of the magnetic field inside the loop.

INSIDE THE LOOP – OUT OF THE PAGE

c. A side view of the loop and the corresponding lines of force of the magnetic field are shown. Draw compasses at positions A, B, and C and show the directions in which the north-seeking ends of the compasses point.

**C**

**B**

**A**

2. Which of the following situations can produce an induced electron current in a loop of wire?

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| situation | loop being moved into a magnetic field | loop stationary in a magnetic field | loop being moved out of a magnetic field | a bar magnet being inserted into the loop | a bar magnet stationary in the loop | a bar magnet being moved out of the loop |
| current produced | YES | NO | YES | YES | NO | YES |