

## SCIENCE SCENARIO

**Directions:** Use the information presented on pages 25 and 26 to answer questions 13 through 16.

### A.2.1.6

14. Students attempted to use the device and the weights in an investigation. None of the metal weights were attracted to the electromagnet when they were placed near it. The students made sure that the power indicator light was on, then they tried every switch combination. Which system modification and test are necessary to solve the design flaw in the experimental setup?
- A Use copper metal weights and test the batteries.
  - B Use a copper rod and test the batteries.
  - C Use smaller metal weights and test the original weights and the smaller weights with a bar magnet. \*
  - D Use a larger iron rod and test the original metal weights with a bar magnet.

- A *Copper is not magnetic.*
- B *Copper is not magnetic.*
- C *Key: Testing with a bar magnet will determine whether the cubes are magnetic. Smaller cubes would verify whether the original metal weights were too massive.*
- D *A larger iron rod will not help to determine whether there is a flaw in the system.*

### C.3.1.1

15. Which statement correctly describes the forces acting on the metal weights when the system design prevented them from being attracted to the electromagnet?
- A The balanced magnetic and gravitational forces were insufficient to overcome the inertia of the metal weight. \*
  - B The balanced frictional and gravitational forces were insufficient to overcome the momentum of the metal weight.
  - C The unbalanced frictional and gravitational forces were insufficient to overcome the inertia of the metal weight.
  - D The unbalanced magnetic and gravitational forces were insufficient to overcome the momentum of the metal weight.

- A *Key: For an object to move, an unbalanced force must act on it.*
- B *A frictional force that does not have a significant role in this device.*
- C *If the forces acting on the cube were unbalanced, the cube would move.*
- D *If the forces acting on the cube were unbalanced, the cube would move.*