EGG DROP

Time Required: 15 minutes

Objective: To demonstrate the importance of wearing a bicycle helmet to reduce the severity of head injuries.

Materials:
- 2 raw eggs or 2 ripe melons (cantaloupe or honeydew)
- Waterproof barrier (plastic bag) and napkins for cleaning
- Cardboard box, approximately 12"x12"x6", full of styrofoam pieces or sand
- Chair to stand on
- ANSI and/or SNELL approved bicycle helmet

Background Information: Research shows that up to 90% of fatal bicycle crashes are the result of head trauma. A properly worn and certified bicycle helmet cushions and protects the head from injurious impacts with hard surfaces such as asphalt and concrete. Scientists measure how hard something hits with "g forces." Things that hit hard have a high g force and high potential for damage. 300 g's is enough to cause permanent brain damage. 500 g's can fracture the skull and cause death. The head of someone who falls from bicycle height to a concrete surface can receive a force of more than 1800 g's. ANSI and/or SNELL approved helmets can reduce the 1800 g's of bicycle falls to less than 200 g's, which is not enough to fracture the skull. Many doctors agree if all bicyclists wore helmets, 75 percent or more bicycle-related deaths would be eliminated.

Activity Description:
1. Teacher explains that an egg simulates the human brain inside the skull (important material within a fragile shell).
2. Ask a student to decide how far from a hard surface (floor or concrete square) he/she can drop the egg without breaking it. Let the student drop the egg from that distance. (Be sure to cover the surface with a waterproof barrier.) The egg will break when dropped from a height of 3 in.
3. Ask the student to stand on a chair, hold the other egg high, and drop it into a box full of styrofoam pieces or sand. (Be sure the box is a large enough target for the student to hit.) The egg shouldn't break.
4. Show the class a bicycle helmet. Explain that it is constructed with an inside crushable liner of styrofoam, like that in the box, which can reduce force to the head from 1800 to less than 200 g's.

Variation: Perform the same experiment using a ripe melon. Drop a ripe melon from about 6 ft. onto a hard surface; it will burst or sustain obvious damage. Then snugly strap a melon into a helmet, and drop it. The melon should still be intact. Note: Be sure to perform this activity on asphalt or concrete. If the helmet-less melon does not burst, save it for a few days and the damage will become obvious.

Definitions:
1. G forces - a measurement scientists use to indicate how hard one object hits another.
2. Bicycle helmet - equipment worn to protect a person's head (Reliable helmets carry a sticker of approval by ANSI and/or SNELL). Helmets which carry their seal(s) have met safety standards. Properly fitting helmets are snug and cannot move or slide about.
3. Crushable liner - the inner portion of a helmet that absorbs and reduces g force to the head.