

UNIT 3 - CELLS, HISTOLOGY, INTEGUMENTARY SYSTEM

ACTIVITY - Rubber Egg

Objectives:

To demonstrate the semi-permeability of a cell membrane

To lay ground-work for discussion of osmosis and the bone disease osteoporosis

Materials Needed:

1 raw egg in its shell

clear vinegar

1 jar with a lid

clear tape

(egg must fit inside the jar)

Procedure:

1. Measure and record the circumference around the center of the egg.
2. Record the appearance of the egg.
3. Place the egg inside the jar. **DO NOT** crack the shell.
4. Cover the egg with vinegar.
5. Close the lid.
6. Observe immediately, and then periodically for the next 72 hours.
7. Remove the egg after 72 hours and measure its circumference.
8. Compare the appearance of the egg before and after being in the vinegar.

Strategy:

The size and circumference of the egg shell will vary. Watch for bubbles as they start forming on the surface of the egg shell immediately when it is placed in the vinegar. The bubbles will increase over time. After 72 hours, the shell will be completely dissolved. Portions of the shell may be seen floating on the surface of the vinegar. The egg remains intact because of the thin see-through membrane that surrounds it. The size of the egg has increased. The shell of the egg is made of calcium carbonate, commonly called limestone. When vinegar chemically reacts with the limestone, one of the products is carbon dioxide gas, those bubbles seen on the egg.

The membrane around the egg does not dissolve in vinegar, but becomes more flexible and rubbery. The increased size is due to osmosis, the movement of water through a cell membrane. The water in the vinegar moves through the thin membrane into the egg because the water inside the egg has more materials dissolved in it than does the vinegar. Water will always move through a membrane in the direction where there are more dissolved materials. The contents of the egg stayed inside the semi-permeable membrane because the molecules were too large to pass through the tiny holes. This selectiveness of materials moving through the membrane is called semi-permeability.