Lesson Title	Diffusion and Osmosis
Length of Lesson	50 min class period
Created By	Kendra Wright
Subject	Science
Grade Level	7th grade
State Standards	7th grade Inquiry & Life Science: 1a, 3e
DOK Level	DOK 1, DOK 3
DOK Application	Recall, Strategic Thinking
National Standards	5-8th grade: C (Life Science)
Graduate Research Element	Understanding cellular reactions and cell membrane diffusion is important to my research involving heavy metal absorption and cell death.

Student Learning Goal

MS 7th grade

1a. Design, conduct, and draw conclusions from an investigation that includes using experimental controls. (DOK 3)

3e. Compare and contrast how organisms obtain and utilize matter and energy. (DOK 1)

National Science Education Standards 5-8th grade

Content Standard C: Structure and function of living things.

Materials Needed (supplies, hand-outs, resources):

Raw eggs, vinegar, corn syrup, gummy bears, water, clear plastic cups, air freshener

Lesson Performance Task/Assessment:

The purpose of this lesson is to teach diffusion and osmosis. Students must understand diffusion as the movement of concentrated molecules to areas of low concentration in order to gain equilibrium. Osmosis is how water moves through a permeable membrane to maintain equilibrium.

Lesson Relevance to Performance Task and Students:

Understanding diffusion and osmosis is important to understanding many chemical and biological processes. In order for cells to survive, diffusion and osmosis must occur with the cell's surroundings.

Anticipatory Set/Capture Interest:

Teacher will complain about a smelly classroom and spray air freshener. The class will see how long it takes for them to smell the air freshener, and the teacher will use this demonstration to explain diffusion on the board.

Guided Practice:
Students will be given directions on how to dissolve the egg shell with the vinegar. After two days, the shells will be dissolved and the eggs (representing cells with just their membranes) will be placed in the hypertonic solution of corn syrup and the hypotonic of tap water.

Also, students will place gummy bears in water to watch osmosis. Because the gummy bears are hypertonic in comparison to the surrounding water, water will be absorbed by the permeable gummy bear. Students will notice a drastic increase in gummy bear size even after one day in water.

See Teacher Notes for directions.

Independent Practice:
Students will get to observe the shell dissolution and feel the egg membrane. They will see how the membranes of the egg and the gummy bear are permeable. Students will record their observations and make predictions to why the shell dissolved and what happened when it was then placed in corn syrup and tap water.

Remediation and/or Enrichment:
Follow IEP.

Check(s) for Understanding:
Students will be able to explain which direction water will move when a cell is exposed to hypertonic and hypotonic solutions.
Questions:

1. Will the egg in corn syrup get smaller or larger?
2. Based on what you know, how would you explain the changes in egg size when placed in water and syrup?
3. If you placed an egg in an unknown n solution, how could you determine if the solution was hypertonic or hypotonic?

Closure:
Students will explain why the water leaves the egg in the corn syrup and fills the egg in the water.

Possible Alternate Subject Integrations:
Diffusion of gases

Teacher Notes:
Egg Experiment Instructions:

1. Each group gets two eggs. Place eggs in clear glassware and completely cover with vinegar.

2. Vinegar will dissolve the shell in two days.
3. After shell dissolved. Pour out vinegar and rinse eggs. Be careful! Eggs after shell dissolution are still very fragile.
4. Place the two eggs in separate glassware. Completely cover one eggs with corn syrup and the other egg with water.
5. The corn syrup is a hypertonic solution; therefore the water will come out of the egg.
6. The water is a hypotonic solution, so the water will permeate the egg.
7. The egg in corn syrup will shrink, while the egg in water will expand.

Gummy Bear in Water

1. Place a gummy bear in clear glassware.
2. Cover the gummy bear completely with water.
3. Let sit for a few hours to a day.
4. The gummy bear is hypertonic; therefore, the water will be absorbed and the gummy bear will grow.