

LCM Formal Loop

Lesson Plan: 'The Rubber Egg'

Name: Clyde Lee

Grade Level: 7/8

Standards:

Science: A2; B1

Math: A6; D2

Cultural: E3

Science Concept:

Osmosis is the diffusion of water.

(timeline: a weekend and parts of 5 days in classroom)

Materials:

(3)-250 ml beakers; (1) lg. beaker or coffee can; (3-4) eggs per group; several pieces of string per group(each about 30 cm in length); a piece of dialysis tubing per group; colored water(prepared by teacher); scissors, knife, vinegar, distilled water, karo syrup, salt water, and a triple beam balance (only have one) will be available with teacher supervision.

Gear-Up:

Discuss/review diffusion:

- Have students stand with backs toward you. Tell them to raise their hands when they notice/smell a different odor (you then spray cologne from your position)
- Have students look around; discuss what happened
- Does anyone recall what diffusion is? Allow students to share.

Process Skills: observing, inferring

Explore:

- Group students (4-5 per group)
- Each group receives a piece of dialysis tubing, 1-250 ml beaker, and they may use a balance
- Students should observe the empty dialysis tubing
- Tie one end of the tubing, pour some colored water into it and tie off the other end (use string; and see teacher for colored water)

- Next fill the beaker about 1/2 full of saltwater, place the dialysis tubing in water, then observe again. (students may try other liquids if there is time.)
- Teacher monitors students as they perform tasks

Process Skills: observing, inferring, cooperating, measuring, collecting data

Generalize:

- What did you observe about your dry dialysis tubing?
- What happened to the dialysis tubing when you placed it in the saltwater?
- Why did this happen?
- What happened when you used other liquids (if they did)?
- Discuss terms as they arise

Process Skills: inferring, communicating

Experiment:

- Continue with groups of 4-5
- Give each group 3-4 eggs, a large container, and vinegar (available from teacher). A triple beam balance is also available
- Students will create an experiment to show what osmosis is.
- Ask students what the vinegar, eggs, and large container are for.
- Discuss questions as they arise. Students should arrive to the idea of soaking the shell off the eggs.
- Note: Do this on a Friday. Allow the eggs to soak in the vinegar over the weekend. They should be ready by Monday.

Monday

- Students will observe eggs and share their observations
- Give groups string pieces, 3-250 ml beakers; tell them they have distilled water, salt water (prepared ahead of time by teacher), karo syrup, and a triple beam balance available to use in their experiment. Depending on your groups, you may need to help them determine how to use these items.
- Hopefully students figure out they need to place an egg into each beaker and cover each egg with a different liquid. Encourage them to label each beaker as to what liquid the egg is submerged in.
- Students observe, collect data, predict over the next few days (have students make predictions in their journals on this first day, then they can compare to actual later)
- Ask questions about the string and balance (students should figure out the balance's purpose quickly - measure the mass of the eggs each day; the

string will be more difficult to measure the circumference of each egg each day)

- Continue observations over the next 3-4 days
- Monitor/observe groups; help as needed, but encourage students to determine the what's, how's, and why's.

Process Skills: observing, predicting, collecting data, hypothesizing, controlling variables, measuring

Interpret:

- Have students discuss, in their groups, what they observed
- If needed, ask questions like: 'What happened to each egg?' 'How does this show osmosis?'
- Groups will share their observations/results
- Ask students to discuss how osmosis was demonstrated in their experiment

Process Skills: analyzing data, interpreting data, communicating

Apply/Assess:

Journal:

- 1) Write what you discovered/learned about osmosis.
- 2) What other situation(s) can you think of where osmosis occurs?

Process Skills: inferring, communicating

Extensions:

'The Shrinking Carrot'

- Submerge carrot pieces in different liquids such as distilled water and saltwater
- Tie a piece of string around each piece of carrot (cut a carrot in half), place one piece in each liquid
- Students predict what will happen prior to placing carrot halves in liquids
- Can easily use this activity as a lesson to reinforce the concept of osmosis

Vocabulary:

diffusion, concentration, equilibrium, osmosis

Grading Rubric for Assessment:

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| 4 | You Rock! | Includes an understanding of osmosis and two or more examples of osmosis found in nature |
| 3 | Good Job | Includes an understanding of osmosis and one example |
| 2 | Almost | Includes an understanding of osmosis, no example |
| 1 | Ouch | Little to no understanding and no example little to no understanding and no example |