Project FOCUS
Best Lessons
MIDDLE SCHOOL

Title of Lesson: Cell Membranes and Diffusion
Theme: Life Science
Unit Number: 2 **Unit Title:** Structure and function of cells
Performance Standard(s) Covered (enter code):
S7L2b - Relate cell structures (membrane, nucleus, cytoplasm, chloroplasts, mitochondria) to basic cell functions.
Enduring Standards (objectives of activity):

Habits of Mind

- ☒ **Asks questions**
- ☒ **Uses numbers to quantify**
- ☐ **Works in a group**
- ☐ **Uses tools to measure and view**
- ☒ **Looks at how parts of things are needed**
- ☒ **Describes and compares using physical attributes**
- ☒ **Observes using senses**
- ☒ **Draws and describes observations**

Content (key terms and topics covered):
Cell membranes, diffusion, equilibrium, osmosis

Learning Activity (description in steps)
Abstract (limit 100 characters): This lesson was about cell membranes and how the processes of diffusion and osmosis are interconnected.
Details: The lesson began with an explanation of cell organelles, and how they are comparable to a castle. We ended with the castle walls, those being the cell membrane. Next, students in groups got together and made a cell membrane system. They filled glasses with water, and then connected a coffee filter to the top with rubber bands. The filter was purposely pushed down into the water so that part was submerged. Students were asked if a) food coloring and b) popcorn kernels would get through. They then dropped some food coloring into the glass, followed by kernels. Students saw that the food coloring (small particles) got through but the kernels (large particles) did not. This led into the discussion of diffusion and osmosis, both of which were taught via explanations on the white board. In order to sum up all of the above processes, the students completed another experiment. They were given a beaker with water, some iodine, corn starch, and plastic bags. Students then were instructed to mix corn starch and water in the plastic bags and close them tight. Next, students put drops of iodine into the beaker of water until the water turned a dark orange color. Students were told that the system was a cell membrane system, and were asked to hypothesize which parts were related to which structures in the cell. Next, students were asked to place the dialysis bags (corn starch and water) into the beaker. The class waited about 10 minutes until the reaction occurred. Students removed the dialysis bags and noticed that they turned from white to purple. This, of course, corresponded to the iodine diffusing through the plastic bags and reacting with the starch, turning it purple. Students were finally asked to explain what had happened, using terms that they had learned from class.

Materials Needed (type and quantity): 10 glass beakers, 2 bottles of Iodine, 2 bottles of food coloring, 5 rubber bands, 5 coffee filters, 2 boxes of corn starch, 5 spoons, water.

Notes and Tips (general changes, alternative methods, cautions): Make sure that students do not have iodine allergies before performing the second experiment. Also, as a change, you can switch up experiment 2. Water and starch can be used in the beaker, whereas water and iodine can be placed inside the bag. In this case, students will see purple conglomerates building up outside of the dialysis bags, and over time the water will turn a purple color.

Sources/References:

1) http://www.youtube.com/watch?v=2Th0PuORsWY
2) Click here to enter text.
3) Click here to enter text.