David Consalvi
December 20, 2005

Assignment 6 – Cooperative Learning

The integration of cooperative groupings in a laboratory setting is required to provide students the connection to the real world. Laboratories typically require coordination between different individuals to complete a common task. The lab experiences in a high school rely on the same principles to succeed. The attached lab activity was performed in multiple biology classes in the same way. The unique differences within each setting provided different paths to acceptable outcomes. The first was fortunately a success and the other was degrees around success but still good learning experiences.

The entire activity was designed as a way to reinforce the lecture material with hands-on practice. The students had outlined the textbook chapter, taken notes from a PowerPoint lecture, and engaged in discussion on the topic of particle movement within a solution. The lab then provided visual evidence for the movement of particles that clarifies the terminology that complicates the subject.

The heterogeneous makeup of the classroom has led me to frequently allow students to group themselves to avoid conflicts. However, after talking with a fellow eMints classmate, I decided to use a random grouping. I explained to the students, in the workplace it is necessary to develop the skills to succeed with whomever you are grouped. Failure to work with others is often grounds for dismissal in many work environments. With this introduction, the majority of the participants functioned well without coaxing. There were a couple that felt the need to dispute the selections. Those individuals were given the opportunity to fail the assignment with a zero and report to the office or try to make the situation work. This was the advice I was given and it worked for all but one student who has greater issues. The end products actually led to the students being more receptive the second time this selection method was used. The students worked well in the groups of either two or three depending on the class size.

The positive interdependence was built into the lab because of the need for more than one activity taking place at once to complete the experiment in the allotted time. Students were sharing a common learning goal, but more importantly had to perform tasks that required several hands and communication to complete successfully. Some of the groups tried to function individually and were set back to the beginning once they realized that errors were occurring from spills, improper labels, and miscommunication. My role was to facilitate the experience so I only intervened when they were getting too far off course and materials were being wasted. This was really only necessary twice in the process. That would be another success in the lab. The dependence on my assistance is something that I try hard to break. They have not let go of the security blanket a teacher offers at this point in the year. Some unfortunately never do.

The individual accountability was evidenced by each student's generated lab report. To successfully complete the papers, the students produce a document that illustrates the activities performed and the data collected. They then need to be able to discuss the activity and analyze the results. To do this, they reflect on what went well and what modifications could improve the experiment. They also manipulate the data into graphs and charts for discussion of the findings in their conclusions.

The assessment is a combination of participation in the lab as well as the lab report. The participation in the lab is fifty percent of the rubric. That provides a relaxation of the stress of grades for the student. They have one week to complete the report from the time the last data is collected. Then the reports are collected and discussed as a class to ensure that everyone discovers the correct conclusions.

David Consalvi
December 20, 2005

For this lab, each class was slightly different because of the size and skill level of the classes. They are not intentionally grouped by ability, but the first class has fewer students and greater percentage of honors students than the other two. The class flowed well and all participants successfully completed the lab report. The second class is larger with several special education students. The class had a few challenges, but all students were able to obtain valuable data. There was one group that had difficulties getting all of the samples prepared in time because of coordination problems. They had to assimilate into another group, which required communication and adaptability uncommon for these students. Finally, the students were able to produce lab reports demonstrating understanding.

In reflection, the random grouping worked well to encourage student participation and cooperation. I have since utilized this method of grouping for other activities. The timing was a difficulty that I experience with every new grouping. It is almost always a break-in period developing the relationship within the group that delays the activity. After this period, the flow seems to be fine. I am considering ways to have a prelab period that overcomes this lag on lab day. To date, I have not been successful instilling the urgency that comes with the actual lab so the time is not efficiently used the preceding day. The key is to establish an activity with a checkpoint that ends on the first day. I just have not found what is not busy work but actually productive.

Overall, the lab was a success and the follow-up exam demonstrated good understanding of the material. This was the least missed material on the exam. The lab does a good job of illustrating the concepts and the students functioned well together so they grasped the information.

David Consalvi
December 20, 2005

I deleted the introduction pages and the tables to avoid the extra information. The introduction provided an overview of the notes and the tables outlined the data to be collected to set up the graphs for analysis.

Objectives:
Osmosis, Diffusion, Permeability, Cell Membranes

Safety:
Follow all standard laboratory safety procedures. Protective equipment must be worn.

Procedure:
Lab 1A:

1. Obtain a 25cm piece of dialysis tubing that has been presoaked in distilled water.
2. Tie off one end securely.
3. Open the other end of the dialysis tube and insert 15mL of 15%glucose/1%starch solution.
4. Tie off the other end of the bag, leaving room for expansion.
5. Record the color of the solution within the bag.
6. Fill a 250mL beaker with distilled water and add approximately 4mL of Lugol's solution (IKI) to the distilled water.
7. Immerse the bag in the beaker of solution.
8. Let this stand for approximately 30min, or until distinct coloration is observed.
9. Record final colors of solutions in the bag and in the beaker.

Questions Lab 1A

1. What do your observations tell you about the presence of glucose, starch, and IKI in the dialysis bag and the beaker before and after the experiment?
2. What can you conclude about the permeability of the dialysis bag membrane? Which compounds were able to diffuse through the membrane? Which were not? Why were only some able to pass through?
3. Was there more or less water in the dialysis bag at the conclusion of the experiment? Why?

Lab 1B:

1. Before starting this lab, wash your hands.
2. Obtain two 25cm dialysis strips that have been presoaked in distilled water.
3. Tie off each end securely.
4. Pour approximately 25mL of each assigned sucrose molar solution into its respective bags (that should be labeled, but not on the tubing itself).
5. Tie off the other ends securely with string, careful to get any air bubbles out and leaving room for expansion.
6. Rinse off each bag and blot off the water.
7. Weigh and record the initial mass of the dialysis bags in the data table.
8. Fill six 250mL glass beakers with 150mL distilled water and label each beaker with its respective bag's molarity of sucrose.
9. Immerse each bag into the distilled water.
10. Allow this to stand for thirty minutes.
11. Remove each bag, blot the sides to get off extra solution and weigh and record mass in grams each bag and determine the mass difference and percent change in mass.
12. Next, compare the group percentages to the class.
13. Calculate the percent change in mass for each of the dialysis bags using the following formula: % Change = [(Final Mass -Initial Mass)/Initial Mass] x 100%
14. Record this data in Table 2.
15. Graph both your individual and class average results, using the independent variable on