

## Biotechnology Techniques Lab Memo

About the setup:

Many of the items will be in the student's trays. A few things will be on the side counter:

- P200 micropipettes
- P10 micropipettes
- Tips (yellow for P200, clear/white for P10)
- Colored water
- 0.2% sodium bicarbonate / Electrophoresis Buffer

Please note that there are only three centrifuges, which have been positioned in the center of the room. The students will need to share. Since they will only be using it for a few seconds, this shouldn't be a problem.

About the lab:

### **Activity 1**

Students will learn how to use a micropipette. It is unlikely that any student has used one of these before and will need a demonstration by the instructor. It works well to have students hold a micropipette while you demonstrate. Please note that we have almost enough P200 micropipettes to go around, but not quite enough, so some students will need to share. Students without a P200 may wish to use a P10 during the demo. Please remind students to always put a tip on their micropipette before putting it into liquid. Students will practice pipetting different volumes of colored water into microcentrifuge tubes and compare them with the instructor key, which will be on the instructor's desk. If the student's samples do not match the key, they should redo them.

### **Activity 2**

In this activity, students will practice loading a gel. There are small, square practice gels in their tray. These are reusable and need to be washed out after the activity. Students will practice pipetting the colored water from activity 1 into the gel. Please note that students should now be using the P10 micropipette instead of the P200 that they used in activity 1.

### **Activity 3**

This activity is a simulation where students are FDA regulators testing samples submitted by companies. The samples are for golden rice, a type of rice that has two genes inserted so that it can produce beta carotene. The students are really using food coloring. The yellow band is the control band that should show up in all rice varieties. The blue and red bands show up in samples that have both genes added. One sample will have a blue and a yellow band, which shows that one gene was successfully added, but the other was not. Please remind students to hold onto these samples when they clean up the lab.

Please discuss with students that the smaller bands run faster and that the larger bands run slower. This is a concept they struggle with on the quiz.

**Activity 4**

The Cell Bio class transformed *E. coli* with GFP, so they now glow green under a UV light. Students will observe this, as well as a tube with GFP DNA in it, and answer questions about whether the DNA glows and why the organism might glow when the DNA does not. Students may need some guidance on this. Note: the DNA does not glow because only the protein glows. The DNA codes for the protein but is not itself the protein, and thus does not glow.