SEED Academy, Spring 2008
Synthetic Biology Module

Homework #2
Due February 28, 2009

There are two principle objectives for this homework assignment. The first question will get you to begin to think more deeply about your final projects. The second set of questions will reinforce your knowledge of the cloning process that we talked about in Day 2, which will prepare you for Day 3.

1) Since we have had a more in-depth discussion about biological engineering and synthetic biology, we want you to return to your initial list of ideas for the system you would like to create. From that same list, or using additional ideas that you may have recently thought of, choose 2-3 of your favorites and think about the following:

   What actually has to happen in order for this system to work?
   (Remember: *Engineering → HOW?)*

   Take the "bacterial balloon" (from the comic) as an example. Think about an *actual* balloon and ask yourself, "*How* does this actually work?"

   1. Why does a balloon float instead of sink?
   2. Do balloons float forever? Why or why not?
   3. Can any material be used to make a balloon? Are there special properties required of a material to be suitable to make a balloon?
   4. When blowing a balloon, there seems to be an initial "barrier" one must overcome before easily/smoothly filling it. What is this? Why is this?

   What we actually want you to hand into us is a set of questions as those above for each of your favorite ideas (at least 3 questions for each idea). If you think about these questions during the week, we encourage you to send them to us early, and we will help you get started framing these questions in a biological perspective.

2) Go through the online tutorial about DNA structure and synthesis (http://depts.washington.edu/mllab/biologyTutorial/)

3) Read about subcloning (a good place to start is here: http://en.wikipedia.org/wiki/Subcloning).