



**Next:** [Materials Needed](#) **Up:** [Introduction](#) **Previous:** [Project Goals](#)

## Design of the Experiment

The most basic data to be collected are measurements of the density of yeast in solution over time. These data can be collected using a microscope and hemacytometer, absorbance of light in a spectrophotometer, or both. In principle it is also possible to collect data on the sugar concentration as a function of time. Two choices exist here as well - one may use a sphigmomanometer (used by brewers) to measure the specific gravity of the medium, or one may use a enzyme reaction and take absorbance readings with a spectrophotometer. Each of these latter is fraught with difficulty. Specific gravity measurements require large (more than 100 ml) samples, and therefore very large volumes. On the other hand, available reagent reactions seem to be very unreliable. It is certainly possible, maybe advisable, to proceed with only population measurements, particularly for students with less lab experience.

In general we started with population densities of 10,000 cells/microliter. Glucose concentrations from 5 to 20 mg/ml then give populations which grow to their maxima in 4-8 hours if stirred and held at a constant 35 degrees C. To achieve these population densities we generally found it easiest to dissolve a tablespoon of dry baker's yeast (from the supermarket) in warm water and let it sit for 15 minutes, stirring or shaking occasionally. After counting cells in this original stock it is relatively easy (and a surprisingly good exercise for students) to dilute to the target density in the experiment. Our classes generally settled on total experiment volumes of between 50 and 100 ml in Ehrlenmeyer flasks, which fit comfortably in shaker baths. Room temperature experiments and absence of shaking generally yield slower experiments. Most of our classes settled on measurments to be taken every two hours.



**Next:** [Materials Needed](#) **Up:** [Introduction](#) **Previous:** [Project Goals](#)

*James Powell*

*2000-07-31*