

## **The Red and White Yeast Lab: An Introduction to Science As A Process**

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Red and White Yeast lab is an experimental system designed for investigation by introductory level biology and non-biology students. The experimental question and techniques have been readily mastered by students in the 6th grade and older. This lab activity focuses on the process of scientific inquiry rather than a particular answer. The teacher's role is that of a moderator; the students design, carry out, and interpret their experiments themselves. The most crucial part of the experience is the classroom discussions which bring out the important features of the interplay between theory and experiment.

The experimental system is an engineered strain of bakers' yeast. When a large patch of these cells is grown on a Petri plate, the patch develops a red center and a white edge. The students' task is to find out what they can about why the center is red and the edge is white. Their tools are fresh plates and sterile toothpicks. Although the system and tools are simple, they allow a wide range of possible models, experiments, and pathways to results.

The students begin by brainstorming about what possible mechanisms could explain this phenomenon. They then do a first round of experiments. At the second meeting, they get their

plates and discuss the results - refining their questions as they see fit. They then do a final round of experiments. At a third and final meeting, they discuss both rounds of results and attempt to reach a consensus about what they can conclude.

### Schedule

- |                |             |  |
|----------------|-------------|--|
| <b>Week 0:</b> | In lab:     | • Look at pictures & video on web site & make hypotheses           |
| <b>Week 1:</b> | Pre-lab:    | • One hypothesis   |
|                | In lab:     | • Introduction to yeast  |
|                |             | • Look at patches on plates  |
|                |             | • Discuss models in groups, then as class                          |
|                |             | • Introduction to techniques                                       |
|                |             | • Discuss experiments as groups, then as class                     |
|                |             | • Do Round I of experiments  |
| <b>Week 2:</b> | In lab:     | • Look at results in groups  |
|                |             | • Discuss results in groups, then as class                         |
|                |             | • Discuss Round II experiments as groups, then as class            |
|                |             | • Do Round II of experiments                                       |
| <b>Week 3:</b> | In lab:     | • Look at results in groups  |
|                |             | • Discuss results in groups, then as class                         |
|                | Lab Report: | • Explain clearly an interaction between hypothesis and experiment |

### Additional resources:

- The yeast strain is available from the ATCC ([www.atcc.org](http://www.atcc.org)), Accession # 201926 and will soon be available from Carolina Biological Supply Co. ([www.carolina.com](http://www.carolina.com)).
- This lab is part of the ResearchLink 2000 Project ([www.researchlink.ferris.edu](http://www.researchlink.ferris.edu)).
- Pictures of experimental results can be found at:  
<http://omega.cc.umb.edu/~bwhite/yeast/yeast.html>
- Detailed descriptions of the experiments, methods, and other resources can be found on the web ([http://intro.bio.umb.edu/RL2000/R\\_W\\_Yeast/](http://intro.bio.umb.edu/RL2000/R_W_Yeast/)).

### Reference

White, B.T. (1999). The red and white yeast lab. *The American Biology Teacher*, 61 (8), 600-604.