Is It Alive??

Subject Area	Cells and Heredity
Age or Grade	8th
Estimated Length	50 minutes (one class period)
Prerequisite knowledge/skills	This activity is meant to be the introduction to the new Cells and Heredity book; however, students should have some prior knowledge of cells at this point.
Description of New Content	Defining the boundaries of living organisms.
Goals	Students should be able to determine what makes something a living organism and identify factors that constitute "living."
Materials Needed	Per group: 2 Packets of fast rising yeast, two sugar packets, 400 mL water, two stirrers, two plastic cups, ruler, graph paper.
Procedure	**Opener-** Introduce yeast as the subject of the experiment and draw on students' prior knowledge of what yeast is used for. Have them make a hypothesis before starting the experiment about whether or not yeast is alive. **Development-** Each group gets two plastic cups containing rapid rise yeast to observe over a 30 minute period. Each cup contains 200 mL water and 1 packet of rapid rise yeast. Into one of the two cups put two packets of sugar. Label the cups "Sugar" and "No Sugar" accordingly. (It helps to have the water and the sugar water prepared before class begins and then the students can add the yeast.) Once the students add the yeast, stir it for about 30 seconds or until clumps disappear. (Stress importance of keeping stirrers separate for "Sugar" and "No Sugar" cups because of cross-contamination.) Have students measure the foam that arises from the yeast

	every 5 minutes, and record measurements in a data table, preferably measuring in metric. Continue measurements for 30 minutes. **Closure-CLEAN UP!** and graph results of measurements.
Evaluation	Have a class discussion concerning the outcome of the experiment. Students should write a conclusion about the evidence they found that yeast is alive and whether or not the experimental results confirmed or rejected their hypothesis. Talk about Carbon dioxide as a waste product and how that results in the foam the students measured.
Extensions	Continue lesson on different cell types (plant, animal, bacterial) and on cellular organelles and cellular functions.
References	Adapted from *From Outerspace to Innerspace: Food and Fitness* from the National Space Biomedical Research Institute.