## Ideal Gas Law Yeast Lab (Teacher Guide)

### Purpose

This lab investigation is designed to get students to compare theoretical calculations and collected experimental data for the volume of carbon dioxide produced when sugar (C12H22O11) is broken down in water (H20), using yeast as a catalyst.

### When To Do This Investigation?

This is designed to be completed after students have practiced ideal gas law problems involving stoichiometry. Students may not have been introduced to catalysts yet, but a simple explanation of what its role is and why yeast does not appear as a reactant or product in the chemical reaction is suggested.

### Materials

There is a lot of flexibility in terms of the materials used here and most are easy to find (even in small communities). If students have access to a balance, they should measure the mass of the sugar before starting the investigation. If not, an estimation using the density is sufficient. Students should make sure that the yeast is not expired.

### Results & Sources of Error

For a remote hands-on lab, asking for digital evidence (in the form of photos or videos) that they completed the lab is recommended.  
  
It is not uncommon for the calculated error in the double digits. The focus should be on the process and writing the lab report and not on the results of the collected data (since this can vary depending on the quality of their materials).  
  
Students often think of sources of error as **mistakes**. However, there are several built-in sources of error in the design of the lab: assuming that the conditions are at SATP, assuming that the balloon is perfectly spherical, etc. The teacher should encourage students to take their time in considering all potential sources of error.

### Safety Considerations

The materials and chemicals used in this investigation do not require any special handling or disposal. It is recommended that students work in a space that is easy to clean up in case there is a mishap involving the balloon slipping off of the bottle neck (which can be messy and smelly but not hazardous).

### Evaluation

There is a provided rubric for this investigation that teachers can use or modify as needed. Note that there are two tabs in the spreadsheet, including one with instructions for the teacher on how it works.