**Engage with Mystery Cube**

**Explore with Do Yeast undergo Alcoholic Fermentation?**

**Explain some of the parameters and supply materials, but let them design experiment.**

**Enrichment – Design Challenge (Can use other food sources be used? Have honey, syrups, etc..)**

**Evaluate throughout and Lab Rubric**

**Mystery Box:**

photosynthesis, cellular respiration and fermentation

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| --- | --- |
| **1A**  Yeast, Sugar, Bread, Beer | **2A**  ATP, Ethanol, CO2  (Alcoholic Fermentation) |
| **2A**  Plant, Person, Food, O2 molecule | **2B**  ATP, Water, CO2  (Cellular Respiration) |
| **TOP**  Sunlight, CO2 molecule, Water droplets,  Plants, | **BOTTOM**  Glucose and O2  **Mystery Side**  (Photosynthesis) |

**Do Yeast Undergo Alcoholic Fermentation?**

**Questions:**

How could you determine if yeast undergo alcoholic fermentation?

What questions do you have?

What do you need to know?

What materials would you need?

How would you execute?

What is the process?

How will you know, what will you measure?

Students develop procedures, data collection, results and conclusions.

Assign roles.

**Design Challenge**

When bakers make bread, they include flour with the yeast, sugar and water. The gluten protein in the flour gives elasticity to the dough and traps the CO2 bubbles produced by the yeast so the bread dough rises and the bread becomes fluffy. The fluffiness of the bread can be influenced by the relative amounts of yeast, sugar, water and flour, as well as other ingredients in the dough. The fluffiness of the bread can also be influenced by the temperature of the dough as it rises and how long the dough rises.

**Challenge:** Jim Baker wants to make his bread as fluffy as possible without spending too much time waiting for the dough to rise. He has asked your class to find the amount of sucrose and temperature that produces the most CO2 in 10 minutes. He does not want his bread to be too sweet, so he doesn't want to use any more sucrose than needed for maximum CO2 production.

May extend until the next day.

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| --- | --- |
| Distinguished  4 | Student demonstrates the ability to design a procedure to determine the optimal sucrose amount and temperature that creates the most C02 in 10 minutes.  Student collects in data tables and creates a graphic presentation.  Clear and Correct Analysis and Conclusion |
| Proficient  3 | Design methods are generally well described with a step or two missing.  Data tables and Graph are present but some information missing.  Analysis and Conclusion generally clear and correct some points missing. |
| Apprentice  2 | Design methods may be insufficient, large gaps in the design.  Data Tables and Graph are insufficient with data missing or errors made in graphing.  Analysis and Conclusion is present but limited. |
| Novice  1 | Most key pieces of the design information are missing.  Data in unaccounted for and no graph is present or is very limited.  No clear understanding of the data and no conclusion given. |