It’s Alive!

Are yeast really alive? Yes, they are alive! Yeasts is a type of fungi. Each yeast organism is made up of only one cell. The yeast that you buy at the grocery is dried. Although it is alive, it is dormant, which means it is inactive. After yeast is reactivated with warm water, you can feed them and they will reproduce. In order to grow and reproduce, yeast feeds on sugars and gives off carbon dioxide gas as a waste product. Therefore, evidence of growth and reproduction of the yeast is the presence of carbon dioxide bubbles.

A fungus appreciation club has announced a contest to determine who can produce the best yeast house. Your goal is to design and test a yeast house, a container in which yeast will grow and reproduce.

Identify the Problem

1. What is your task? 

Do Research

Examine the sugar and water mixture which has no yeast. Now examine the four mixtures with yeast. Look at the chart for information about each mixture.

<table>
<thead>
<tr>
<th>Mixture</th>
<th>Water</th>
<th>Sugar</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Warm</td>
<td>No</td>
</tr>
<tr>
<td>2</td>
<td>Warm</td>
<td>Yes</td>
</tr>
<tr>
<td>3</td>
<td>Cold</td>
<td>No</td>
</tr>
<tr>
<td>4</td>
<td>Cold</td>
<td>Yes</td>
</tr>
</tbody>
</table>
2. How do the mixtures with yeast compare to the mixture without yeast? In which mixture did the yeast seem to grow best? Explain your reasoning. (Hint: Look for bubbles as a sign of growth.)

3. What can you conclude about the ideal conditions for growing yeast?

The bubbles you see in the mixture are made from carbon dioxide (CO₂). When yeast digests sugar, it produces CO₂ as a waste product.

4. Explain why the bubbles signal growth.

5. What are your design constraints?

Go to the materials station(s). Pick up each material one at a time. Think about how it may or may not be useful in your design. Leave the materials where they are.

6. List two different ways you could combine some of the materials to make a container for growing yeast. Include the contents of the container.
Choose One Solution

7. Describe your yeast house and its contents. 

8. List the materials that you will need.

9. Explain how you will know if yeast is growing.

Design and Construct a Prototype

Gather your materials plus a thermometer. Build your yeast house. Measure the amount of each ingredient in your yeast house using an appropriate unit of measurement. If your house uses liquid, measure its temperature. If not, measure the temperature of the air where you leave your yeast house.

10. Record the design details of your prototype.
Test the Prototype

Test your yeast house. Leave it for at least two hours. When you return, write your observations below.

☐ 11. Observations: ____________________________________________________________

__________________________________________________________________________

__________________________________________________________________________

__________________________________________________________________________

Communicate Results

☐ 12. Rate your yeast house on a scale of 1 to 3 where, 1 = yeast grew/reproduced very little, 2 = yeast grew/reproduced moderately, and 3 = yeast grew/reproduced very well.

Explain why you chose your rating.

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Evaluate and Redesign

☐ 13. Explain how you would change your yeast house or its contents to grow more yeast.

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