Facilitator Materials

Driving Question:
How does yeast make pizza and breads rise?

Yeast-Air Balloon Exploration:

Ingredients

- 2-1/4 Teaspoon Active Dry Yeast or 1 (0.25 oz) Package of Dry Active Yeast
- 1 Cup Warm Water (105 - 115 degrees F)
- 2 Tablespoons Sugar
- 1 Large Rubber Balloon
- 1 Empty Water Bottle (at least 1 liter bottle)
- 1 spoon
- 1 small cereal bowl
- 1 ruler
- 1 funnel
- 1 water pitcher

Directions:
Step 1: Read the experiment steps, what do you think will happen?

Facilitation:
Purpose: The purpose of this step is to help children learn how to read the recipe and to begin thinking about what they think will happen when they construct the water-bottle.

Support: Help them to think about what each ingredient will do and what type of observations they will make and record.

Then ask them to make a prediction based on the purpose of each ingredient about what they think will happen when they are mixed together and put in a bottle and left alone for a while.

Observations:
Possible Response: The balloon will blow up.
Facilitation Prompt: Why do you think the balloon will blow up? How do you think the balloon will blow up? What ingredients will make the balloon blow up?
Step 2: Stretch out the balloon by blowing it up and releasing the air repeatedly, and then lay it aside.

Facilitation:
Everyone is going to want to do this step. So make sure that you have enough balloons available for everyone to have their own balloon. But select only one person’s balloon to go on top of the bottle.

**Note:** It is Important to stretch the balloon so that it will inflate more easily.

Facilitation Prompts:
Prompt: Why do you think the instructions ask us to blow up the balloon and release the air repeatedly?
Possible Response from Children: To stretch the balloon
Prompt: Why is the stretching important?
Possible Response from Children: I don’t know.
Facilitator response: stretching the balloon will make the balloon easier to inflate

Small Group Management:
Depending on the age of the children, the children may need help with group management. Help them split the work up so that everyone gets a chance to measure and mix. When possible help the group know what things can be done at the same time.

Note: Step #2 #3, and #5 can be done at the same time.

Step 3: Measure the temperature of the hot water in the faucet when it becomes warm (105 – 115 degrees Fahrenheit) catch water in a pitcher.

Observations:
Record the Temperature of the water: _________

Facilitation:
The temperature of the water is important. If the water is too cool/cold the yeast will not activate. If the water is too hot it will kill the yeast.

Therefore it is important to help students measure and use water of the right temperature.

Support use and reading of the thermometer:
Children may need help reading the thermometer. Help them understand what each tick mark stands for. Many times the small tick marks are increments of 2 and the large tick marks denote increments of 10 (some of these larger ones are marked and others are not). Before they measure the temperature of the water, have the children show you the tick marks the water temperature is aloud to be fall within.
Make sure that children use the thermometer holder or hold the thermometer dial and not the temperature probe.

Step 4. Measure 1 cup of water using the liquid measuring cup

*Difficulties:*  
Children may have difficulties distinguishing between the liquid measuring cup and the dry measuring cups.  
They may also have difficulties measuring accurately.

*Facilitation:*  
Help the children to understand that we use liquid measuring cups to measure liquids because they are more precise. Point out the graduated measurement markings on the side of the liquid measuring cup. Then have them look at the dry measuring cups and notice that they do not have those graduated lines but are estimated approximations of the volume.  
Help them to measure accurately, by pouring water into the liquid measuring cup and then placing the liquid measuring cup on the table and stooping down to eye level to see if the bottom most curve of the water line hits the measurement line.

Step 5. Measure the yeast and put it into a small cereal bowl.  
Next, measure and add the sugar to the yeast.  
Then mix with a spoon.

*Difficulties:*  
Children may have trouble distinguishing between measuring spoons and measuring cups. They may have lots of difficulties distinguishing between teaspoons (tsp) and tablespoons (tbsp) They may also have problems measuring accurately. Children have this difficulty because they often focus on the number or amount and not the volume of the substance that needs to be measured.

*Facilitation:*  
Help participants to identify the measuring spoons and explain to them that the measuring spoons are used to measure small amounts of liquids and dry ingredients. These ingredients often ingredients that can be very powerful in small amounts (e.g., salt, sometimes sugar, pepper, and other seasonings.)  
Also point out to the children, the differences between the tsp and the tbsp by pointing out the abbreviations on the handles of the spoon and the relative size of the spoons to one another.
Also point out to the children, the accurate way to measure amounts is by dipping the spoon in the ingredient jar or pouring the ingredient into the appropriate spoon and then leveling off the extra ingredient. Depending on how you do this the excess product may go back into the original container or into the trash or waste bowl.

Observations:
No reactions or changes of state occur at this time. However, it is important to note that the yeast and the sugar do nothing when mixed together dry. They should notice that both the yeast and the sugar feel grainy.

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**Step 6. Add the 1 cup of warm water you measured in the liquid measuring cup to the yeast and sugar mixture in the bowl. Stir until the yeast dissolves into the water.**

Observations:
When they first add the water to the yeast and sugar mixture, they should notice the yeast spread out over the surface of the water and begin to clump. As they stir the water, they should notice that the yeast begins to turn the water a cloudy tan/brown. They should also notice that many of the clumps begin to break apart.

*Facilitation:*

*Note: Dissolved means when most of the yeast clumps are broken and the water is cloudy brown.*

*Help the children mash up the yeast clumps by pressing the clumps into the side of the bowl.*

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**Step 7: Once the yeast and sugar have dissolved, pour the mixture into the bottle using a funnel.**

Observations:
They shouldn’t notice the mixture change but what they should notice and mark using a permanent marker is the top of the mixture in the bottle.

*Facilitation:*

*Note: Have the children Mark the top of mixture using a marker*

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**Step 8: Make sure all the air is out of the balloon. Then attach the balloon to the mouth of the bottle, and set both aside.**

Observations:
They should also notice that the balloon is deflated and hanging to the side.
Step 9: Let sit until you finish your pizza.

Facilitation:
Make sure that the water-bottles stay on the table so that they can watch to balloon blow up while they are preparing their pizza for the oven.

Depending on the size of the bottle and the temperature of the water, the balloon should inflate in about 5 – 10 minutes.

Observations:
Over time they should see the yeast producing a foam and they should see the foam increase in height. They should also notice the balloon inflating. They might also notice the smell of yeast fermenting that can often smell like alcohol.

Step 10: Describe what happened to your water bottle over time?
Use your 5 Senses to describe what you notice

Sight:
They should have noticed that the balloon is inflated and most likely standing straight up. and that the yeast mixture has now produced a thick foam on top of the liquid in the bottle. They may have also noticed the yeast spilling over into the balloon.

Facilitation:
Have the children mark of the top of the foam.

Smell:
Many will describe the smell of yeast as “smells like bread” or “alcohol”
Others will say it stinks

Facilitation:
Help the children to use descriptive words like “strong”, “not pleasant” and “like bread” and not opinion or derogatory words like “yucky” “stinks” “disgusting”

Sound:
May hear a low crackling

Taste:
(They do not need to taste this) but it will probably taste bitter

Feel:
Feels warm