Activity: Living, Breathing Yeast!

# Background

How do you make bread? What ingredients are needed?

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Why is yeast so important?

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What is cellular respiration?

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Why is it so important?

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What is the equation?

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# Cellular Respiration in Action

## Different Situations

1. 300ml of warm water
2. 300ml of warm water and 1 tbsp yeast
3. 300ml of warm water, 1tbsp yeast and 2 tbsp flour
4. 300ml of warm water, 1tbsp yeast and 2 tbsp corn starch
5. 300ml of warm water, 1tbsp yeast and 2 tbsp sugar
6. 300ml of warm water, 1tbsp yeast and 2 tbsp salt
7. 300ml of warm water, 1tbsp yeast and 2 tbsp corn syrup

## Hypothesis

Which set-up will produce the most CO2? **WHY**?

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## Set-Up

We will be using balloons to **catch the CO2** produced and be using this as an **indicator** of how much **cellular respiration** is taking place inside the bottle!

You have each been provided with some string as well in order to measure the circumference of your balloon.

We’ll be checking their growth at 5 minute intervals for about 20-25 minutes

**Each bottle already has the yeast and the “fuel”**

1. Turn on taps to get hot water
2. Add water to bottle up to the designated fill line
3. Put the cap on the bottle (make sure it’s tight) and shake vigorously for a few seconds to mix the contents
4. Remove the cap and quickly pull the balloon over the mouth of the bottle. Start timer!
5. After every 5 minutes (for a total of 20 minutes) record the circumference of the balloon and any other observations

# Results

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|  | Observations for each bottle |
| Time | A | B | C | D |
| 5 min | Circumference |  |  |  |  |
| Other observations |  |  |  |  |
| 10 min | Circumference |  |  |  |  |
| Other observations |  |  |  |  |
| 15 min | Circumference |  |  |  |  |
| Other observations |  |  |  |  |
| 20 min | Circumference |  |  |  |  |
| Other observations |  |  |  |  |

## Results continued

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| --- | --- | --- | --- |
| Time | E | F | G |
| 5 min | Circumference |  |  |  |
| Other observations |  |  |  |
| 10 min | Circumference |  |  |  |
| Other observations |  |  |  |
| 15 min | Circumference |  |  |  |
| Other observations |  |  |  |
| 20 min | Circumference |  |  |  |
| Other observations |  |  |  |

## Analysis Questions

1. a) Which bottle produced the most CO2?

 b) Why do you think that is? *Think back to the equation for cellular respiration*

1. Why have a bottle with just water? And one with just water and yeast?
2. Why do you think the other “fuels” did not work as well?

## Taking it Further

1. Why would the balloons eventually stop inflating?
2. How can this activity help to understand why people suffering from anorexia may die from organ failure?
3. What are some possible sources of error in our experiment? Any design improvements?
4. What other factors do you think influences the rate of cellular respiration?
5. What test could we do to confirm that there is CO2 being produced?