# Apple Usage: Apple Yeast

Most organisms get their energy from cellular respiration. We call them heterotrophs. This means that they are fed with already prepared organic food produced by green plants during the photosynthesis.

Yeast fungi are organisms that gain energy for life through fermentation. At first water activates the enzymes which decompose polycarbohydrates into sugars. Next, the yeast converts sugars into carbon dioxide and alcohols, which happens in the absence of oxygen during the fermentation process.

We can buy yeast in the supermarket, but we can also produce it at home. Yeast can be found everywhere in nature, also in the fruits' skin.

In the 19th century, Louis Pasteur found out that yeast fungal cells contain substances that convert sugar into alcohol. He called them "ferments" (enzymes) and the process fermentation.

1. **Look for a recipe for apple yeast on the internet. Use key words “APPLE YEAST”.**

For example:

**Ingredients:**

- 250 g flour
- 200 mL water
- 1 tablespoon sugar
- 1 small, grated apple

**Equipment:**

Kitchen scales, beaker or a glass with a scale, 1 litre jar with lid, tablespoon, grater, plate

**Preparation:**

Mix all the ingredients in a 1 litre jar. Close the jar with a cover and leave at room temperature.

After 3–5 days the jar will be full. Next, add 200 g of flour and knead the dough for your pizza.

## 2. Does the recipe you found on the internet have a scientific basis?

Plan an investigation to find out.

**A. QUESTION:**
Does the mixture rise, if we don't add _____ (e.g. apple …)?

**B. HYPOTHESIS:** *(Read about fermentation and write the hypothesis)*
The mixture will/will not rise, because _____

**C. EXPERIMENT:**

For investigation use the internet recipe but prepare smaller amounts:

**Ingredients:**

- 50 g flour
- 40 g water
- 1 teaspoon sugar
- 1 tablespoon grated apple

**Equipment:**

Kitchen scales, 200 ml jar with lid, tablespoon, teaspoon, grater, elastic bands in different colours

➔ Form a group with the other students who have the same hypothesis as you. Each group prepares a sample with one ingredient missing and one control sample with all the ingredients in the recipe.

If you want to measure the height of the mixture, mark the height with an elastic band. If you want to measure it every day, use differently coloured elastic bands.

| | Flour | Water | Sugar | Room temperature | Apple | Does the mixture rise? | Height of the mixture |
|---|---|---|---|---|---|---|---|
| All groups | + | + | + | + | + | | |
| Group 1 | + | + | + | + | - | | |
| Group 2 | + | + | + | - | + | | |
| Group 3 | + | + | - | + | + | | |
| Group 4 | + | - | + | + | + | | |

Think about the VARIABLES AND CONSTANTS.

INDEPENDANT VARIABLE (factor to be changed) _____

DEPENDANT VARIABLE (result to be measured) _____

CONSTANTS (factor to keep the same)

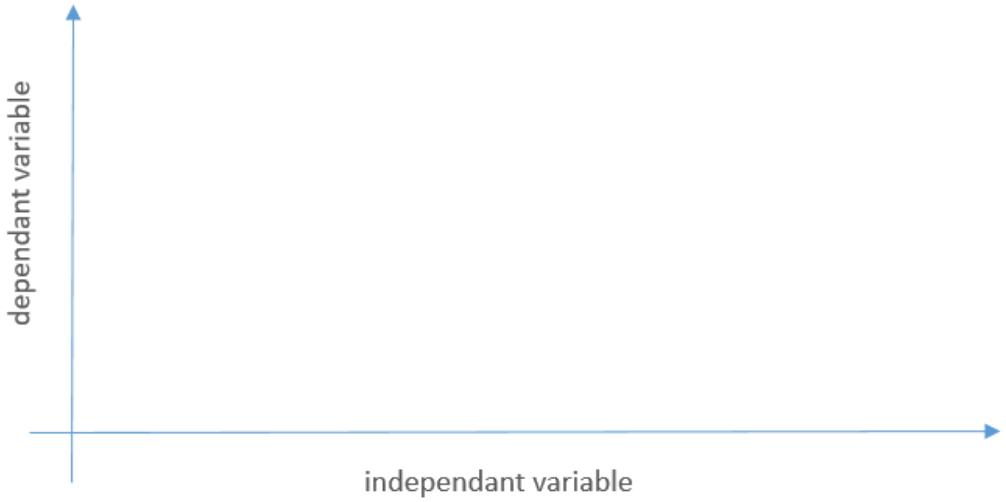
_____

## A. RESULTS:

Table title: _____

| | Flour | Water | Sugar | Room temperature | Apple | Does the mixture rise? | Height of the mixture |
|---|---|---|---|---|---|---|---|
| Jar 1 | | | | | | | |
| Jar 2 | | | | | | | |

Graph title: _____




## B. DISCUSSION:

Confirm or deny the hypothesis.

_____

Try to explain with scientific ideas.

_____

_____

Explain the connection with a real-life example.

_____

_____

Did any new ideas come to mind while doing the experiments? Possibly more than one? What are they? Try to explain as fully as possible.

_____

_____