# Foods and nutrients (Item No.: P8012200)

## Curricular Relevance

**Area of Expertise:** Biology
**Education Level:** Age 14-16
**Topic:** Nutrition and digestion
**Subtopic:** Nutrients
**Experiment:** Foods and nutrients

| Difficulty | Preparation Time | Execution Time | Recommended Group Size |
|---|---|---|---|
| Intermediate | 10 Minutes | 10 Minutes | 2 Students |

**Additional Requirements:**

- Boiled egg white
- Refined sugar

**Experiment Variations:**

**Keywords:**

Nutrients, Carbohydrates, Fat, Protein

## Task and equipment

## Information for teachers

## Additonal Information

For our bodily nourishment we absorb the most varied foods: bread, meat, cheese, fruit, and butter, to name a few. All these foods contain, besides water, salts and constituents which cannot be utilised, substances which are indispensable for our bodies. They are called nutrients, and can be classified in three groups: **carbohydrates** (starch and sugar), **fats** and **proteins**.


## Hazards!

- Carry out the experiment in a fume cupboard whenever possible!
- Gases with an unpleasant smell are evolved on heating!
- Wear protective glasses!

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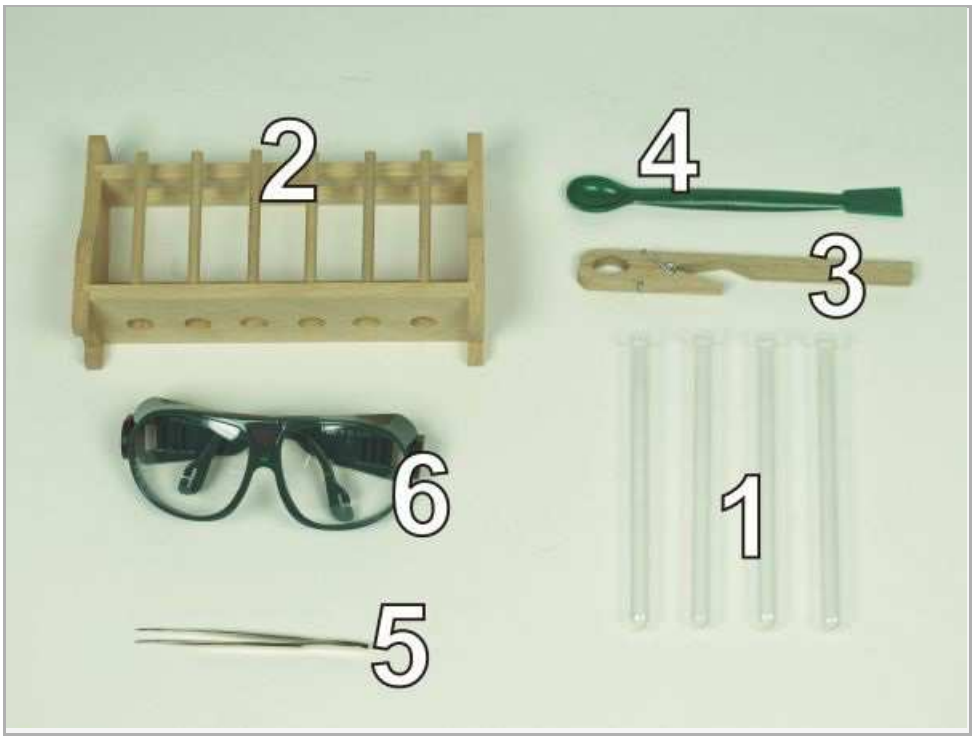
## Task and equipment

### Task

### Which elements build up the nutrients?

Make tests in order to find out the elements that build up the nutrients.

## Equipment




| Position No. | Material | Order No. | Quantity |
|---|---|---|---|
| 1 | Test tube 160x16 mm, 10 pcs | 37656-03 | 4 |
| 2 | Test tube rack f. 6 tubes, wood | 37685-10 | 1 |
| 3 | Test tube holder, up to d 22mm | 38823-00 | 1 |
| 4 | Spoon,w.spatula end,18 cm,plastic | 38833-00 | 1 |
| 5 | Tweezers,straight,pointed,120mm | 64607-00 | 1 |
| 6 | Protecting glasses, clear glass | 39316-00 | 1 |
| | Butane burner, Labogaz 206 type | 32178-00 | 1 |
| | Butane cartridge C206, without valve | 47535-01 | 1 |
| | Indicator paper f.water roll 5m | 47015-00 | 1 |
| | Litmus paper, red, 1 box | 30678-02 | 1 |
| | Olive oil,pure 100 ml | 30177-10 | 1 |
| | Starch,soluble 100 g | 30227-10 | 1 |
| Additional material | | | |
| | Boiled egg white | | |
| | Refined sugar | | |

# Set-up and procedure

## Hazards!

- Carry out the experiment in a fume cupboard whenever possible!
- Gases with an unpleasant smell are evolved on heating!
- Wear protective glasses!


## Experiment 1

Attach the butane burner to the butane cartridge as shown in Figures 1 and 2. Use matches to light up the butane burner.


Fig. 1


Fig. 2

Place enough starch in a test tube to cover the tip of the spatula about three times, hold the tube almost horizontal and heat the starch carefully over a small flame (see Fig. 3).

Fig. 3

On the upper end of the test tube a deposit is forming.

Fig. 4

Moisten a strip of Watesmo indicator paper with some water. Use tweezers to hold the strip of paper. How does the paper change?

Wipe away the deposit in the test tube with a strip of Watesmo indicator paper (use tweezers). How does it change?

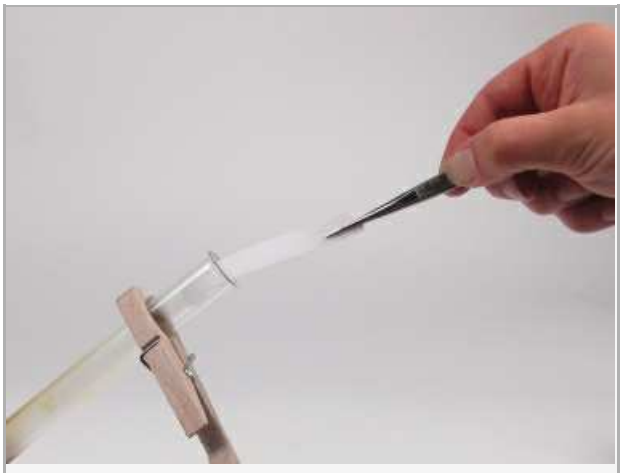


Fig. 5

Write down your observations in the report.

## Experiment 2

Repeat the experiment with the same quantity of granulated sugar.

## Experiment 3

Repeat the experiment with some olive oil).

## Experiment 4

Repeat the experiment with a small piece of boiled egg white (Fig. 6).

Fig. 6

The small piece of egg white must be heated very slowly in the test tube over a tiny flame. After a short while, there is a thick, whitish mist. What does it smell of?

Hold a moistened strip of red litmus paper in the mist. How does it change? Write you’re your observations in the report.

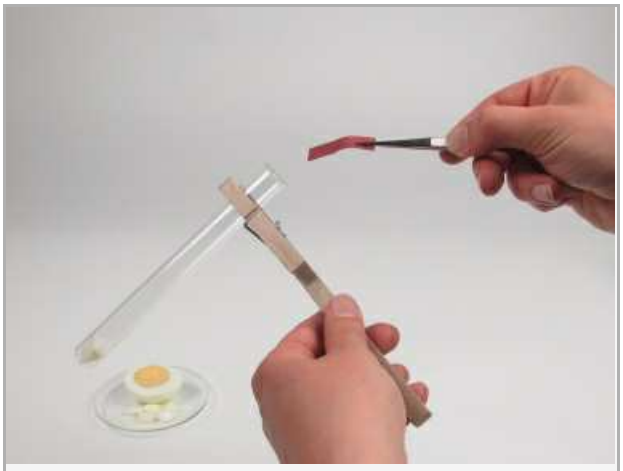


Fig. 7

# Report: Foods and nutrients

## Result – Observations 1

Note down your observations on experiment 1. How does the starch change on heating? Which results do the examinations with Watesmo indicator paper and litmus paper have?

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## Result – Observations 3

Write down your observation on experiment 3. How does the olive oil change on heating? Which results do the examinations with Watesmo indicator paper and litmus paper have?

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## Result – Observations 3

Write down your observation on experiment 3. How does the olive oil change on heating? Which results do the examinations with Watesmo indicator paper and litmus paper have?

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## Result – Observations 4

Write down your observations on experiment 4. How does the egg white change on heating? Which results do the examinations with Watesmo indicator paper and litmus paper have?

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## Evaluation – Question 1

Which elements can be detected? Which substance can be detected with Watesmo indicator paper? Out of which elements does this substance consist?
How does the colour of the nutrients change on heating? Think how a chip of woods changes when it is burnt. How do we describe what happens to the wood when it is burnt and so causes a change in colour too? What element does this change in colour indicate? For which element is this typical?

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## Evaluation – Question 2

What elements do the nutrients tested contain? What elements are contained in all nutrients? What element occurs in only one nutrient?

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