

# LEGEND

- direction
- research topic
- conclusion and discussion
- experiments
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# MILK

## Hey, nature friends!

Have you ever wondered what different solutions contain?

For example **milk**, **cooking oil** or **sugar water**?

## START

Which experiments help us determine the presence of **carbohydrates**, **proteins** and **fats** in a solution?

These 3 experiments help you find the answers, but you have to figure out which experiment leads to the answer you're looking for.

## NB! Safety precautions

When using a cooking stove, be very careful and avoid setting the paper on fire!

## Proteins

are both the body's **energy source** and its "**building blocks**", helping to create muscle, bone and other tissues. Proteins also help our **enzymes and hormones to function** and transport various compounds in the blood.



## Fats

are **odourless**, **colourless** and **tasteless** substances, either **liquid** or **solid** and **water-insoluble**.

For humans, edible fats are concentrated energy sources – a gram of fat provides us with almost twice as much energy as a gram of protein or carbohydrates.

## Sugar

is a natural product that is refined from either **sugar cane** or **sugar beet**. These are the only plants that contain enough sucrose (16-18%) for commercial extraction.



## Sugar water

In order to produce energy, our bodies need to break down sugars at first. Regular table sugar (sucrose) is broken down into glucose and fructose.

## Cooking oil

is made from vegetable fat, which is liquid. Animal fat is usually solid (except for seal and whale blubber)

## Milk

is a complex substance, white or slightly yellow biological fluid that contains almost all the chemical substances that are essential for the production and functioning of living cells.

## EXPERIMENT A SECRET MESSAGE

1. Use milk to write something on a piece of paper, then pick a second sheet and write something in oil, then write a third message in sugar water.

2. Let it dry

3. When the paper is dry, heat it on the stove until the message becomes visible

## EXPERIMENT B COLOURED FLUIDS

1. Take three shallow bowls or glasses. Pour some milk into the first one, some oil into the second and some sugar water into the third – so that it covers the bottom of the dish.

2. Add a few drops of food colour and draw some patterns.

3. Dip a Q-tip in liquid soap and place it in the middle of the bowl/fluid.

## EXPERIMENT C ADDING VINEGAR

1. Take three shallow bowls or glasses. Pour 100 ml milk into the first one, 100 ml oil into the second and 100 ml sugar water into the third.

2. Add about half a teaspoon of vinegar to each dish

3. Stir very carefully

What happens if you add washing detergent to different coloured fluids?

**Carbohydrates** include starch and various sugars, but also fibre. **Carbs** are our most important sources of energy.

## FINISH

Does milk contain proteins, fats and carbohydrates?

Does every fluid react to vinegar the same way?

Did the experiment work with each fluid?



# EXPERIMENTS WITH DIFFERENT SOLUTIONS

Have you ever wondered what different solutions contain?  
For example milk, cooking oil or sugar water?

Which experiments help us determine the presence of carbohydrates, proteins and fats in a solution?

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Does milk contain proteins, fats and carbohydrates?

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Did the secret message experiment work with all of the solutions?

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What happens if you add washing detergent to different coloured fluids?

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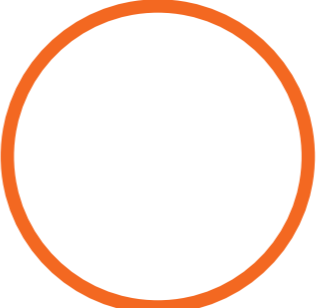
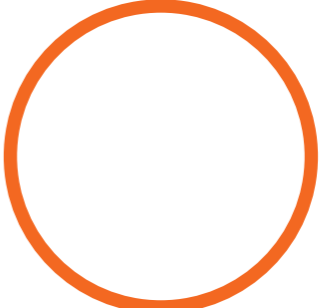
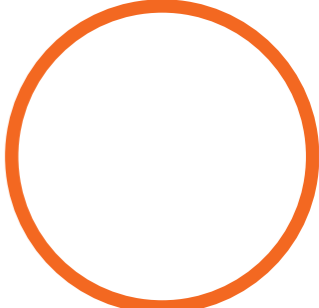
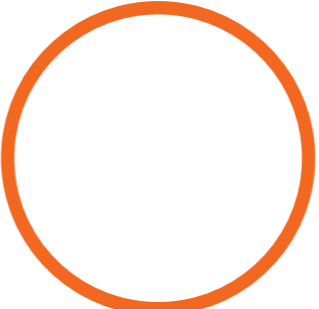
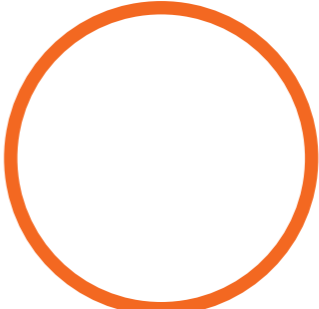
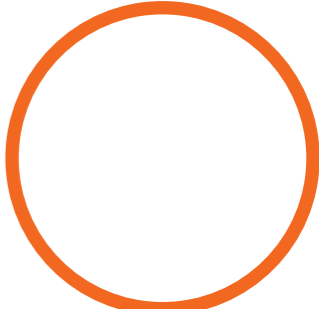
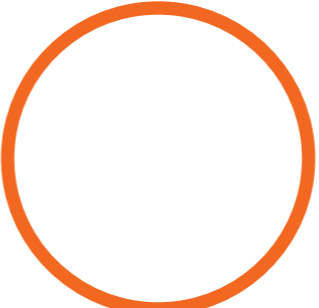
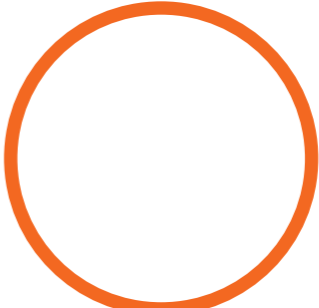
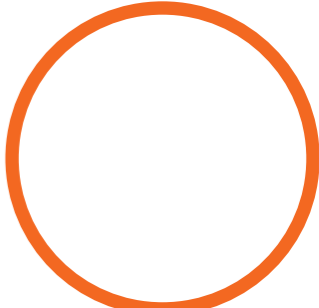
What happens if you add washing detergent to different coloured fluids?

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## CONDUCT 3 EXPERIMENTS WITH EACH FLUID AND DESCRIBE WHAT YOU NOTICED!

NB! PAY ATTENTION TO SIMILAR RESULTS!

|   | MILK                                                                                  | COOKING OIL                                                                           | SUGAR WATER                                                                           |
|---|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| A |    |    |    |
| B |   |   |   |
| C |  |  |  |

What kind of experiment did you need to carry out to determine the presence of a specific component?

Experiment A  
Experiment B  
Experiment C

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Does milk contain  fats  proteins  carbohydrates

ADDITIONAL INFORMATION: