

Chemical processes



Nature & technology

Substances in everyday use



Difficulty level

medium



Group size

2



Preparation time

10 minutes



Execution time

20 minutes

This content can also be found online at:

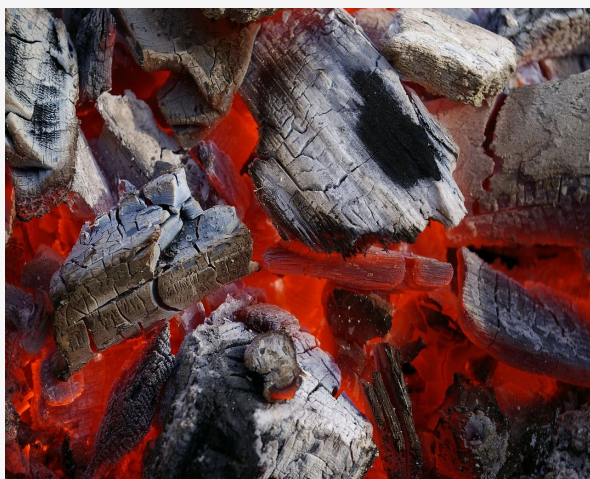
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PHYWE



Teacher information

Application



The combustion of charcoal is a chemical process

Chemical reactions are processes in which new substances, reaction products, with new properties are created from the starting materials. A conversion of substances takes place, which is always associated with a conversion of energy. Chemical reactions can be represented with word equations or formula equations.

In physical processes, only a temporary change takes place. In contrast, with chemical reactions, the substances undergo a permanent change. Chemical processes are encountered in everyday life when burning charcoal, dissolving an effervescent tablet or using baking powder.

Other teacher information (1/2)

PHYWE

Prior



- A chemical process occurs when the starting substances are consumed and new substances with different properties are formed.
- Chemical processes associated with energy conversions are called "chemical reactions".

Principle



- In this experiment, pupils learn how to distinguish between chemical reactions and physical processes.
- This is done by heating stearic acid and sugar in a test tube.
- In a physical process, only certain physical substance properties change (e.g. aggregate state), the final substance is still the same as the initial substance.

Other teacher information (2/2)

PHYWE

Learning



- Learning about chemical processes.
- Distinguish chemical processes from physical processes.

Tasks



- The students heat stearic acid and sugar.
- They check the behaviour of both substances when heated.
- They distinguish between chemical and physical processes.

Safety instructions

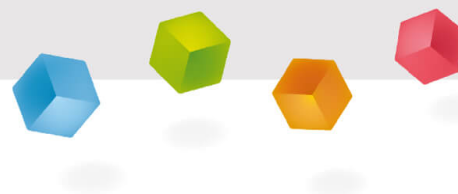
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- Use protective goggles/gloves!
- The general instructions for safe experimentation in science lessons apply to this experiment.

PHYWE

Student information



Motivation

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Effervescent tablet

You see chemical processes very often in everyday life. Effervescent tablets are medicines or food supplements that are dissolved in water and drunk. You notice effervescence when they are dissolved.

The effervescence comes from the fact that a salt of carbonic acid splits off carbon dioxide by reacting with an acid in the presence of water. The chemical reaction is basically the same as with baking powder. Baking powder releases gaseous carbon dioxide under the action of water, acid and heat.

To better understand the chemical processes and reactions, stearic acid and sugar are heated in this experiment.

Tasks

PHYWE

- Heat stearic acid and sugar.
- Investigate the behaviour during heating.
- Distinguish between chemical and physical processes.
- Note down your observations and answer the questions in the protocol.

What happens in a chemical process?



How can you recognise a chemical reaction?

The aggregate state of a substance has changed.

A new fabric has emerged.

Equipment

Position	Equipment	Item no.	Quantity
1	Beaker, Boro, low form, 250 ml	46054-00	2
2	Test tube, d = 16 mm, l = 160 mm, 100 pieces	37656-10	2
3	Test tube holder up to d = 22 mm	38823-00	1
4	Spoon spatula, steel, l = 210 mm	40874-00	1
5	Glass stirring rod, Boro, l = 200 mm, d = 5 mm	40485-03	1
6	Test tube rack, 6 holes, d = 22 mm, wood	37685-10	1
7	Safety goggles "classic" - OneSize, Unisex	39316-00	1
8	Pipettes with rubber cap, laboratory glass, l = 80 mm, 10 pieces	47131-01	1
9	Laboratory pen, waterproof, black	38711-00	1
10	Drinking water, 10l		

Implementation (1/4)

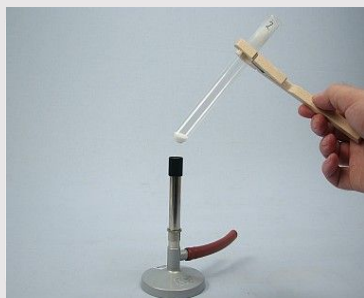
PHYWE

- Number the two test tubes 1 and 2.
- Place them in the test tube rack.
- Add a spatula of stearic acid to test tube 1.
- Put a spatula of sugar in test tube 2.



Implementation (2/4)

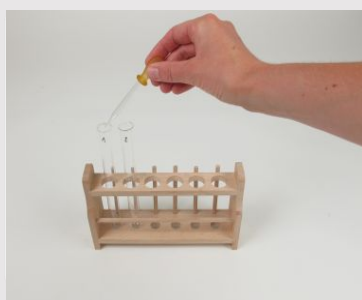
PHYWE



- Remove test tube 1 with the test tube clamp.
- Close the opening with a glass wool pad.
- Heat the lower part of the test tube in the non-luminous burner flame.
- Observe what is happening and record your observations in the log.

Implementation (3/4)

PHYWE



- Allow the test tube to cool and return it to the test tube rack.
- Now remove test tube 2 with the clamp, also close it with a glass wool pad and heat it.
- Look closely at test tubes 1 and 2 during and after the cooling phase and record these observations in the protocol.
- Then take a pipette and drip some water into the two test tubes.
- Write down your observations in the protocol.

Procedure (4/4)

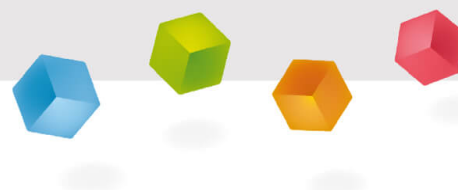
PHYWE



- Did the solubility (in water) of a substance change during the experiment?
- Compare this with the solubility of the pure substances.
- Number the two beakers 1 and 2.
- Fill both with about 50 ml of water.
- Put a spatula of stearic acid into beaker 1.
- Put a spatula of sugar in beaker 2.
- Observe the solubility.

PHYWE

Report



Task 1

PHYWE



What happens in test tube 1 (stearic acid) and 2 (sugar)?

Task 2**PHYWE**

What happens after you drop some water into both test tubes?

Task 3**PHYWE**

Which process took place in test tube 1 (stearic acid), which in test tube 2 (sugar)?

Task 4

PHYWE



Describe a chemical reaction and a physical process using both processes.

Task 5

PHYWE



Now answer the introductory question again

How can you recognise a chemical reaction?

A new fabric has emerged.

The aggregate state of a substance has changed.



Task 6

PHYWE



Did the solubility of the substances change during the experiment?

Compare it with the solubility of the pure

Task 5

PHYWE



Which process (heating) is a physical process?

One physical process is the heating of

Stearic acid

Sugar



Slide	Score / Total
Slide 8: Difference physical and chemical process	0/1
Slide 19: Physical and chemical process	0/1
Slide 21: Physical process	0/1

Total  0/3

 Solutions

 Repeat

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