Part B

Systematic investigation in physics

15. Execution (Time 30 minutes)

You are going to carry out an investigation to find out:
Which of the substances water, glycerol **or** cooking oil that demands most energy to heat, that is, decide which substance has the highest specific heat capacity.

In your execution, you are going to:

- work according to your plan or the prepared experiment instruction.
- consider the safety instructions your teacher has informed you about.
- take notes on your measurements in a table.

Part B

Experiment instruction for a systematic investigation in physics

You are going to carry out an investigation to find out:
Which of the substances water, glycerol **or** cooking oil that demands most energy to heat, that is, decide which substance has the highest specific heat capacity.

Equipment:
Liquids at room temperature: water, glycerol and cooking oil.
Goggles, apron, digital scale, thermometer, matches, candle (tealight),
3 beakers (100 ml) and stopwatch or similar.

Risks with the experiment:
Consider the safety instructions informed by your teacher.

Method of investigation:

Water

1. Weigh 50 g water (room temperature) in a beaker.
2. Light the candle.
3. Hold the beaker with water 1 cm above the flame from the candle and start timing.
4. Put the thermometer in the beaker.
5. Note the time when the thermometer reaches 35 °C.
6. Blow the candle.
7. Note the result.

Glycerol

8. Repeat step **1 – 7** with glycerol.

Cooking oil

9. Repeat step **1 – 7** with cooking oil.

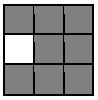
10. Empty all beakers in containers decided by your teacher, and wash up.

Part B

Systematic investigation in physics

16. Evaluation (Time 30 minutes)

a) Present your measurements of the three substances in a table.

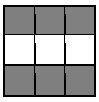


b) Draw a conclusion on which substance that has the highest specific heat capacity.

Suppose you can do the investigation once again.

c)

- Give **one** suggestion on an improvement of your investigation to make your result more reliable.

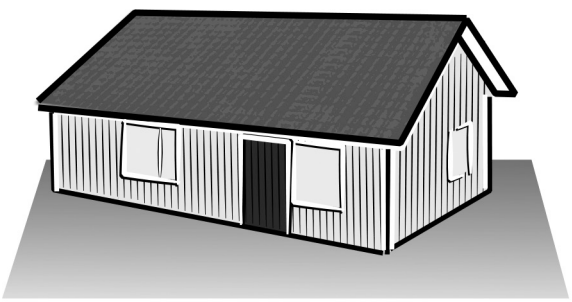


- Explain why this improvement would give a more reliable result.

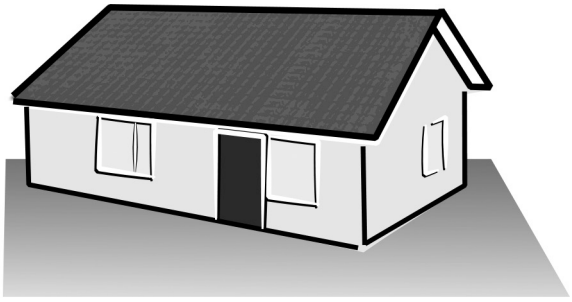
Part B

Systematic investigation in physics

Different materials' specific heat capacity influence how fast they will be heated. Two houses in the same block are having walls made of different material. One of the houses has walls of wood and the other has walls of concrete. Both houses have as thick walls as the other and the same amount of insulation inside the walls.



House with walls of wood



House with walls of concrete

Material	**Specific heat capacity** (The **amount of energy** needed to heat **1 kg** of a substance **1 °C**)	**Density**
Wood	0,4 kJ/kg·°C	0,5 kg/dm^3
Concrete	0,9 kJ/kg·°C	2,0 kg/dm^3

d) In the early summer, both houses are heated by the sun and the surrounding air. Which of the houses are heated faster, the house of wood or the house of concrete? Motivate your answer with help from the information in the table.