Discovering digestion

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Experimenting with energy: Student sheet

Equipment

- Food samples
- Boiling tube
- Clamp stand, boss and clamp
- Weighing scale
- Bunsen burner
- Heatproof mat
- Tripods and pipe clay triangles
- Crucibles
- Measuring cylinders (to measure 20cm^3)
- Thermometer or temperature probe
- Safety goggles

Predictions

List the food you think will have the highest energy content, to the food you think will have the lowest energy content.

1. _____
2. _____
3. _____
4. _____
5. _____

Lab activity 1
Method

1. Read the instructions in full before you begin
2. Put on your safety goggles
3. Use the measuring cylinder to measure 20cm^3 of water into the boiling tube
4. Clamp the boiling tube to the clamp stand
5. Measure the temperature of the water with the thermometer. Record the temperature in the results table
6. Choose a piece of food and find its mass using the balance. Record the mass in the table
7. Put the food into a crucible on a tripod
8. Light the Bunsen burner and hold the food in the flame until it catches alight
9. As soon as the food is aflame, put it under the boiling tube of water so that the flames heat the water. Try to make sure that as much of the heat from the burning food as possible is transferred to the water. Do this by keeping the flame under the tube
10. Hold the food in place until the food has burnt completely. If the flame goes out, but the food is not completely burnt, quickly but carefully light it again using the Bunsen burner and replace the food beneath the tube
11. As soon as the food has burned away completely and the flame has gone out, measure the temperature of the water again. Before measuring, stir the water carefully with the thermometer and note down the highest temperature reached in the results table
12. Repeat the procedure for other foods following your teacher's directions
13. Calculate the rise in temperature of the water and note it down in the results table below
14. Calculate the energy released from each food by using this formula: energy (J) per gram of food = mass of water (g) × temperature rise (°C) × 4.2/ mass of food (g)
    - (4.2 is the value of the specific heat capacity of water, in joules per gram per degree Celsius – the number of joules taken to raise the temperature of water by 1°C. 1 cm^3 of water has a mass of 1g

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Results table

Food	Mass of food (g)	Starting temp (°C)	End temp (°C)	Temp rise (°C)	Energy per gram (J)