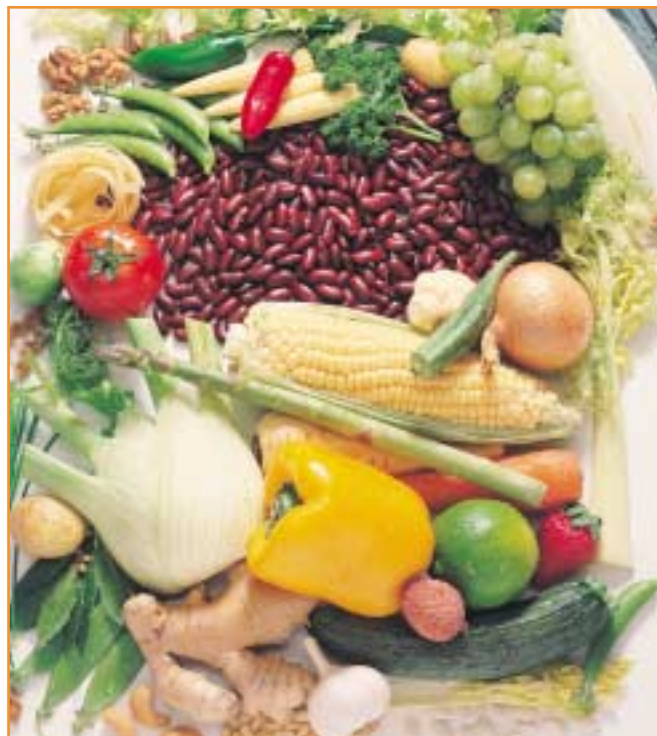
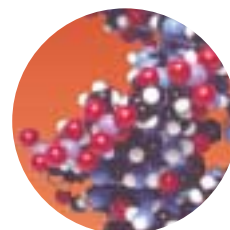


Teach Assist Resource Worksheets

Series 14 of 16



"Finding the energy in food"



Teach Assist Resources

TeachAssist resources are written with the practical needs of science teachers in mind. Each resource covers a practical activity that is integral to the QCA schemes of work to provide quick and easy preparation for practical classes.

Please feel free to photocopy the sheets to suit your needs.

Each TeachAssist resource contains:

- Student worksheet with practical instructions and activities.
- Technicians' equipment list for a class of 30 students.
- Reference to allow trouble-free ordering of materials and resources.

A summary table links each resource to the National Curriculum programme of study which allows TeachAssist practical activities to be quickly included into lesson plans and schemes of work.

If you require other booklets in the series, please telephone the Griffin Education sales team or send your request to the following address:-

Griffin Education
Bishop Meadow Road
Loughborough
Leicestershire LE11 5RG

STUDENT WORKSHEET

Important information:

Follow all the safety instructions that your teacher gives you.
 Take care with the bunsen flame and burning food.
 Use a heat resistant mat.
 Point the boiling tube away from yourself and others.
 Wear safety glasses.

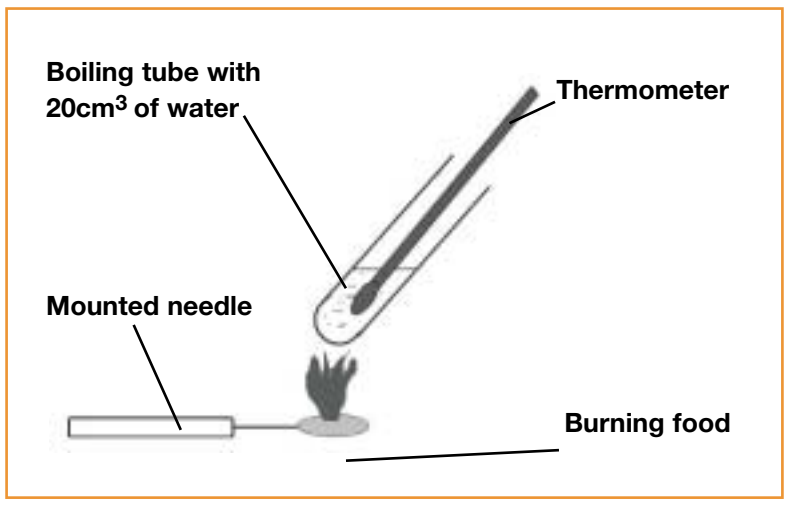
Measuring the energy in food

You eat food for nutrients and also for energy. Different foods contain different amounts of energy. This can be measured by looking at how much heat energy is released when they burn.

Care:

Use a heat resistant mat underneath the bunsen burner and also the boiling tube.

Keep the bunsen away from the boiling tube.



Compare the amount of energy in different food using this test.

1. Set up a bunsen burner on a heat-resistant mat. Leave it on a yellow flame.
2. Add 20cm³ of water to the boiling tube and measure its temperature.
3. Take a sample of food.
4. Carefully stick the food onto the end of the mounted needle.
5. Turn the bunsen to a blue flame and use it to set the food on fire.
6. Once the food is burning, quickly put it under the boiling tube to heat the water.
Turn the bunsen flame back to yellow.
7. When the food has gone out, measure the final temperature of the water.
8. Put your results in a table like the one below.

Food	Start temperature (°C)	Final temperature (°C)	Rise in temperature (°C)

- Which food had the most energy?
- What would you need to control to make a fair comparison?
- Did all the heat from the flame go into the water?
- How could the test be made more accurate?

TECHNICIANS' EQUIPMENT LIST

QCA Unit 7I: Energy resources

Date:	Room	Time/Period:
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Equipment Class of 30 pupils, working in pairs.	Quantity	Check	Out	Back
Boiling tubes	15			
Thermometers	15			
25ml measuring cylinders	15			
Mounted needles	15			
Heat-resistant mats	15			
250ml beakers (for water)	15			
Retort stand and clamp	15			
Wooden splints	15			
Safety glasses	30			

Important Information:



- The activity contains reagents and procedures that can be hazardous. It should not be performed unless an appropriate risk assessment has been made.
- Use mounted needles with wooden handles and take care with points.
- Remind students not to over-tighten the clamp on the boiling tube and to leave the bunsen burner to cool before handling it.
- Instruct students to position the boiling tube over a heat resistant mat so that any burning food does not drop on the bench.
- Suitable foods include peanuts, crisp breads, marsh-mallows, stale bread.
- For reliable comparisons, more able students can weight the food and calculate the temperature rise per gram.
- Energy (J) = Temp. rise (°C) x Volume of water (cm³) x 4.2
- 4.2 is the energy in joules required to heat 1g of water by 1°C.

ORDER REQUISITION

Equipment	Griffin Catalogue No.	Page	Unit cost (£)	No.	Cost (£)
Boiling tubes, Pyrex (pack of 100)	TES-630-189U	529	59.70		
Wooden splints (pack of approx. 1,000)	GFD-452-G	424	2.95		
Bunsen burner	BYB-400-026V	375	6.65		
25cm ³ measuring cylinders, polypropylene (pack of 5)	CYP-740-050E	394	7.15		
Thermometer (-20 to +150°C, 30.5cm, mercury-free)	THL-460-060L	534	3.50		
250cm ³ beakers, borosilicate glass (pack of 10)	FB33112	362	11.70		
Safety glasses	FB55125	492	2.25		
Total cost					
VAT					
Order total					

Complete the order form above and place your order with Griffin Education in your usual way. Prices are correct at time of print, please contact the Griffin Sales office or check on the Griffin Education website for the latest prices.

By phone: 01509 233344
By post: Griffin Education
 Bishop Meadow Road
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By fax: 01509 231893
By email: griffin@fisher.co.uk
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SUMMARY TABLE

QCA unit	KS3 NC programme	Y7 TeachAssist	Activity	Relevant experience from Key stage 2
7A: Cells	Sc1.2f Sc2.1a	1	How to use a microscope and prepare an onion epidermis slide	Use of hand lenses and basic microscopes. Plants and animals, including internal body organs and plant structures
7C: Environments and feeding relationships	Sc1.2g	2	Using a data logger to monitor environmental conditions	Some use of data loggers How organisms are suited to their environment
	Sc1.1a,c,d Sc1.2h,k,o	3	Wood lice in choice chambers	Asking questions and designing a fair test How organisms are suited to their environment
	Sc2.5b,e	4	Organisms and food chains in leaf litter	How organisms are suited to their environment Food chains as a feeding relationship
7E: Acids and alkalis	Sc3.3d	5	Finding the pH using universal indicator solution	Little or no previous coverage of pH
	Sc1.2g Sc3.3e	6	Using a data logger to monitor changes in pH when an acid is added to an alkali	Some use of data loggers Identification of patterns and trends
	Sc3.3e	7	Investigating the neutralisation of acids with antacid tablets	Use of tables and line graphs to represent data Mixing materials can lead to a change
7F: Simple chemical reactions	Sc3.3a	8	Reactions of metals with acids	Describing how materials change when mixed or heated and how irreversible changes produce new materials
7H: Solutions	Sc1.2a Sc3.1h	9	Purifying salt from rock salt	Use of dissolving, filtering and evaporation to separate mixtures
	Sc3.1h	10	Simple distillation	Knowledge of evaporation as a separation technique
	Sc3.1h	11	Paper chromatography of ink	Separation of colours in food colourings such as sugar-coated sweets
7I: Energy resources	Sc1.2f	12	Using the Bunsen burner	Possible use of methylated spirit burners or candle-burners
	Sc4.1c Sc4.5a,e	13	Demonstrating solar energy: solar cells and absorption of heat energy by different surfaces	Little or no previous coverage of energy
	Sc4.5a	14	Finding the energy content of foods	Little or no previous coverage of energy
7J: Electrical circuits	Sc4.1a	15	Current in series and parallel circuits	Construction of series circuits from circuit diagrams
7K: Forces and their effects	Sc1.2f,g,j,k Sc4.2b	16	Extension of springs and elastic bands	Push and pull in springs Testing elastic band catapults. Some may have extended bands with masses Measurement of forces and weight