

National curriculum links

KS3, Sc4 electrical circuits and energy resources.

Main learning objectives

Pupils learn:

- that we (and all living beings) need energy for every activity;
- that food is the energy source of animals;
- that energy is measured in joules;
- to use the joule as the unit for communicating about energy;
- that the sun is the ultimate source of the energy in foods;

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Energy for living beings – Foody fuels, part 1.

Where do we and all living beings get the energy to survive and do things?

RESOURCES REQUIRED

- 1 each of packaged food examples – bottle of vegetable oil, packet of peanuts, bag of sugar, bottle of vodka/gin (think about emptying or replacing contents with water!)
- Label for bottle of alcohol as most don't display the energy content.
1L vodka = 2.2kcalories, 9240kJ
1L gin = 6.8kcalories, 28560kJ
- Sufficient copies of "Food frenzy? DATASHEET" for everyone to work from.

TIME REQUIRED

Class time

Approximately one period

OVERVIEW

This has been designed as part of a three lesson topic highlighting some of the connections between food and bio-fuels (Foody fuels – parts 1, 2 and 3). It can, however, be taught independently of the other two lessons.

TEACHING ACTIVITIES

Introduction

Lead a discussion, using the following questions, prompts and clarifications.

- "Why do living beings – like you – need energy?" To stay alive, in human beings' case, to stay warm, move around, digest, sense, think etc.
- "Where do you get your energy from?" Explain that although activity and sleep are essential for health, neither supplies us with the chemical energy that food does. If your class has previous knowledge of fuels as concentrated, stored energy, offer a comparison – "Like fuel, food contains stored energy that we can use when needed."
- "Which foods make you feel really active and full of energy just after eating them? Which foods do you most want to eat when you're tired or after you've done a lot of physical exercise? Which other foods do you think contain a lot of energy?" Carbohydrates and fats come under the heading of 'energy foods' and are part of a balanced diet.
- "Where does the energy in food come from?" Trace the basic energy route back to the sun. Focus on the fact that plants need sunlight, and that they do the essential work of transforming that light energy into an energy resource which animals, including us humans, can eat. "Imagine trying to eat sunlight!"

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**Learning about the joule.**

- Explain that the joule is the basic unit for measuring energy. You might want to explain that the 'calories', which many students will have heard of, are old-fashioned energy units, now superseded by the joule in science.
- Use lifting an apple by 1 meter to give pupils a general sense of the 'scale' of a joule.
- Give out some examples of 'energy foods' with their energy ratings in joules written on the packet. The examples listed in the resources required section above are chosen due to their dual use as foods and bio-fuels, a link which can be drawn on in Foody fuels - parts 2 and 3.
- Have each pupil work out how far they could lift an apple using the energy from 100ml or 100g of one of the food examples.
- Hand out copies of the "Food frenzy? DATASHEET" as the basis for a chart drawing exercise, looking at per capita joule/calorie consumption in Bangladesh, the UK and the USA.

Food chains

- Draw on pupils' existing knowledge of food chains. Get the class to help you draw a food chain, starting with the sun and incorporating arrows to show the direction of energy flowing through the system.
- Have each pupil draw a food chain, with energy arrows from the sun to themselves, including a food from their previous nights' meal.