1 Food substances which contain lots of energy and are easily used by the body, for example sugar.

2 Food substances needed by the body to grow and repair itself.

3 Food substances which contain so much energy that we can easily put on weight, if we eat too much of them.

4 Food substances which are needed in tiny amounts to keep us healthy.

5 Food substance which cannot be digested but is needed for a healthy gut.

6 The units used to measure the energy content of food.

7 Too much fat in the diet is one aspect of an ________________ lifestyle.

8 The instrument used for measuring the energy content of food.
1 Obtaining food

Word search: Balanced diets

Teacher feedback
The energy you need from your food varies at different times in your life. It depends on whether you are male or female, how active you are and the type of work you do. The recommended values vary too, depending on where in the world you live. These figures are for Europe.

<table>
<thead>
<tr>
<th>Age/sex/occupation of person</th>
<th>Energy needed per day / kJ</th>
</tr>
</thead>
<tbody>
<tr>
<td>New born baby</td>
<td>2000</td>
</tr>
<tr>
<td>Child aged 2 years</td>
<td>5000</td>
</tr>
<tr>
<td>Child aged 6 years</td>
<td>7500</td>
</tr>
<tr>
<td>Girl aged 12–14 years</td>
<td>9000</td>
</tr>
<tr>
<td>Boy aged 12–14 years</td>
<td>11 000</td>
</tr>
<tr>
<td>Girl aged 15–17 years</td>
<td>9000</td>
</tr>
<tr>
<td>Boy aged 15–17 years</td>
<td>12 000</td>
</tr>
<tr>
<td>Female office worker</td>
<td>9500</td>
</tr>
<tr>
<td>Male office worker</td>
<td>10 500</td>
</tr>
<tr>
<td>Male farm worker</td>
<td>15 000</td>
</tr>
<tr>
<td>Pregnant woman</td>
<td>10 000</td>
</tr>
<tr>
<td>Breastfeeding woman</td>
<td>11 300</td>
</tr>
<tr>
<td>Woman aged 75+ years</td>
<td>7610</td>
</tr>
<tr>
<td>Man aged 75+ years</td>
<td>8770</td>
</tr>
</tbody>
</table>

1. How much energy each day is needed by:
   a. a 14-year-old girl? ____________________  
   b. a 16-year-old boy? ____________________
   c. a pregnant woman? ____________________
   d. an 80-year-old man? ____________________

2. How much more energy a day does a pregnant female office worker need than a non-pregnant female office worker?

3. At most ages, males need more energy than females. Suggest a reason for this difference.

4. If a female office worker ate food containing 10 000 kJ of energy every day, would you expect her to lose weight or gain weight? Explain your answer.
You are going to find out more about vitamins and practise interpreting graphs.

Over the years evidence for the importance of vitamins in our diets has been built up. It started centuries ago when sailors realised that eating citrus fruits helped prevent the disease scurvy and so saved thousands of lives. Citrus fruits are rich in vitamin C, although the sailors didn’t know that at the time. Modern scientific methods can show us exactly where the vitamins are used in the cells of the body.

In the early years of the 20th century Sir Frederick Gowland Hopkins did some research at Cambridge, UK. This work is still used as a classic piece of evidence for the importance of vitamins.

He took two sets of eight young rats and fed both sets a diet consisting of pure protein, carbohydrate, mineral salts, fat and water. In addition, one of the two groups of baby rats was given 3 cm³ of milk every day for the first 18 days of the experiment. This group of young rats then stopped getting the extra milk. From then on the milk was given to the other set of young rats, until the end of the experiment.

A close look at the results shows clearly that a diet, consisting of carbohydrate, protein fat, minerals and water, is simply not enough for the long-term health and growth of the young rats. The vitamins present in the milk were needed for the animals to survive and grow well.

The results from Gowland Hopkins’s experiments on young rats

1 Which deficiency disease is caused by lack of vitamin C? ________________

2 Suggest how sailors might have realised that something in citrus fruits was important to prevent the development of scurvy.

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________
Use Gowland Hopkins’ results from the graph to help you answer the following questions:

3. What was the average mass of the group of young rats at the beginning of the experiment?
   ____________________________

4. What was the average mass of the group of young rats fed milk from the start of the experiment:
   a. on day 18? _________________
   b. on day 50? _________________

5. What was the average mass of the group of young rats who had no milk at the start of the experiment:
   a. on day 18? _________________
   b. on day 50? _________________

6. Explain these observations and suggest how they helped Gowland Hopkins develop his ideas about vitamins.
   ____________________________
   ____________________________
   ____________________________
   ____________________________
   ____________________________
   ____________________________
   ____________________________
   ____________________________
   ____________________________
Think about the foods you like to eat. Now think about what you have learnt about the balance of foods needed for a healthy diet.

In the space below, plan a healthy, balanced diet for three days. You can write in your choices, draw pictures of the foods or stick in pictures from magazines or the Internet.

<table>
<thead>
<tr>
<th>Day</th>
<th>Breakfast</th>
<th>Lunch</th>
<th>Dinner</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td></td>
<td></td>
<td></td>
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</tbody>
</table>