

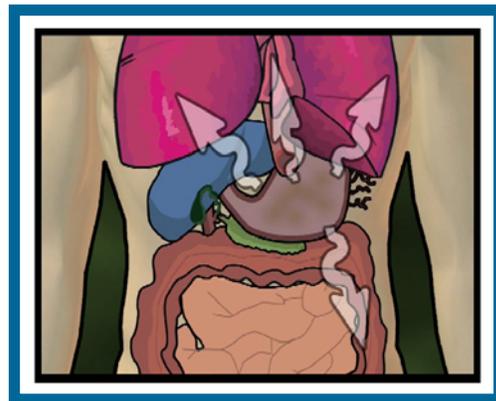


## **The Science in Foods**

**2006**  
**24 minutes**

### **Program Synopsis**

What exactly is food? In this program we introduce students to the science behind the food we eat. We start by describing what food is, the components found in food and why we need carbohydrates, protein, vitamins and minerals, fats and oils. And we show how to test different foods to determine which of these components are present. We also examine keeping food safe and how it should be handled and stored. Packaging, use-by-dates and refrigeration are also covered as well as long-term storage methods. Food allergies, the concept of genetically modified foods and possible problems with gene technology are also discussed in The Science of Foods.



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## The Science in Foods

*Teacher Notes:*

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### **Introduction**

This program introduces students to the science behind the food we eat. It starts by describing what food is, the components found in food and why we need these substances. Carbohydrates are for energy, proteins for growth and repair of tissue, vitamins and minerals to keep our bodies working efficiently and fats and oils also for energy. In the second chapter students are shown the tests that can be carried out on different foods to determine which of these components are present.

The third chapter of the program deals with keeping food safe for consumption. It explains how food should be handled and stored. Packaging, use by dates and refrigeration for short term storage are covered as well as long term storage methods such as freezing, dehydration, sterilization and chemical preservatives. In the following chapter the program explains the cause of food spoilage by micro-organisms as well as the beneficial benefits of others such as yeast.

Food allergies, their symptoms, most likely causes and treatment are covered in the fifth chapter before the concept of genetically modified foods are explained in the sixth chapter. Students are shown how the technology is carried out and the perceived benefits. The possible problems with gene technology are also discussed.

### **Program Rationale**

The program aims to educate students about food, why we eat it, what different foods are composed of and the benefit of each type. Correct handling and storage are covered as well as food allergies. Students are shown how science has contributed to the improvement in quality and quantity of the food we eat.

### **DVD Timeline**

00:00:00	Introduction
00:04:50	Types of Food
00:15:49	Food Allergies
00:18:36	Genetically Modified Foods
00:22:27	Conclusion
00:23:24	End credits
00:23:54	End program



**Program Worksheet**

**Before the Program**

1. Record everything you ate over a 24 hour period. At school, break these items into their components and write each in a table under the following headings:

Example: A ham sandwich consists of 2 slices of bread, 1 slice of ham and some butter.

meat, eggs	bread, cereals	dairy foods	Fruit & Vegies	fats & oils	sugar
1 slice ham	2 slices bread			butter	

When you have finished recording all the food you ate in your table, your teacher can shown you the food pyramid and discuss the types of substances found in each category and the proportion of our diet that should come from each food group.

meat, eggs	bread, cereals	dairy foods	Fruit & Vegies	fats & oils	sugar

2. Design a well-balanced diet for yourself for a 24 hour period, or design a menu for a two-day class camp.
3. Compile a list of common food items bought at the supermarket and for each describe how they should be handled from the moment they leave the shop until they are consumed serval hours later. A further task could be to suggest the best method of long term (eg. 2 months) storage for each item if the item can be stored.
4. Choose one method of long term storage such as dehydration, freezing, bottling & canning, smoking, picking in acid or salt, preserving using chemicals such as sulphur products, or using sugar and or alcohol. Discuss which types of foods are stored using this technique, how the technique slows down spoilage and the benefits and disadvantages of the technique.





## The Science in Foods

20. A gas that is sealed inside packages of dry foods to reduce spoilage is \_\_\_\_\_
21. Anaphylactic shock is due to eating a food to which the person is \_\_\_\_\_
22. Two foods that cause allergies in many people are \_\_\_\_\_ and \_\_\_\_\_
23. The new technology in which scientists are able to transfer a gene from one organism into another to change its characteristics is called \_\_\_\_\_ technology.
24. Two oils that have been genetically modified are \_\_\_\_\_  
and \_\_\_\_\_ oil.
25. In a balanced diet, a person should eat the largest amount of \_\_\_\_\_ foods,  
moderate amounts of \_\_\_\_\_ and to avoid obesity the least amount of  
\_\_\_\_\_ and \_\_\_\_\_.

**After the Program**

1. Do a research assignment on a technique of long term storage as suggested in the section under activities *Before Watching the Program*.
2. Research a disease of the digestive system caused by poor diet, allergy or genetics. Topics to choose from include eating disorders (several types), diabetes, peritonitis, beriberi, coeliac disease, cholera, hepatitis, phenylketonuria (PKU), rickets, scurvy, Crohn's disease, peptic ulcers. Present your work as a book that explains to a child who either suffers from the conditions or has a family member with the condition, the cause, symptoms, treatment, impact and prevention of the problem.
3. A class debate on the topic "*Genetically modified foods should not be grown in Australia*".
4. Word Search  
Find the 38 words listed below in the grid. They can be written horizontally backwards or forwards, vertically up or down or diagonally. If these words are shaded in, it will leave 16 letters that spell out a statement about the food that you eat.

C	E	S	I	R	U	E	T	S	A	P	L	I	O	S	Y
F	A	E	K	G	N	I	Z	E	E	R	F	O	N	T	D
N	A	R	N	L	A	L	L	E	R	G	Y	O	T	O	L
O	T	T	B	E	I	A	O	F	A	M	I	N	E	M	U
I	S	I	S	O	R	M	B	A	C	T	E	R	I	A	O
T	A	U	U	E	H	G	A	R	A	I	L	E	G	C	M
A	P	K	N	R	T	Y	Y	R	R	C	B	H	N	H	S
V	S	I	W	A	F	R	D	T	E	R	A	C	I	G	P
R	M	T	E	I	I	Y	U	R	E	H	T	R	K	R	O
E	E	C	S	A	H	N	E	A	A	T	E	A	O	O	R
S	L	H	D	E	A	A	D	T	A	T	G	T	O	W	C
E	L	E	D	Y	L	I	M	E	S	O	E	S	C	T	U
R	E	N	A	S	N	I	M	A	T	I	V	S	T	H	G
P	D	I	G	E	S	T	I	O	N	T	S	A	E	Y	M

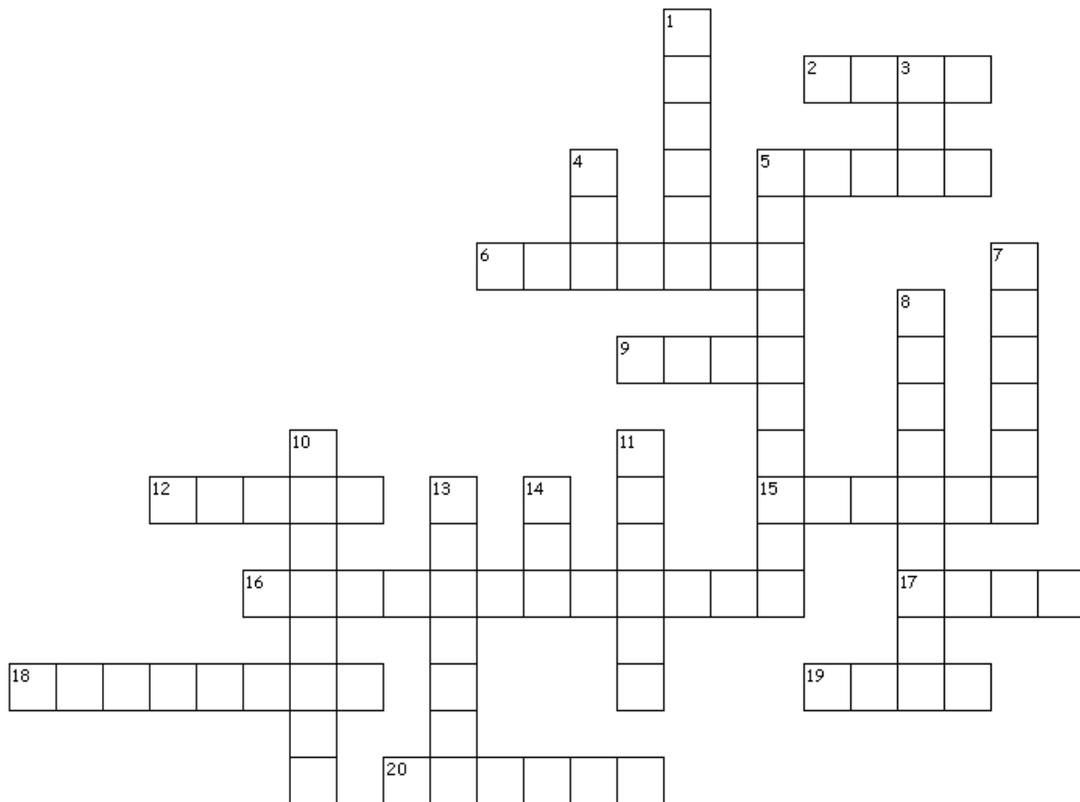
ALLERGY  
BACTERIA  
BREAD  
CARBOHYDRATES  
CEREAL  
COOKING  
CROPS  
DAIRY  
DEHYDRATION  
DIGESTION  
EAT  
ENERGY  
FAMINE

FATS  
FISH  
FREEZING  
FRUIT  
GM (genetically modified)  
GROWTH  
KITCHEN  
LIMES  
LOT (2 x)  
MEAT  
MILK  
MINERAL  
MOULD

NUTRIENT  
OIL  
PASTA  
PASTEURISE  
PRESERVATION  
PROTEIN  
SMELL  
STARCH  
STOMACH  
VEGETABLES  
VITAMINS  
YEAST

Statement: \_\_\_\_\_

### 5. Crossword Puzzle



#### Across

2. Food can be stored in a ... refrigerator to slow down the growth of bacteria
5. A food that is rich in carbohydrates
6. Food can be preserved by heating it in sealed ... or cans
9. A grain that is a good source of carbohydrate, often associated with Asian foods
12. Is a delicious source of vitamins and minerals.
15. This substance changes from brown to inky black in the presence of starch
16. A food component that is a source of energy when digested in the body
17. These are the best source of plant protein
18. Micro-organisms that spoil food
19. Sea creatures that are a good source of animal protein
20. Is produced by the body during digestion, so it can carry out daily activities

#### Down

1. Is a good source of carbohydrate, often eaten for breakfast
3. Eat a ... of fruit and vegetables to increase you intake of vitamins and minerals
4. A food component that causes obesity if too much is eaten
5. This is the method used to kill bacteria in milk, by heating it to 73oC for 15 seconds.
7. Means there is a shortage of food and is when the body uses protein for energy
8. The general name given to the chemicals found in food that the body needs
10. Is a chemical found in food that is needed to keep it healthy and free from disease
11. A form of carbohydrate that can be tested for using iodine
13. Is needed by the body for growth and repair of tissue
14. Foods in which the moisture has been removed to preserve them are said to be...

## Suggested Student Responses

### During the Program

1. Food provides us with nutrients.
2. Carbohydrates are the fuel our needs to supply us with energy.
3. Two foods that consist of a lot of carbohydrates include any 2 of bread, cereal, rice, pasta.
4. Protein helps the body to grow and repair tissue.
5. Protein is found in meats and dairy products.
6. Fats and oils are also a rich source of energy.
7. Vitamins and minerals are essential for maintaining good health, and to avoid disease.
8. During cellular respiration, energy is released and carbon dioxide is a waste product.
9. If there is a famine and the body's fat stores run out, protein can be used as a source of energy.
10. In what part of a person's life is their need for all food components highest? puberty.
11. What chemical is used to test for starch (carbohydrate)? iodine.
12. A mixture of copper sulphate and sodium hydroxide is usually blue in color. It turns mauve to show the presence of protein.
13. The chemical used to test for glucose (sugar) is called Benedict's reagent.
14. Absorbent paper, such as filter paper is used to test for fats and oils in food.
15. To keep food safe in the refrigerator, it should be stored between 0 and 4 °C.
16. A dairy product that is commonly pasteurized to kill bacteria is milk.
17. Five natural substances that can be used as preservatives to slow down the growth of bacteria include sugar, salt, lemon juice, vinegar and alcohol.
18. The most common type of micro-organism that spoils food is bacteria.
19. The most dangerous temperature over which bacteria multiply fastest is 5 to 60 °C.
20. A gas that is sealed inside packages of dry foods to reduce spoilage is nitrogen.
21. Anaphylactic shock is due to eating a food to which the person is allergic.
22. Two foods that cause allergies in many people are peanuts and seafood.
23. The new technology in which scientists are able to transfer a gene from one organism into another to change its characteristics is called gene technology.
24. Two oils that have been genetically modified are cotton seed and canola oil.
25. In a balanced diet, a person should eat the largest amount of plant foods, moderate amounts of meats and to avoid obesity the least amount of fats and oils.

After the Program

4. Wordsearch Answers

C	E	S	I	R	U	E	T	S	A	P	L	I	O	S	Y
F	A	E	K	G	N	I	Z	E	E	R	F	O	N	T	D
N	A	R	N	L	A	L	L	E	R	G	Y	O	T	O	L
O	T	T	B	E	I	A	O	F	A	M	I	N	E	M	U
I	S	I	S	O	R	M	B	A	C	T	E	R	I	A	O
T	A	U	U	E	H	G	A	R	A	I	L	E	G	C	M
A	P	K	N	R	T	Y	Y	R	R	C	B	H	N	H	S
V	S	I	W	A	F	R	D	T	E	R	A	C	I	G	P
R	M	T	E	I	I	Y	U	R	E	H	T	R	K	R	O
E	E	C	S	A	H	N	E	A	A	T	E	A	O	O	R
S	L	H	D	E	A	A	D	T	A	T	G	T	O	W	C
E	L	E	D	Y	L	I	M	E	S	O	E	S	C	T	U
R	E	N	A	S	N	I	M	A	T	I	V	S	T	H	G
P	D	I	G	E	S	T	I	O	N	T	S	A	E	Y	M

Statement: **YOU ARE WHAT YOU EAT**

5. Crossword Puzzle Answers

**Across**

- |   |                     |
|---|---------------------|
| 2. Food can be stored in a ... refrigerator to slow down the growth of bacteria     | <b>COLD</b>         |
| 5. A food that is rich in carbohydrates   | <b>PASTA</b>        |
| 6. Food can be preserved by heating it in sealed ... or cans                        | <b>BOTTLES</b>      |
| 9. A grain that is a good source of carbohydrate, often associated with Asian foods | <b>RICE</b>         |
| 12. Is a delicious source of vitamins and minerals.                                 | <b>FRUIT</b>        |
| 15. This substance changes from brown to inky black in the presence of starch       | <b>IODINE</b>       |
| 16. A food component that is a source of energy when digested in the body           | <b>CARBOHYDRATE</b> |
| 17. These are the best source of plant protein                                      | <b>NUTS</b>         |
| 18. Micro-organisms that spoil food   | <b>BACTERIA</b>     |
| 19. Sea creatures that are a good source of animal protein                          | <b>FISH</b>         |
| 20. Is produced by the body during digestion, so it can carry out daily activities  | <b>ENERGY</b>       |

**Down**

- |  |                   |
|--|-------------------|
| 1. Is a good source of carbohydrate, often eaten for breakfast                             | <b>CEREAL</b>     |
| 3. Eat a ... of fruit and vegetables to increase you intake of vitamins and minerals       | <b>LOT</b>        |
| 4. A food component that causes obesity if too much is eaten                               | <b>FAT</b>        |
| 5. This is the method used to kill bacteria in milk, by heating it to 73oC for 15 seconds. | <b>PASTEURISE</b> |
| 7. Means there is a shortage of food and is when the body uses protein for energy          | <b>FAMINE</b>     |
| 8. The general name given to the chemicals found in food that the body needs               | <b>NUTRIENTS</b>  |
| 10. Is a chemical found in food that is needed to keep it healthy and free from disease    | <b>VITAMINS</b>   |
| 11. A form of carbohydrate that can be tested for using iodine                             | <b>STARCH</b>     |
| 13. Is needed by the body for growth and repair of tissue                                  | <b>PROTEIN</b>    |
| 14. Foods in which the moisture has been removed to preserve them are said to be...        | <b>DRY</b>        |