

16a – What are chemicals?

What would you think if someone told you that the following chemicals were in your food?

Quercetin

Phenolic acid

Perhaps you would be afraid to eat that food. But in fact, these two chemicals are vital to our health. They are plant chemicals commonly found in apples. They protect the apple against bacteria, viruses and fungi and provide the fruit's anti-oxidant and anti-cancer benefits.

Everything on the planet is made of chemicals of some sort. Chemicals are substances. Our food, clothing and buildings are all made of chemicals. Our bodies are made of chemicals too.

The universe consists of matter, energy and empty space. We can think of matter as “stuff” or “substances”. Matter can be any substance that has mass and takes up space. Chemistry is the science that deals with matter. Matter can change. The change can be a physical change or a chemical change.

Matter can be in one of three states: solid, liquid or gas. When matter changes from one state to another, it is called a physical change. For example, when we dissolve sugar, the state is changed from solid to liquid. This is a physical change.

A chemical change is when one substance is used up and others are formed in the place of the one that has disappeared. An example is when wood is burnt. The wood is burned up and what is left is carbon, or black charcoal. This is a chemical change, or a chemical reaction.

Chemicals can be safe or unsafe. They can be helpful or harmful. Plant chemicals, in foods like apples and lettuce, are safe chemicals. However the man-made chemicals that are sprayed on the apples and lettuce to keep the bugs away are not always safe, so we should always wash our fruit and vegetables before we eat them.

Many man-made chemicals are added to processed foods, to make them last longer (preservatives), to make them look or taste better (artificial colourings and flavourings) or to change the texture. Hundreds of food additives have been tested for safety, and we are told that they are safe. That means that you won't get sick immediately after eating a food additive. But no one really knows what the long-term effects might be. Some researchers believe that some food additives may not be good for our health. The food additive decoder shows us the safe and not-so-safe food additives.

Which chemical do you think is the safest?

Phenolic acid (the natural plant chemical in apples) **or**

Butylated Hydroxytoluene (Preservative no. 321, a preservative derived from petroleum often found in bubble gum and chewing gum)

When buying processed food, make sure you know what you are buying. Use your chemical food decoder.

- What is a chemical?

- What is a physical?

- Are all chemicals bad?

- Name a chemical that is good for us.

- Name a chemical that not good for us.

- Write P or C next to these to show whether it is a physical or chemical change:

- melting an ice block _____
- making custard _____
- dissolving sugar in water _____
- boiling water _____

**Use your
food
decoder!**



16b – Be a detective

Here are a few of the most common food additives that may not be so healthy:

Preservatives:

- 320, 321 – in bread, cakes and biscuits
- 282 – a mould inhibitor in bread that may cause allergic reactions in some people
- 310, 311, 312 – in vegetable oils, chips and fried foods
- 200, 201, 202, 203 – in some cordials and soft drinks
- 210, 211, 212, 213 – in some cordials, soft drinks and sausages
- 249, 250, 251, 252 – in processed meats like ham and salami

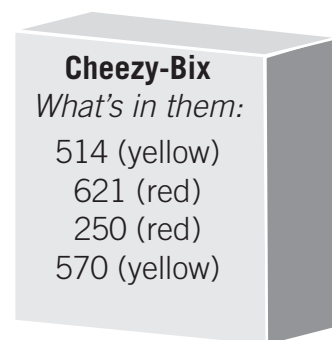
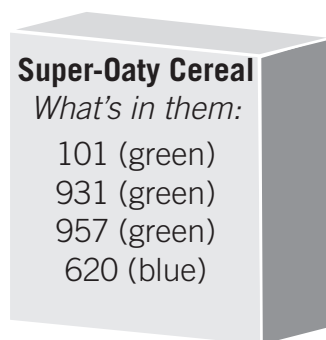
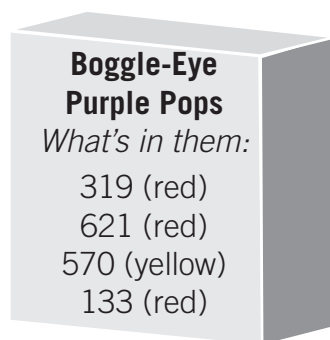
Colours:

102, 104, 107, 110, 122, 123, 124, 125, 126, 127, 128, 129, 133, 142, 155

Flavours:

621 or 635 – MSG, used in instant noodles, pies, sausage rolls and take-away chickens.

Use the code to work out which of the following three products is the healthiest. Tick the healthiest product:



Boggle-eye Purple Pops Super-oaty cereal Cheezy-Bix

Code:

red = could have bad effects

blue = probably safe

yellow = might have bad effects

green = safe

Collect food packet and wrappers

See how many packet, wrappers and food labels you can find with numbers listed in the ingredients list. Make a collection in the classroom. Write down any products that contain the food additives listed at the top of this sheet. Look up the numbers using your food additive decoding sheet and record the colour rating next to the number.

16c – Our bodies and their marvellous defence mechanisms

If you pay attention to my commandments, I will put none of these diseases upon you. I am the Lord who heals you. Exodus 15:26

The Israelites were God's special people. They were special because the Son of God was one day going to be born into their nation. God protected the Israelites throughout the Old Testament in many ways. One way was to provide for them special health laws, to keep them healthy.

One such law was to do with eating fat. God instructed them not to eat the fat of any animal. In those days it was not known that too much animal fat clogs up the arteries of the body and causes many illnesses. Today we know that this can be true, especially if a person doesn't do enough exercise. Not all fats are unhealthy. The bible also speaks about some very good oil, olive oil. Other good fats are in nuts, seeds, avocados and coconuts. The worst fats are ones that have been heated when they are being processed. These fats are in margarine, cooking oils and everything made from them – things like pastry and chips.

Another law given to the Israelites was to do with eating certain meats. The Israelites were only to eat particular meats that God had told them to eat. They were not to eat birds of prey, or land animals that ate meat because these carried diseases. They were not to eat shellfish because this can give us food poisoning if it is not fresh.

The Israelites were also told not to eat blood, because this too could cause disease. The Bible was actually saying that to avoid disease, meat should be well cooked and not have blood oozing out of it.

The book of Genesis tells us that in the Garden of Eden, God gave people plants and seeds for food. Plant foods were the only food in the Garden of Eden, and Adam and Eve lived very well without eating meat at all.

God wants us to be wise about the way we treat our bodies. If we want to do His work, then we need a healthy body to do it. The Bible says our bodies are temples of the Holy Spirit. Our bodies are marvellous machines. They need the right food to keep them going well. They also need exercise. By not overloading our bodies with the wrong sort of fat, sugar and salt, and by avoiding the not-so-healthy food additives, we are actually protecting ourselves from sickness. God has placed within our bodies a defence mechanism called the immune system. The immune system works hard for us, fighting battles all the time against poisons, bacteria and viruses that are all around us. A healthy immune system works hard to fight against the bacteria and viruses that we come into contact with. If we do get sick, then a healthy immune system will help us to get well again quite quickly.

God said, "I am the Lord who heals you." While many sick people are healed simply by praying, it is also part of God's plan that people allow their healthy immune system to do part of the healing too. We can only have a healthy immune system if we eat the right foods, drink enough water, and have enough exercise and rest. If we do this, then the built-in healing system of our body will go into action if we do happen to get sick.

1. Name some good fats. _____

2. Name some bad fats. _____

3. What were some of the meats the Israelites were not to eat, and why? _____

4. What was the first food given to human beings? _____

5. What is the name of our body's defence mechanism? _____

6. What does it do? _____

7. How can we keep our immune system healthy? _____

16d – My personal eating plan

Make up a personal plan for improving your diet. Decide which foods you are going to cut out, or cut down on, and which foods you are going to eat more of. Remember to include drinks too. Write down your plan. Include the date. Review your plan after 2 weeks and write a report on how well you stuck to your plan.

This is what I plan to eat for:

Breakfast

Lunch

Evening meal

Snacks:

Drinks:

After 2 weeks...

I think that my diet over the last 2 weeks has been:

- the same as before
- a little healthier
- very healthy

I think my diet was healthier than before because:

Can you help?

Here is a list of food that a boy eats in one day. On a separate sheet of paper, make a new list for him, giving some suggestions for improving his diet. Also think about his water intake.

• Breakfast

- 1 glass chocolate milk
- 2 slices of white toast with jam

• Mid-morning

- 2 chocolate biscuits
- 1 fruit box drink

• Lunch

- Peanut butter sandwiches made with white bread and margarine
- 2 sweet biscuits

• After school

- 1 strawberry flavoured milk drink
- 1 packet potato crisps

• Evening meal

- 1 ham and cheese pizza
- 1 serving of hot chips
- 1 corn on the cob
- 1 serving of Neapolitan ice-cream

Food rhyme

There once was a man who lived in a tower.
He hated vegetables, especially cauliflower.
He ate junk food instead,
No matter what was said,
And preferred to drink fizz on the hour.



17a – Who’s telling the truth?

Truthful lips endure forever, but a lying tongue lasts only a moment. Proverbs 12:19

If any of you lacks wisdom, he should ask God, who gives generously to all... and it will be given to him. James 1:5

Do you ever get the feeling that TV commercials are trying to fool you? It is very easy to become sucked in by the spectacular advertisements, with their sensational colour, sound and action, designed to make you look. Once they have your attention, then they work on you to buy their product.

Just think of all that delicious chocolate or ice-cream looming up in front of you. It’s enough to make you scream, “I want one!”

However, TV commercials do not tell us about all the bad effects this junk food will have on our bodies. That means that someone is not telling the whole truth. Some commercials make food look good when it is really not-so-healthy. Some commercials even go so far as to say how healthy the junk food is. They say that chocolate-coated biscuits are healthy just because the chocolate has whole-wheat biscuit inside it. They say that chocolate and sugar give you energy. Now this may be true for 5 minutes. You may get a 5-minute burst of energy, only to be followed by a complete lack of energy, as these junk foods sap the energy from your body. And how about the chocolate that is supposed to be made from full cream milk. They try to tell you that that’s healthy too.

We don’t need to be deceived by misleading information. God has given us wisdom. We can think carefully about the information we hear, and say, “Is it really true?” Ask God for wisdom and He will give it to you. Try to find out who’s telling the truth.

In the Bible, Jesus said that He is the truth. He is the Good Shepherd who can lead us into truth. When the voice of a stranger comes along, we don’t have to listen to it. Now there will be many times in life when we are presented with false information. Just like the junk food, bad things can be made to look good. We need to be listening to the voice of the Good Shepherd always, praying for wisdom to discern between what is true and what is not true. Is it good? Or is it something bad just wrapped up in a beautiful package.

1. Describe a junk food commercial on TV and explain how it influences people to buy the product. Comment on both sound and image.

2. Think of another TV commercial that tries to convince you that the product is good, when really it is not good. Describe the commercial and explain why it isn’t telling the truth.

Advertisements often try to trick people into buying products they don't really need. This is true about junk food. We don't need it. It is bad for our bodies and an absolute waste of money. If we want a delicious snack, then there are plenty of healthy snacks we can make to replace junk food.

Here are some of the things advertisers say to make you buy things:

- "Everyone else is buying one so you must get one too."
- "It tastes good."
- "It is good for you."
- "It is recommended by important people."
- "It gives you energy."
- "It will make you happy."
- "You get a lot for your money."
- "You need to buy it **now**."
- "You get a free gift if you buy one."
- " Buy one and get one free."
- "You deserve it."
- "Spoil yourself"

Here are some other methods that advertisers use to persuade you:

- musical jingles
- 'sale' or 'special price'
- big packets but only small quantities
- close-up photographs to make you think that the item is bigger than it really is

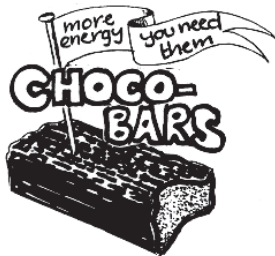
Choose a junk food advertisement that is on TV.

Think about the tricks that have been used. Try to find anything about the advertisement that is not completely true or honest. Now write about the advertisements you have chosen.

17b – Food advertisements

Are they telling the truth?

Here are some junk food advertisements. Explain why they might be misleading. Explain how the advertising techniques are trying to tempt you into buying the product.



1. Chocobars

2. Lickety Pops

3. Dairy milk chocolate

4. Fizzo

Can you pick out the faults with these advertisements?

Why are they misleading?

1. For better health, drink more dairy milk and eat less avocado. Avocado is higher in fat.

2. Eat more margarine. It's great for heart health.

3. Sugar is such a natural food, and full of goodness.

4. *Fruity-Bix* sugar-coated breakfast cereal is full of the goodness of real fruit.

Finding out the truth about food additives

If we want to know the truth about the packaged food we eat, then we must find out what's in it. All packaged food should have a list of ingredients. Sometimes these ingredients are listed as numbers, and sometimes as actual food items. We can read the labels to find out more about the ingredients.

Some numbers tell us that the food additives are completely safe. Other numbers tell us that some people may have a reaction to this additive, especially if they eat a lot of it.

Food Labels

Collect food wrappers and food packets. Look at the numbers on the ingredients list and use your decoding sheet to measure how healthy the ingredients are. Take a sheet of paper and write the name of the product you are investigating. Give each product a rating for healthiness:

1 — for 'natural or completely safe'

2 — for 'average'

3 — for 'may have problem ingredients'

Unlabeled

There are many artificial flavours used that don't have to be labeled. You will find these chemicals in many ice-creams, sweets and lollies. You won't find these chemicals listed on your decoding sheet because they don't have to be labeled.

Many of the chemicals that are used to make artificial colourings and flavourings can be also found household products like plastics, dyes, rubber, glues and cleaners.

What can we do?

When you buy ice-cream and sweets, make sure that they are made from natural ingredients. Many companies choose natural ingredients, like real fruit colourings and flavourings. Look out for the label, “no artificial colourings and flavourings” and choose these products when you go shopping.

**Only eat ice-cream
made from natural
ingredients**



17c – Sugar, Fat, Salt

For better health, eat as little as possible of these:

Heated Oils

Heat-processed vegetable oils are also called hydrogenated oils, (pronounced “hi-droj-en-a-ted”) or trans-fats, and these can create toxins in our bodies. Toxins are poisonous substances. Now you may be thinking that these toxins would make you sick. Actually, they don’t make you feel sick. The amount of toxins you take into your body with hydrogenated oils in one meal is actually very small, and your body doesn’t notice it straight away. However, after a long time, the toxins build up, and can cause health problems.

Where do we find them?

Examples of heat-processed vegetable oils are margarine and ordinary cooking oil. However olive oil is an exception. It is a good oil because can withstand heat. We can also find heat-processed vegetable oils in foods cooked in oil. Chips, crisps and pastries are examples.

Which oils are the best?

Olive oil, and oils in avocados, nuts, fish and coconuts are good oils. A little butter is also good. You can also try making your own nut spread, or nut dip, in a blender. (See the recipe section).

List some good fats

List some bad fats

White table salt

White table salt, used in most foods that we buy, is called refined salt, and contains no goodness. It actually contains chemicals that are not good for our bodies. The pure salt from the sea however, has lots of minerals that are useful. This sort of salt is called ‘unrefined salt’. It is grey-looking, and is available from health shops.

Where do we find white table salt?

Apart from on the table, it’s in potato crisps, most breakfast cereal, tinned foods, cracker biscuits, bought bread, tomato sauce, hamburgers, sausages, hot dogs and many other foods.

What can I eat instead?

Make your own healthy snacks. If you make your own food, then you can add the good, unrefined salt, or if you don’t have any, just use less white salt.

List some healthy snack foods that you could make or buy:

Sugar from sugar cane

Although this comes from natural sugar cane, it is no longer natural once it has been processed. This type of sugar is called refined sugar, unlike the sugar you would find naturally in a piece of fruit. Our bodies have to work hard to break down refined sugar. People who eat a lot of sugar have less energy and can catch colds more easily.

Where do we find it?

Refined comes in three types, white, brown and raw. It is found in sweet foods and soft drinks. It is also added to many other foods, like muesli bars, which sometimes carry the label, 'glucose'.

What can I eat instead?

Eat fruit in which there is natural fruit sugar. The body can use this type of sugar more easily. You can also eat a little honey, but remember to clean your teeth because all sweet things can promote tooth decay. You can also make your own healthy sweet treats using honey. Many people get confused about sugar. If it is a natural product, why isn't it good for you?

Firstly, let's look at where sugar comes from. Sugar comes from a plant called sugar cane. The stalk of the plant, which looks a bit like bamboo, contains a very sweet liquid. This is natural sugar. However very few people eat sugar in this way.

The sugar we use as food today is a white crystal substance that has been made out of the liquid cane sugar. The liquid sugar is heated and cooled until crystals are formed. The crystals that are produced have all the vitamins, minerals, proteins, enzymes and other good nutrients stripped away. The sugar that is left is not good for us at all. The good part of the sugar is a sticky black liquid called molasses. Molasses has some goodness, but tastes very different from crystallised sugar.

Over time, sugar can do damage to our bodies because:

- People eat sugar in large quantities.
- Babies and toddlers are given sugary drinks, and they want to keep having it.
- People cannot stop eating it. (addicted)
- Sugar causes tooth decay.
- Sugar is the main cause of diabetes.
- Sugar weakens our immune system, so that we catch colds more easily.
- Sugar can makes us feel tired.
- Sugar can cause people to gain weight.

Processed foods are loaded with sugar

If you examine the processed foods in any supermarket, and start reading labels, you will find just about everything contains sugar. Most of the foods are loaded with it – from cereals, to soups, to tomato sauce. Some cereals are as much as 50% sugar.

What to do if you are addicted to sugar

Some adults are addicted to sugary drinks. For people who add sugar to their drinks, they can start by cutting down the amount of sugar little by little. For example, instead of 1 teaspoon in a cup, they could try three-quarters for a while. Then go to a half, and gradually cut down. The taste buds will get used to it and before long, they will be enjoying the drink just as much without sugar.

For children who only want to drink sweet drinks, they could try drinking watered-down fruit juice occasionally, and water regularly. They will soon find that they enjoy drinking water.

To cut down on sugar in foods, read the labels on processed foods and eat fresh fruits, nuts or make your own treats using a little honey.

What not to do if you want to cut down on sugar

There is a sweetener that is worse for our bodies than sugar. That is aspartame, (pronounced *ass-par-tame*). Some people think that they will replace sugar with aspartame, to help them lose weight. Aspartame is in diet drinks and some sweets. Look up your decoding and see the rating for aspartame, no. 951. Aspartame affects the central nervous system. That means it affects our brain. Beware of any sweet product that is labeled 'no added sugar'. Check to see if it contains food additive 951.

Answer the following in your own words:

1. Give two reasons why sugar is not good for health.

2. What is the meaning of addictive?

3. What advice would you give to someone who is addicted to sugar?

4. Think of some supermarket foods that contain sugar.

5. List some supermarket foods that don't contain sugar.

6. Which sweet food additive is worse than sugar?

Circle the healthy foods

Which of these foods contain **no** refined salt or sugar, **no** preservatives and **no** hydrogenated vegetable oils?

sausages apples bananas dried beans roast lamb potato crisps
hamburgers carrots sesame seeds sultanas potato rice margarine
tinned soup plain pasta ice-cream cheese beef steak avocado

Investigate breakfast cereal packets

Be a detective. Look at the table of ingredients and work out the percentage of salt, sugar and fat contained in breakfast cereals. Rate them in order of healthiness.

The ideal breakfast would be porridge or eggs that you cook yourself. But if you are in a hurry, sometimes you may like to eat a cereal that is already prepared. Here is a guide.

If the cereal contains:

- More than 200 mg. of salt per 100 grams of cereal, it is definitely too much.
- More than 15 g. of sugar per 100 grams of cereal, it is definitely too much.
- More than 10 g. of fat per 100 grams of cereal, it is definitely too much.
- And the cereal should also contain more than 4g. of fibre per 100g

I think that _____ is the best breakfast cereal
because _____

I think that _____ is the worst breakfast cereal
because _____

Food Limerick

There was an old woman in a shoe.
She hated vegies and always had the flu.
So she ate fruit and greens
And a plate full of beans
That was the very best thing to do.

18a – Enough food for the whole world

Give and it shall be given to you. Luke 6:38

Think about the Garden of Eden, with all its wonderful fruits, vegetables, nuts and seeds. The garden provided enough food for Adam and Eve as well as all the animals. As time went by, things changed. Because of disobedience to God, a curse had to be put on the earth. The climate was not perfect everywhere. There were floods and droughts, which were not part of God's original plan. However, God made it possible for people to survive by providing foods that could be stored for times of emergency. Seeds, like grains, could be harvested in the summer and stored for use in the winter. God also allowed the eating of animals, for survival in such times, when there were no plants to be found.

Seeds are an important part of God's provision, because not only are they an excellent food by themselves, not only can they be stored for long periods, but also, they can start new plants. God intended that people use seeds to farm crops, and so His provision for the creation was on-going.

What about times when there is no rain to water the crops? What if there is no harvest? We call this a drought or a famine. In God's perfect world there would be no droughts or famines. Unfortunately, God's perfect world has been spoiled by sin, so it is no longer perfect. However, God has made a way. God expects those people who live in lands where there is plenty, to share with those lands that have little.

"Why doesn't this always happen?" you may ask. "Why are there children starving because of famine?"

There are many people who are willing to give food and money to people suffering from famine. However, there are other people who want to stop the food getting through. Because of wars and evil powers, food often does not get through and people starve. This is not God's plan, but the plan of evil greedy people.

There are many places, however, where food gifts can get through to the people. There are many organisations which make this possible. They need people like us, who have plenty, to give to those in need. You might think that you don't have enough money to give away, but really, most people in our country have more than enough. Can you think of anything that you could do without, so that you could give to someone in need? Think about the most expensive foods your family eats. Are there any cheaper foods that you could eat that are just as healthy, or even healthier? Did you know that the cheapest foods we can buy are the plain wholesome foods like rice, dried beans, lentils and fresh fruit and vegetables. The most expensive foods are the junk foods because these are empty foods. That means that they contain very few nutrients. Compare the cost of an apple with a packet of potato crisps. Which is better for you?

There are many ways in which we can give money to those in need. Some families regularly give money to support an overseas child in need. Schools and churches can also do this. Eating less expensive, but healthier food is a good way to save some money to give away. A money box is a good idea, so that you can save regularly.

Name three excellent properties of seeds.

1. _____

2. _____

3. _____

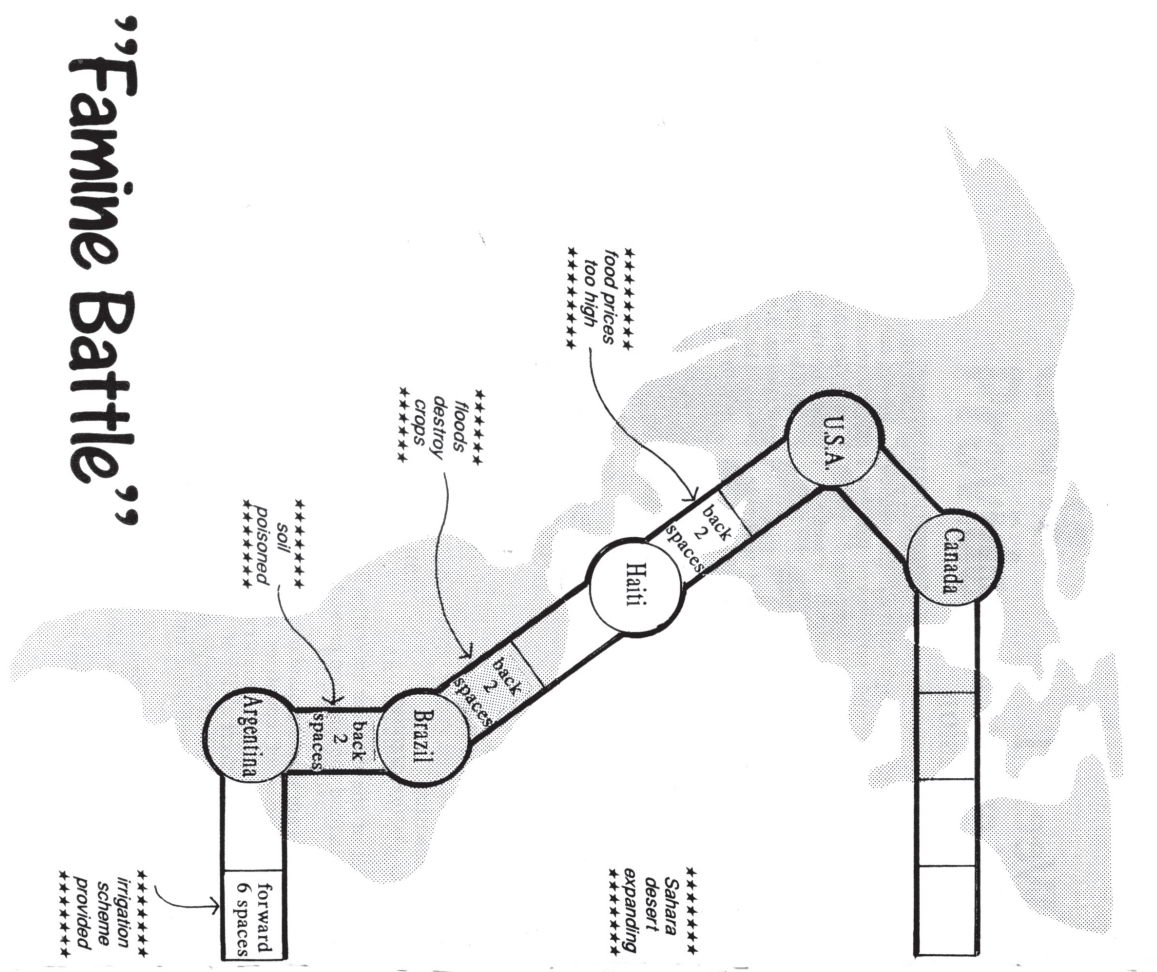
How can we work help people who don't have enough to eat?

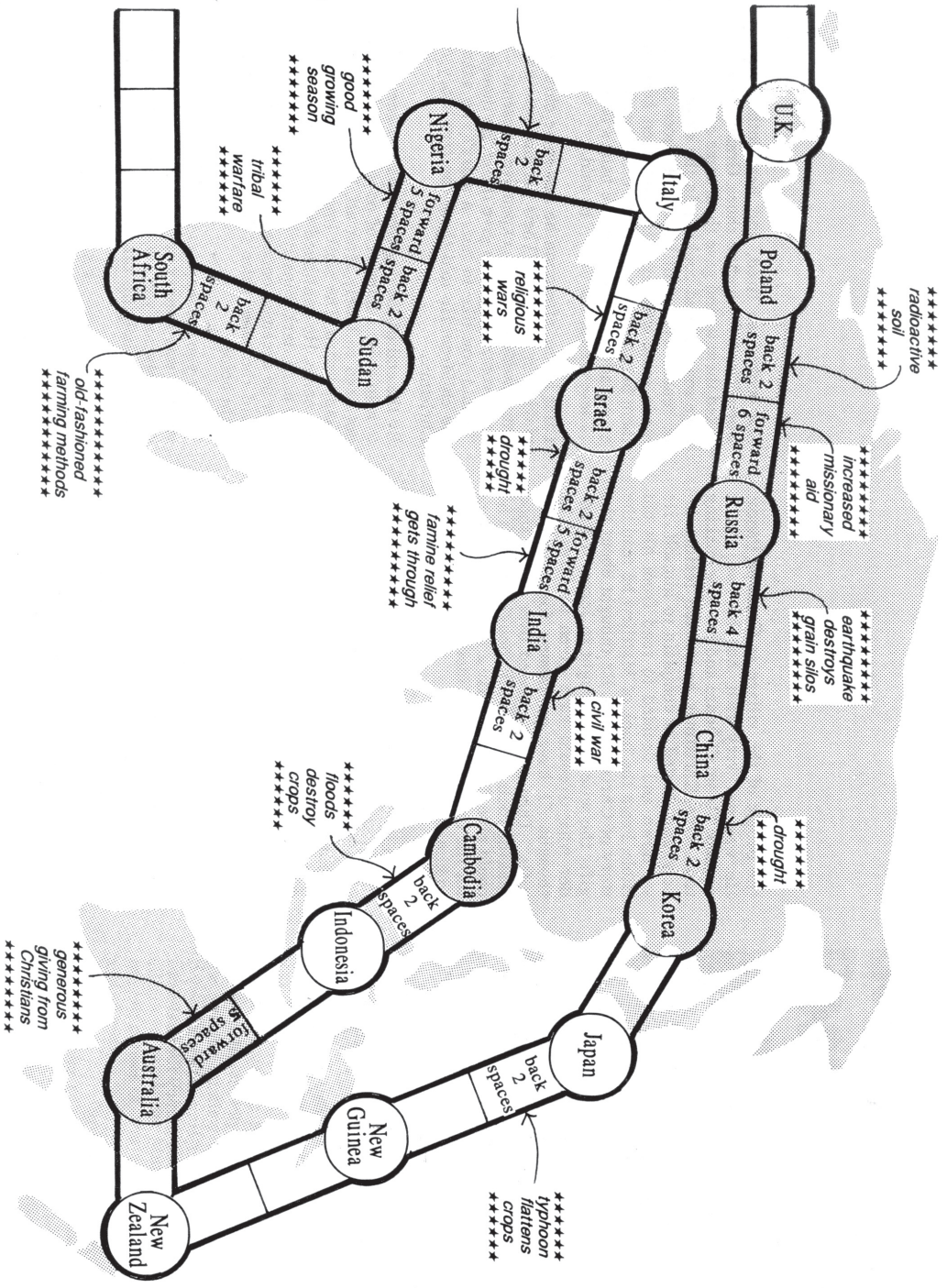
18b – The famine battle game

Dice & board game – “Famine Battle”

Find out some of the reasons for food shortages around the world. Join these two sheets together and make a board game. Use a dice and move around the board.

Each player is allocated a country. Starting from their own country, they must do a complete circuit of the board, finishing at their own country again. The first player home wins the game.





18c – Food and culture

Here are four different cultural food traditions:

1. Chinese

Find China on a map. Most of you have probably been to a Chinese restaurant. Write down some of the foods you think might be part of a Chinese meal.

We would have to agree that rice is one of the most important ingredients. The food we get from Chinese restaurants in Western countries is only a small taste of real Chinese food. The traditional Chinese have many vegetables that we don't have. There are different sorts of dried mushrooms, water chestnuts and dried sea weed (the Japanese also eat seaweed; it is extremely good for you). The Chinese also use green vegetables like bok choy and watercress.

Chinese food is usually prepared by the stir-fry method. For this they use a wok, which is a deep frying pan. Because the vegetables are cooked very quickly, and only for a short time, they retain a lot of their nutrients, unlike the boiling method, which causes nutrients to be lost in the water.

Meat is often added to the stir-fry, but only in small amounts, so people on this diet do not suffer from too much saturated fat or protein. Vegetables and rice form the main part of a Chinese dish. Traditional Chinese do not usually eat desserts. However they do eat fruits like lychees and citrus fruits.

2. Indian

Have you ever eaten Indian food? If you have, write down the main thing you noticed about it.

Indian food is usually spicy. Some dishes are spicier than others. Curry is a mixture of spices which usually gives the Indian flavour. Curry is made up of turmeric, coriander, cumin and chillies. The chillies are the hottest, so if you want to make your own curry you can buy the spices separately and leave out the chilli.

Indian food is usually vegetarian. This means that dried beans and lentils form the main part of the meal. Different kinds of potatoes and sweet potatoes are also popular. To add to the meal, and to give a cooling flavour to the spices, Indian food is served with little dishes of yoghurt, and sometimes with cucumber.

3. Mexican

Mexican food is very popular in Western society, and there are even fast food Mexican chain restaurants! Can you name any type of Mexican food?

You may have guessed tortillas, burritos and Mexican chilli beans. Corn chips are also a processed type of Mexican food. Traditional Mexican food is of course home-made. The main ingredients are corn meal and dried beans, particularly red kidney beans. Corn meal is a type of flour made from ground up corn. It is used for many things, like tortillas, which are round circles of pastry made from corn meal and water, then cooked in a pan. Corn bread is also made from the corn meal, and served with hot dishes.

Beans are very popular, cooked in a hot chilli and tomato sauce. Sometimes hot chilli sauce is served without the beans, to complement other food. The Mexican word for sauce is salsa. In our country, you can buy it already made up, from the supermarket.

Burritos are another popular dish. Burritos are a type of pancake, rolled up with a savoury filling inside. The filling sometimes contains meat, but only small quantities. More often the filling is made from beans. Traditional Mexican food does not major on meat, as it is too expensive.

4. Mediterranean

Look on a map and find the Mediterranean Sea. When we speak of Mediterranean culture, we usually mean Italian or Greek. Italian food has become very popular all over the world. Can you guess the most common Italian food?

If you guessed pasta, you were right. There are all kinds of pasta, from spaghetti, to macaroni, penne, (short tubular lengths), and curly. Pasta is usually served with a tomato sauce, since tomatoes grow very well in the Mediterranean climate. Salads are also very popular. Salads are often served with olive oil dressing, as olives also grow well here. Olive oil is used for cooking many dishes, and is one of the best oils for health. Bread is a staple food, which accompanies main meals, and is usually served without butter.

Greek food is usually made from a similar variety of vegetables to Italian, although eggplant is a favourite. Olive oil is also used in Greek cooking. Greek salads are often served with feta cheese, which is a goats milk cheese. Goats' milk is more easily digested by humans than cows' milk, and therefore healthier.

Mediterranean dishes contain some meat, but not too much, as it is expensive. Bread and pasta more often provide the filling part of the meal. The use of olive oil and the use of many vegetables, make this diet a fairly healthy one.

Quick quiz

1. Which of the four diets contain plenty of fresh vegetables?

2. What are the main foods in each kind of diet?

3. Why are these traditional diets fairly healthy? (Think about saturated fat, protein, sugar and added chemicals).

Now let's compare these diets with our own. In the modern world, many people are eating the same sort of foods. Unfortunately, even traditional diets like the ones we have read about, are being replaced by fast foods and packaged foods. We call this modern diet *the typical Western diet*. It is the food eaten by Australia, U.S.A., England and many other countries.

The typical Western diet consists of large amounts of meat, large amounts of dairy products, some fruits and vegetables, and all sorts of packaged, processed foods, fast foods and junk foods. If we compare the food of our great grandparents with the food of today, we will see that the supermarket has changed our lives. Our great grandparents did not have the selection of fast foods and junk foods to choose from. Food was home-made and often home-grown.

1. What are the health problems caused by the typical Western diet?

2. What can we do to avoid these problems?

The cost of the typical western diet

What do you think are the most expensive foods in the typical Western diet? Remember that if a food has no nutrient value it is expensive.

Even if you think fast food and junk food is cheap, you are really paying money for something that has no nutritional value, and which is often a risk to your health. For this reason, fast foods and junk foods are a waste of money.

What about meat? How expensive is it?

Let's compare the cost of these meals:

1. Minced-steak hamburgers with vegetables
(Minced-steak costs \$10 per kilo. One kilo feeds 10 people.)
2. Stir-fried rice with vegetables
(Rice costs \$2.50 per kilo. One kilo of rice feeds 20 people.)
3. Lentils with vegetables
(Lentils cost \$4.50 per kilo. One kilo feeds 20 people.)
4. Mexican beans with vegetables and corn bread
(Red kidney beans cost \$5 per kilo. One kilo feeds 20 people.)

Work out the cost of one serving for each of these:

Minced steak \$_____

Rice \$_____

Lentils \$_____

Red kidney beans \$_____

How much would these meals cost?

Stir-fried rice? \$_____

lentils? \$_____

Mexican beans? \$_____

Foods from animals, like meat, are more expensive, because you need more land to raise animals than you do to grow plants. If there was a world food crisis, how could people get more to eat?

18d – Traditional grains

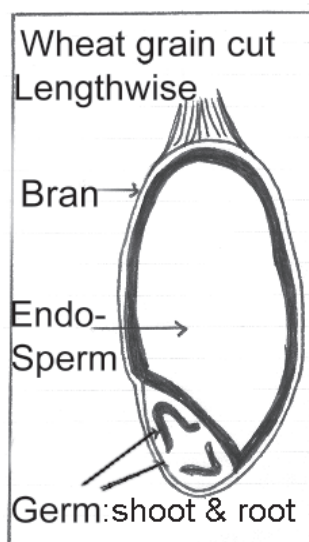
Grains have provided the staple foods (main foods) of traditional cultures.

Asia:	rice
America:	corn
Europe:	wheat
Middle East:	wheat
Africa:	maize (white corn)

Flour is made from grain. Grains are called **cereals**. Most of our bread is made from wheat, but some is made from rye or barley. When the wheat is ground up it becomes flour. There is the white part, from the inside of the grain, and the brown part, from the outside of the grain.

The white part of a wheat grain contains both **starch** and **protein**. Starch provides energy for our bodies. Gluten is a protein and gives us strength. It also makes the bread stretchy, so that when the bread rises, it stays spongy and doesn't fall apart.

The outside part of the wheat is darker in colour, and harder. This is called **bran**. When it is ground up, it gives our bodies vitamins and fibre. Vitamins keep us healthy in many ways. Fibre helps our food pass through our bodies quickly enough. There is another part of the grain that is high in vitamins. It is called **wheat germ**. This is the part of the seed from which a new plant grows. When we eat all of the grain, we call it **wholemeal**. Wholemeal bread is better for us than white bread because we get the goodness of the whole grain, and not just part of it. Today bread is made in factories and may have added preservatives. These preservatives make the bread last longer, but may not be good for our health. It is important to read labels and buy bread that does not contain preservatives.



How long will bread last these days?

Many brands of bread contain the mould inhibitor, preservative 282. Have a look of the food additive decoder and see how this preservative is rated. Preservative 282 gives bread a fresh look. But it can cause allergic reactions in some people. When buying bread, read the labels on packet and choose bread that does not contain preservative 282.

How did people make bread in earlier times?

In early times bread did not stay fresh for more than a day, because there were no preservatives. People used to grind their grain into **meal** by using two big stones.

People first ate meal as porridge, but later learned to make small, thin cakes cooked on hot stones. It was the Egyptians who learned how to make their bread rise using yeast. They also built ovens from mud bricks. It was the Romans who invented a better way of grinding grain. They built a special grinding machine, which was operated by a donkey! As the donkey walked round and round, the grain was crushed between stones. The stone at the top, which moved around was called a millstone.

Which traditional foods would you prepare from grain if you lived in:

Vietnam _____

Mexico _____

Holland _____

Lebanon _____

List the health benefits of the following parts of the grain:

starch _____

protein _____

bran _____

wheatgerm _____

Show in a drawing the method that the Roman invented for grinding grain.

Which Bread?

Have you ever looked at the many different types of bread in the supermarket? It is hard to know which to choose. There are white breads and wholemeal and multigrain breads, rye breads, flat breads and gluten-free breads.

Here are some good clues for choosing a good bread:

1. Don't choose white bread. The outer part of the grain, called the fibre, has been removed. This is the part that contains the B vitamins. The whiter the bread is, the fewer vitamins it contains.
2. Don't choose bread that is light and full of air.
This sort of bread doesn't have any goodness at all.
3. Choose bread that does not contain preservative no. 282. (Look this up on your food additive decoder).

How does bread rise?

If you don't use yeast when you are making bread, then your bread will be hard and flat. But what is yeast? You buy yeast as little dry grains. Have a look at some. When you mix it with water and give it warmth, the yeast becomes active. It gives off bubbles of gas, which get into the dough and make it rise.

Yeast is made up of tiny little living fungi, which give off gas. When we mix dry yeast with warm water, the fungi become **live**.

Experiment:

Place 1 teaspoon of dry yeast in some luke-warm water. Leave it there for about 15 minutes. You should see bubbles on top of the water. What do the bubbles mean?

Is there anything else that will make dough rise?

Try making the potato bread recipe in the recipe section. For this you will need baking powder. This is a chemical that also gives off gas, and makes dough rise. It is not live like yeast. Try putting some baking powder in warm water and see if it makes bubbles.

Quick quiz – Circle the correct answer

1. What is in bread that gives you energy?
 - a) air
 - b) water
 - c) starch
2. What is it in bread that helps your muscles grow?
 - a) starch
 - b) protein
 - c) fibre
3. Our bodies need fibre
 - a) for growth
 - b) so that food doesn't pass through our bodies too slowly
 - c) for energy
4. We get vitamins from
 - a) starch
 - b) gluten
 - c) wheat germ and bran



Knock Knock

Who's there?

Pizza

Pizza who?

Pete's a healthy eater.

Food Limerick

There once was a boy from Geelong
Who wanted to grow to be strong.
His Mum said, "Eat greens and don't leave your beans,
Then you'll be able to beat King Kong.

18e – God provides the things we need

“Give us this day our daily bread”. Matthew 6:11

Do you know who said this? It was Jesus who told us how to pray. He showed us that it was important to pray daily for the food we need. Of course we need to thank God for our food too. I think that Jesus wants us to pray for our food just so that we remember that it is God who provides it. So many people forget that, and are not thankful at all. God also wants us to trust Him for our food. Now that may be easy when there is plenty of food, and when we have enough money to buy it. But what if you didn't have enough. Would you be able to trust God to provide it?

In the Old Testament there is a story about God's people, the Israelites, and how they had to trust God for their food. You see, the cruel Egyptian Pharaoh had kept them as slaves for many years, but finally God said, “that's enough”. No more slavery! God had to force the Pharaoh to let them go, by bringing lots of disasters upon Egypt.

The Israelites had to escape quickly by night. God told them to make some unleavened bread and eat it so that they would have strength for the journey. I'm sure they took some unleavened bread with them too. Have you seen unleavened bread in the supermarket? On some packets it tells you that it is a type of bread from the Middle East. That's where Israel is. Isn't it amazing to think that the pocket breads and flat breads that we can get today actually started way back in bible times. Unleavened bread has no yeast. That's why it's flat. It has no yeast to make it rise. You see, the Israelites didn't have time to wait for their bread to rise. They had to make it in a hurry and escape quickly.

The Pharaoh's army chased the Israelites as they were trying to escape. Then God opened the Red Sea and let the Israelites through, but closed it up again so that the army drowned. This is how the Israelites became free.

However, it wasn't easy for them, because before they could get back to their own land they had to cross a large desert. They couldn't buy food out there. There were no shops. They soon ran out of the bread they had brought with them. Do you know how God provided for them? He sent bread! It was called **manna**. Every morning when they woke up it was there on the ground. All they had to do was to pick it up. God provided for the people's **needs**. However he didn't provide for those who were greedy. Some people wanted to collect a whole lot and put it in a bag for the next day...just in case God didn't provide. Do you know what? The next day the bread was mouldy and filled with worms. God wanted to teach the Israelites to trust Him **daily** for their food. We must trust Him daily too.

1. What is unleavened bread? _____
2. Why did the Israelites have to make unleavened bread? _____

3. What was the name of the bread that God provided in the desert? _____
4. What happened to the bread collected by greedy people who wanted to save it for the next day? _____

5. How often should we thank God for providing the things we need? _____

19a – The miraculous healing power of plants

On each side of the river stood the tree of life, bearing twelve crops of fruit, yielding its fruit every month. And the leaves of the tree are for the healing of the nations. (Revelation 22:2)

For I am the Lord that heals you. (Exodus 15:26)

God created plants for many special purposes. Firstly, they were created as food for animals and human beings. He also created them with special healing properties. In the Garden of Eden there were two trees with special names. One was 'the tree of knowledge of good and evil'. That was the tree that Adam and Eve were not to eat from, but they did. The other tree was the tree of life. The bible tells us that the leaves from that tree had special healing properties.

Do you know that today, there are many plants that can be used to heal all kinds of diseases? Some are just being discovered, but they have been there since the creation of the world. Some, like the vine 'cat's claw' are found deep in the Amazon jungle. There are also many herbs that can cure all kinds of diseases including cancer.

Even the plants that are available to us every day have healing properties. Did you know that fresh fruits and vegetables contain special chemicals, which work in our bodies to build our immune system and fight diseases? Often we destroy those good chemicals by over-cooking. Raw fruit and vegetables contain more nutrients. Try to think of some of the vegetables that you like to eat raw. Some vegetables, like potatoes, we must cook, but others are best cooked for only a short time or eaten raw.

God provided for our needs right back there at the creation, by providing plants with all their wonderful properties. Let's make plant foods our best foods, and eat more of them than anything else. They are God's gift to us.

1. Why are plants important? Give two reasons. _____

2. What do plant chemicals do? _____

3. Which plant foods have the most valuable plant chemicals? _____

4. Name a herb that has healing properties. _____

5. Why might you take a lemon drink when you have a cold? _____

6. Use this table to make a list of your favourite plant foods.

Favourite raw vegetables	Favourite cooked vegetables	Favourite fruits

19b – What is food made of?

Different foods have different properties. These properties are called nutrients.

Carbohydrates:

Carbohydrates are **sugars** and **starches**.

There are some **sugars** that our bodies can use very well. These are the sugars that occur naturally in fruit. There are some sugars that our bodies do not use so well. These are the refined sugars like white and brown sugar, common in most sweet processed foods.

Starches are very useful for giving us energy. Starches containing **fibre** are better for us as they make our digestive system work better. We find starches in foods like **rice, oatmeal, dried peas and beans, wholemeal flour and potatoes**.

Vitamins and minerals:

To release the energy that is stored in the carbohydrates, we need **vitamins**. We also need **minerals** for many functions. Here is a list of some important vitamins and minerals, and where they come from:
Vitamin A, from carrots, broccoli, cabbage and fish oil, for defending the body against diseases like cancer and for good eyesight and healthy skin.

Vitamin B1, B2, B3, B6, B9 from whole grains like **brown rice** and **wholemeal bread, nuts, yeast extract and egg yolk**. We get **vitamin B12** from all animal products. The B vitamins keep our hair, skin, eyes, mouth and liver healthy. They also help our brain to work well. They are good for our nervous system and blood circulation.

Vitamin C, from fruits like oranges, mandarin's, lemons, grapefruit, berries, kiwi fruit and apples. This is very good for keeping colds away and helps the body fight against infection.

Vitamin D, from fish oil, vegetable oil, egg yolk and sunlight, for healthy bones.

Vitamin E, from nuts, for healthy skin, muscles and heart arteries.

Vitamin K, from green leafy vegetables, for blood clotting. That means that when you cut yourself, you stop bleeding.

Calcium is an important **mineral** for healthy teeth and bones. However our bones can only take in the calcium when there is another mineral present. This is **magnesium**. To take in the calcium, we should eat vegetable foods containing magnesium. **Nuts** are good sources of **both calcium and magnesium**.

Iron is another important mineral. We get it from foods like **parsley, grains, sunflower seeds, pumpkin seeds, potatoes, raw cabbage, beetroot, peas** and many other vegetables. **Dried apricots** are also good for iron. So are **bananas**.

Protein

Proteins are needed for growth. They are needed for many other functions too, like tissue repair, digestion, building muscles and for healthy skin, hair and nails. Exercise is therefore important for building muscle from the protein that we eat.

We get protein from **meat, fish and dairy products**. These foods provide a lot of protein, so we don't need to have large amounts; four times a week for red meat is enough. We also get protein from plant foods like **dried peas, dried beans and also from nuts**. Some people choose to get all their protein from plant foods.

Fibre

Fibre makes food chewy. It is necessary to keep the digestive system working well. We find fibre in **wholemeal flour, whole grains like brown rice, fruits and vegetables**.

Fats

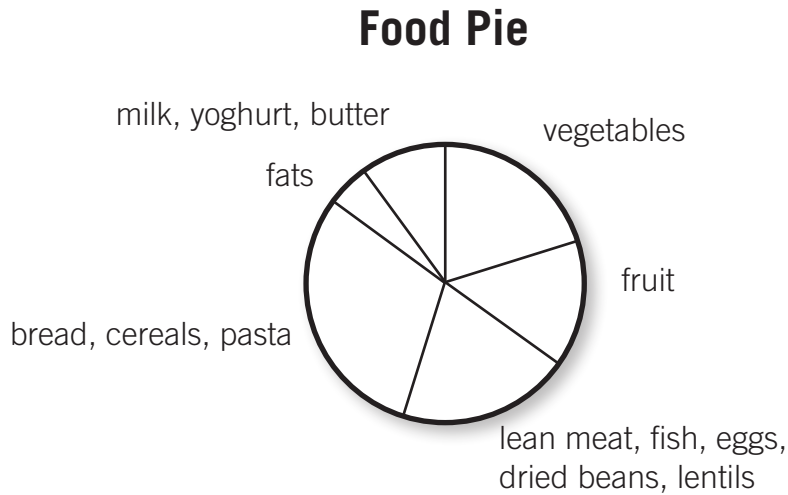
There are two main types of fats. These are **good** and **bad** fats. Good fats come from nuts, seeds, avocados, olive oil, coconuts, fish and butter. Bad fats come from margarine, cooking oil, bought chips and pastries.

Quiz

1. Which foods give the best sugar? _____
2. Name a food that contains starch. _____
3. Why do we need vitamins and minerals? _____
4. What can carrots and broccoli do for us? _____
5. Which foods are good for our brain? _____
6. What is a good food to eat to prevent colds? _____
7. What does vitamin D do for us? _____
8. What are two minerals that we need for healthy bones? _____
9. Name two foods that contain protein. _____
10. Why do we need protein? _____
11. Why do we need fibre? _____
12. Name two foods that give us good fats _____

19c – Getting the right balance

The Healthy Food Pie



Draw a healthy food pie to show the types of healthy foods YOUR family would eat. List your family favourites.

A balanced diet

Look at the table below and choose 10 foods that you would like to eat in a day. Try to get a good *balance* of carbohydrates, protein, fibre and fat. Column A shows carbohydrates, B shows protein, C shows fibre and D shows fat. Make a list of your 10 foods and record the figures for each. Add up the figures for each of the four food types. For a balanced diet you should end up with:

- A** carbohydrates highest (45–60 points)
- B** protein next highest (20–30 points)
- C** fibre next (10–20 points)
- D** fats next (5–15 points)

Here are some clues for choosing a good balance:

For **carbohydrates** choose bread, pasta, rice, Weet-Bix

For **protein** choose meat, fish, nuts, cheese, milk, yoghurt

For **fibre** choose fruit and vegetables

You will get enough **fats** from your protein foods, as well as avocado.

	A	B	C	D
wholemeal bread – 2 pieces	7	2	3	2
Weet-Bix – 2	5	2	3	0
porridge – 1 bowl	5	2	3	0
lettuce, tomato and cucumber salad	2	0	6	0
raw carrot – 1 whole	4	0	4	0
avocado – half	1	1	0	6
sweet corn	6	1	3	0
steamed green & orange vegetables	3	1	5	0
fruit – 1 piece	2	0	6	0
nuts – ten	2	3	1	4
mexican beans in tomato sauce	5	2	3	1
pasta – half cup	7	1	0	1
rice (white) – half cup	6	1	0	0
meat – 1 serve	0	6	0	3
cottage cheese – 1 tablespoon	0	6	0	3
milk – 1 cup	0	6	0	3
yoghurt – 1 cup	0	6	0	3
fish – 1 serve	0	6	0	2
mashed potatoes – 1 scoop	7	1	1	1
stewed fruit – 1 tablespoon	5	1	3	0
home-made biscuit – 1	5	1	2	2
banana smoothie – 1 glass	4	3	2	2
sultanas – 1 tablespoon	3	2	4	0

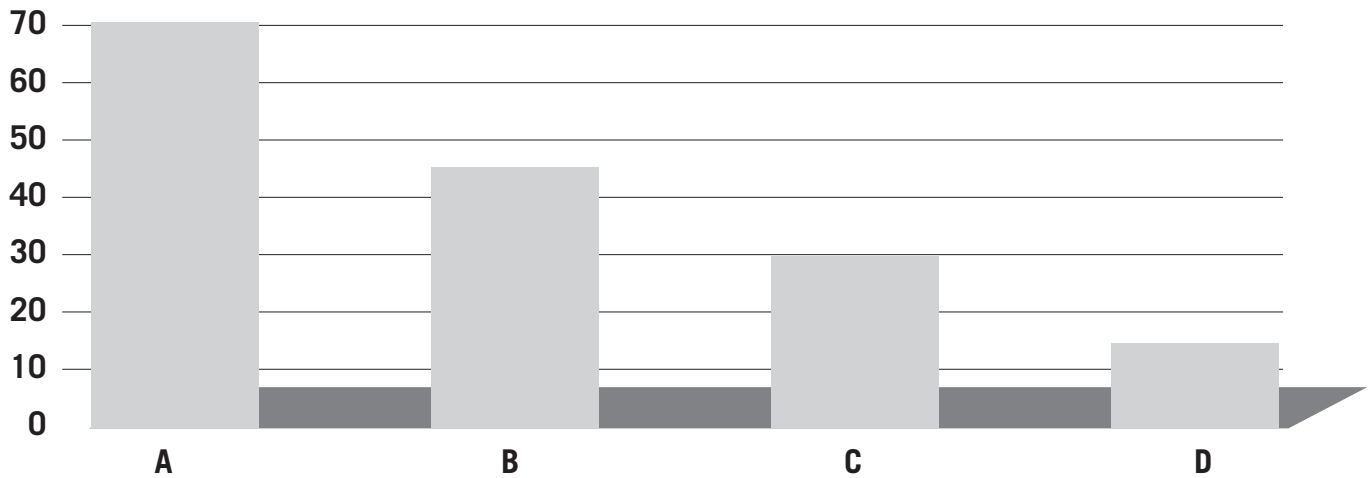
Foods I would like to eat:

Foods	Carbs	Prot	Fibre	Fat
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
Total				

My score:

Carbohydrates: ____ Protein: ____ Fibre: ____ Fats: ____

Take some graph paper and make a graph to record your scores.
Your graph could look like this one:



- Which was your highest score? (carbohydrates, protein, fibre, fat) _____
- Which was your lowest score? (carbohydrates, protein, fibre, fat) _____
- Did you get a good balance? _____
- Could you improve the balance? _____
- If so, which foods could you exchange? _____

My food diary

Write down everything you ate over the last 24 hours.

Breakfast _____

Lunch _____

Dinner _____

Snacks _____

Which foods contained processed sugar? _____

What could you have eaten instead? _____

Which foods contained the wrong kind of fat? _____

What could you have eaten instead? _____

Which foods contained too much salt? _____

What could you have eaten instead? _____

How many different kinds of fruit did you eat? _____

How many different kinds of vegetables did you eat? _____

Which foods contained fibre? _____

Which foods contained carbohydrates? _____

Which foods contained protein? _____

Plan a balanced weekly main-meal menu.

Sunday _____

Monday _____

Tuesday _____

Wednesday _____

Thursday _____

Friday _____

Saturday _____

Limerick

There once was a man from Crew
Who found a large mouse in his stew
The waiter said, "Don't shout, and wave it about,
Or the rest will be wanting one too."

Draw a picture for this limerick.

20a – The circulatory system

The heart is a muscle – the most important muscle in your body! It is divided into four pockets. The heart is a pump that circulates blood through the body at a rate of five litres per minute. Arteries are blood vessels that carry blood away from the heart. They carry oxygen to all the parts of the body. The oxygen makes arteries look red. Veins are blood vessels that carry blood from the body parts back to the heart. The blood in veins has no oxygen, so veins look blue. The heart pumps blood to the lungs where it can pick up oxygen again, and then it goes around the body again, in a continuous cycle.

The heart pumps by contracting and relaxing. Each time the heart contracts it forces blood through the arteries. This is what causes the heartbeat and the pulse rate. You can feel your pulse on your neck or your wrist. The normal pulse rate is between 70 and 80 beats per minute. However after exercise your pulse rate will be much higher.

Heart health

It is good to get your heart pumping rapidly when you exercise. Exercise is good for a healthy heart and healthy arteries. Exercise that causes our heart to pump rapidly is called *cardiovascular* exercise. It makes you huff and puff.

Here are some good things to do regularly for cardiovascular exercise:

running, skipping, swimming, fast walking, aerobics

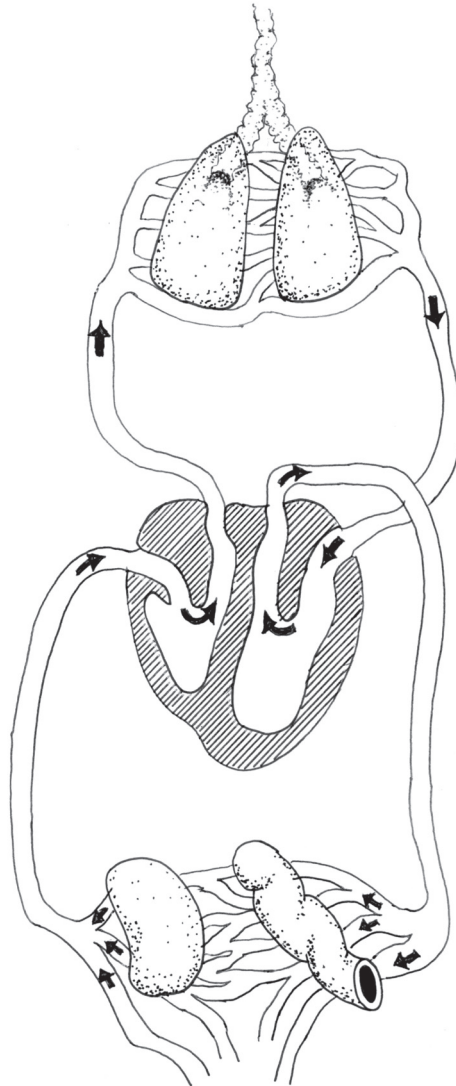
We can also maintain a healthy heart and healthy arteries by eating the right foods. If we become overweight we can put too much strain on the heart. To maintain a healthy weight we need to do regular exercise and eat the foods that are as close to nature as possible. Foods that cause us to put on weight are the processed foods like fast foods and junk foods, white bread and sugar.

There are good fats and bad fats, as you already know. Eating the bad fats like margarine and the fats in bought chips, burgers and pastries will not be good for our arteries. They can cause the arteries to become narrow, due to a gradual build-up of a substance called plaque, and then the blood cannot flow through properly. If the arteries around the heart get blocked, it can cause a heart attack. This can happen to older people. It takes many years for the plaque to build up. However, we should look after our heart even when we are young, and form good habits, so that when we are older we have less health problems. We need to eat the good fats like the fats in nuts, avocados, eggs, olive oil, fish, and a little butter. We should avoid the bad fats and foods made with white flour and sugar.

Follow the arrows, using your finger, to trace the flow of the blood around the body.

Colour the blood vessels on the left, in blue. This is the blood that does not carry oxygen. It comes from the cells of the body, where all the oxygen has been used up. This blood is on its way to the lungs where it will receive oxygen again.

Colour the blood vessels on the right, in red. This is blood that has received oxygen from the lungs. It is taking the oxygen around the body, to the cells.



What can you do to maintain good heart health?

Functions of the blood

Blood consists of a watery liquid called plasma, with red and white blood cells and platelets.

- Red blood cells carry oxygen to all parts of the body.
- White blood cells fight infection and protect the body against disease.
- Plasma is the liquid part that carries nutrients around the body.
- Platelets make blood clot if you cut yourself.

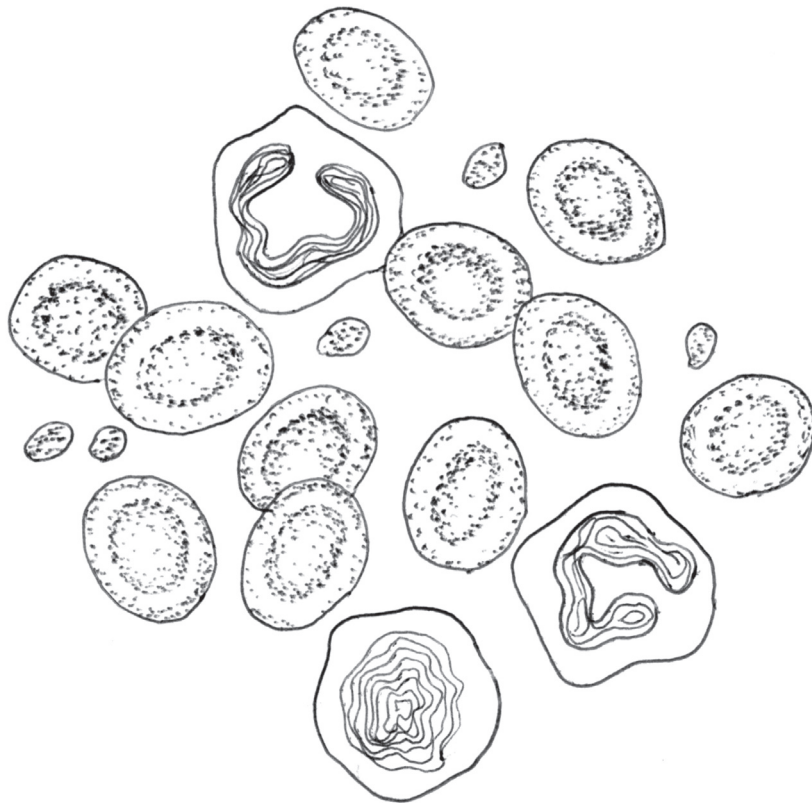
There are many more red blood cells than white blood cells. The blood is a transport system. It transports oxygen and nutrients to the body cells so that the body can live and have energy. It carries the waste products back for filtering out through the kidneys and liver. It takes water to our cells, keeps us at the right temperature, and protects the body against infection. Blood also protects us because it has the ability to clot after an injury. This stops us from bleeding to death!

1. What is blood made of? _____

2. What are the functions of the blood? _____

20b – The blood under the microscope

Label the red blood cells, white blood cells and blood plasma.



Clues:

- Red blood cells – doughnut shaped and plentiful
- White blood cells – irregular shaped, bigger and fewer
- Plasma – the fluid containing the blood cells

20c – The immune system

The immune system is a system of defence. As well as blood vessels, (arteries and veins), we have other vessels throughout our body. These are lymphatic vessels, which carry clear, slightly yellowish blood plasma called lymph. This circulating body fluid helps defend the body against disease-causing agents. Lymph carries special cells that will attack invaders. Some will eat (ingest) bacteria. Others will fight viruses and any unusual cells like cancer cells. Some cells, called natural killer cells, have little spears that make holes in the enemy cell, making little channels. Surrounding fluid flows into the enemy cell so that it fills up and bursts. This reminds us of how God fights for us, just like the armour of God in Ephesians 6.

The skin is also part of the immune system. It keeps out bacteria. However it does not keep out all chemicals. The skin has pores through which waste product are eliminated as sweat. Substances can also be absorbed through our skin into the bloodstream, so we have to be careful about what we put on our skin. We should never touch toxic chemicals.

How to build a healthy immune system

A person's immune system can be strong or weak. A person with a strong immune system is a healthy person who does not get sick very often. They don't catch many colds and flu because their defence system is working hard to keep out the invaders. If they do happen to catch a cold, or a contagious illness, this person will recover very quickly and return to good health. A person with a weak immune system will be the opposite – often sick, and their recovery time is slow.

We can make our immune system stronger by eating healthy food. Sugar is one of the worst foods for making our immune system weak. This is because it's hard for the body to break sugar down into small units. Raw fruits and vegetables are the best foods for building a strong immune system.

To build a healthy immune system, so that we can resist the effects of germs, we need to follow the rules for healthy living:

- **N**utrition – eat healthy food
- **E**xercise – at least half an hour every day
- **W**ater – 6 glasses a day, (not fruit juice or fizzy drink)
- **S**unlight – for vitamin D. Keep sun exposure to 10 minutes at a time, in the cooler parts of the day
- **T**oxin-free – avoid food additives and avoid toxic chemicals in the environment
- **A**ir – get fresh air every day
- **R**est – don't stay up late
- **T**hink happy thoughts and trust in God

1. What is the immune system? _____

2. What does it do for us? _____

3. How can we build a healthy immune system? _____

4. Which two words can you make using the first letter of every rule? _____

5. Write the eight rules for healthy living and draw a symbol for each rule.

20d – The skeletal and the muscular systems

These two systems are connected because the muscular system holds the skeletal system in place. There are 400 muscles supporting the spine.

The skeleton is made of bones, which are the hardest material in the human body. Yet the bones of a living person are living tissue in which red and white blood cells are made, and also a storage site for calcium. Bones have the ability to grow and repair themselves if they are fractured or broken. Although bone is the hardest tissue in the body, it contains nearly 50% water.

There are two parts to the skeletal system:

1. The axial skeleton consists of the skull, the spine and the rib cage. This part of the skeleton protects the brain, the heart and the lungs.
2. The appendicular skeleton consists of the bones of the arms, shoulders, legs and hips. This part of the skeleton has joints, which allow us to move, and do activities like throwing a ball, riding a bike, and walking.

The spine is a very important part of the skeletal system because it is also part of the nervous system, which send messages to the brain. The spine is made up of 26 bones called vertebrae. If the spine is broken, the nerves can no longer send messages to the brain, so a person may become paralyzed.

1. What are the two parts of the skeletal system? _____

2. Which important organs are protected by the skeletal system? _____

3. What happens to a bone if it is broken? _____

4. What happens if the spine is broken? _____

Bone health

To build strong and healthy bones we need to do two things:

1. eat nutritious food
2. exercise

The bones are storage places for calcium. Bones are made from calcium. When the body needs calcium, it can get it from the bones. The bones will send calcium into the blood and the blood takes it around the body as needed. So we need to eat foods that give us calcium. Although milk contains lots of calcium, that form of calcium is not the best form of calcium to build bones. We also need foods like fruits and vegetables – especially green ones – to help the body absorb the calcium.

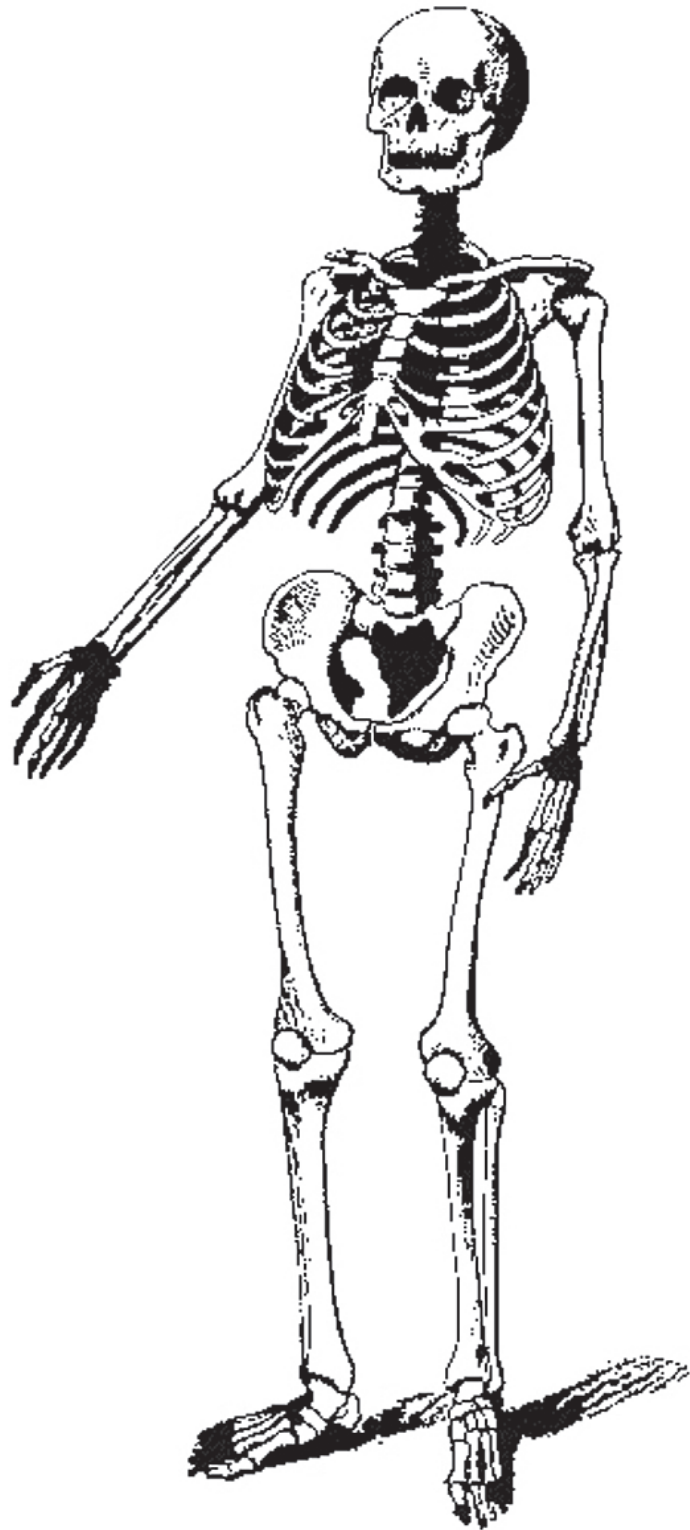
To build bones we need to do exercise called *weight-bearing* exercise. This type of exercise makes the muscles work hard, but the heart does not have to work hard in this case. You do not huff and puff, but you do stretch and push. Weight-bearing exercise is hard work.

Good forms of weight-bearing exercise are: riding a bike uphill, walking uphill, climbing, lifting weights and swimming.

What can you do for good bone health?

The skeleton

Label the major bones of the body



21a – How much are you worth?

Every person is unique and very special. Everyone has their own unique finger prints.

Here's an old saying:

“Love your neighbour as yourself.”

If we don't like ourselves, how can we love our neighbour? Sometimes people do not appreciate their own special gifts and talents. They put themselves down, and think that they are not good at anything. This is usually because they look around and see other people with gifts that they don't have. They think, “that person is better than me.” The truth is that we all have a special personality, a special body and special gifts. Even the ability to give a smile and make someone else happy is a gift. We all have something of ourselves to share with others. Each person's gifts will be quite different to another person's gifts. It is important to accept ourselves as we are, and not want to be like someone else. We should not think of ourselves as being better than we really are, and not see ourselves as worse than we really are. We should look for the gifts inside of us, and start using those gifts. We should not worry about whether we are good enough.

- How do we know that every person is special and unique? _____

- What would you say to a person who said they didn't like themselves? _____

21b – The digestive system

Digestion starts when you chew your food and swallow it. The food then makes its way through your gut. It goes down the oesophagus, into the stomach, then to the small intestine, then to the large intestine and is finally eliminated through the anus. On its journey, food is changed so your body can use it. This change is called digestion. Your body needs food so you can grow and have energy.

Digestion begins in the **mouth** and ends in the anus. In the mouth, when the food is properly chewed, enzymes in the saliva start to break down the carbohydrates. Carbohydrates are in foods like potatoes, rice, pasta, bread and sugars.

Then the food travels down the **oesophagus**. Muscles in the wall of this tube push the food along after it has been swallowed. The muscles make the food travel in little wave-like movements, until the food arrives in...

- the **stomach**, which is like a bag. Here the food is mixed with digestive juices and acids which break the food down into a liquid state. Little by little, the liquid food passes into...
- the **small intestine**. Here there is more breaking down of the liquid food into smaller particles, until the particles are so small that they can be absorbed into the bloodstream. The wall of the small intestine has tiny hair-like projections called villi. Their job is to absorb the food and deliver the nutrients to the bloodstream. Once the nutrients are in the blood, they travel to where they are needed.

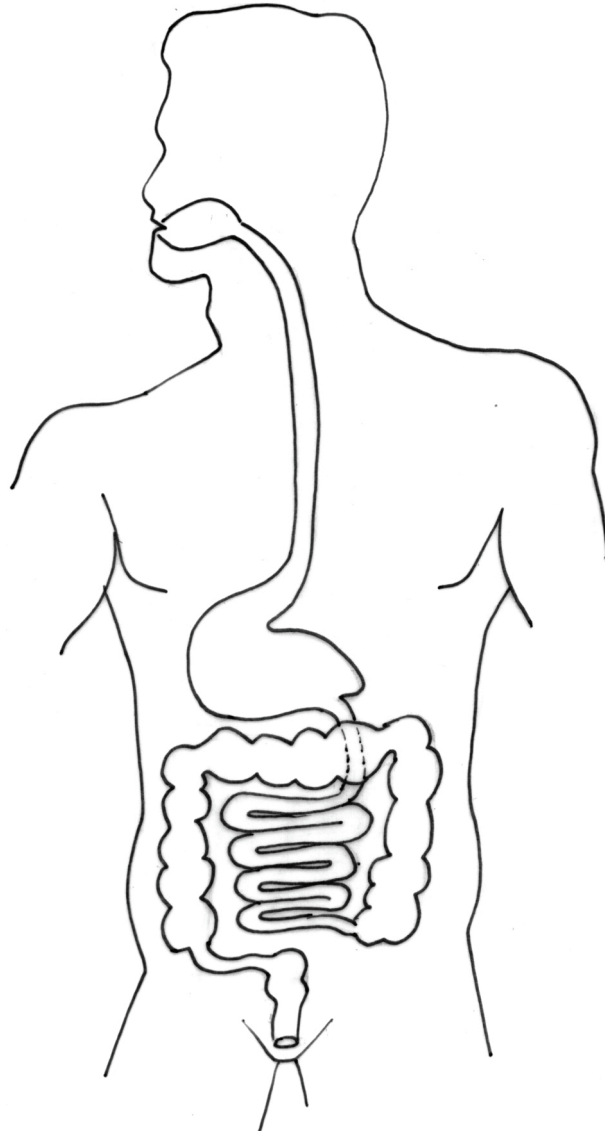
The nutrients go to the **cells**. Our whole body is made up of cells, tiny microscopic building blocks, which are little energy-producing machines. Using oxygen from the blood, they burn the nutrients as fuel, and produce energy, so that the body can live, breathe and move.

Now let's get back to the digestive tract. The nutrients have performed their job, so now the body has to get rid of what's left over. The parts that were not needed to create energy are the waste products.

- The waste products pass into the **large intestine**. Water is absorbed here, and is used by the body, but the remaining waste material gets expelled as faeces through the **anus**.

Digestive health

- Chew your food well. Your body can't take in the nutrients unless the food is chewed well enough, so that the enzymes and digestive juices can act on it.
- Eat foods that contain the best nutrients, so that your blood can deliver the right fuel to the cells.
- Avoid white, highly processed foods like white flour. These foods slow down the movement of food through the digestive system.
- Eat plenty of fresh fruits and vegetables.



Label these parts of the digestive system:

mouth, oesophagus, stomach, small intestine, large intestine, anus

Summary

Digestion begins in the _____. Food travels down the _____ and arrives in the _____. The food is mixed with digestive _____ and gets broken down into _____. The liquid passes into the _____ and then the tiny particles get absorbed into the _____. The blood takes the nutrients to the _____. The waste products pass into the _____ and then out through the _____.

Write four rules for digestive health.

1. _____

2. _____

3. _____

4. _____

21c – The respiratory system

Use your library to find a picture of the respiratory system. Now draw a picture of the respiratory system and label these parts:

1. **lungs**
2. **diaphragm**
3. **trachea**
4. **bronchi**
5. **bronchioles**
6. **alveoli**

Now follow the passage of air through these parts as you read the following:

Our lungs are organs in the chest. Lungs are used for breathing. The lungs are filled with air and emptied by the up and down movement of the diaphragm. Chest muscles move the diaphragm.

Air passes from the nose, through the trachea, the bronchi and bronchioles then into smaller branches where there are tiny air sacks called alveoli.

Oxygen is necessary for all cells to function as tiny energy-giving machines. Without oxygen we would die. We can live without air for a maximum of 3 minutes.

The body also needs to get rid of the waste product called carbon dioxide. The carbon dioxide goes out of our body through the lungs.

The lungs have passageways with many branches like a tree. At the end of the passageways are little balloons called alveoli that fill up with air and deliver oxygen to the blood, which then takes it to the cells. The cells need oxygen to stay alive.

Air is made up of 79% oxygen, 16% nitrogen and 4% carbon dioxide. The air that we breathe **in** contains 79% oxygen. The air we breathe **out** does not contain oxygen because it has been used up by the body cells. But it contains a lot of carbon dioxide as the cells get rid of this waste product after creating energy.

Respiratory health

There are many pollutants in the air that can affect our lungs...things like car exhaust fumes, tobacco smoke, air sprays, dust and gases. These can make the passageways of the lungs inflamed. Smoking is the worst way to damage your lungs and many people who smoke eventually die of lung cancer.

Some people suffer from asthma, when the alveoli tighten up and the person cannot breathe properly for a time. This can be a very frightening experience.

We all need clean fresh air, but it's not always easy to get if you live in the city. It's a good idea to do exercise in fresh air. Going to the beach or a park or bushland where there are trees, is a good way to get fresh air.

Sometimes air inside houses can become stuffy. Remember that we breathe out carbon dioxide. If the air in the house becomes high in carbon dioxide content we feel drowsy. It's good to keep windows open and to go and play outside regularly.

Summary

Air is breathed in through the _____ and travels to the _____. Air goes in and out of the lungs because of the movement of the _____.

The air passes through many branches. At the end of the branches are little balloon-like structures called _____. The air then goes into the _____ and then into the _____. Air that is breathed in contains mostly _____.

Air that is breathed out contains mostly _____. This is a waste product that comes from the _____.

Write two rules for good respiratory health

1. _____

2. _____

21c – The urinary system

Use your library to find a picture of the urinary system. Locate these parts:

1. **kidneys**
2. **bladder**
3. **ureters**
4. **urethra**

The urinary system is made up of two kidneys, two ureters, the bladder, urethra and muscles that can allow the flow of urine to start or stop.

The average kidney is reddish-brown in colour and approximately 10cm long. The function of the kidneys is to filter waste products from the bloodstream. The kidneys also remove a type of waste called urea from your blood. Urea is produced when foods containing protein, such as meat, are digested. The body does not need urea, so it gets taken out of the body through urine. That's what gives urine its strong smell.

The kidneys also help to adjust blood pressure and keep check on how much water is in the body. Water is essential to life. Every one of the cells in our body depends on it. If our body is not getting enough water, the kidneys will take steps to slow down the loss of water from the body. The kidneys do this because they work with the lungs, skin and intestines.

If we do not have enough water, our blood can become thick, and we can eventually die. A person can live only 3 days without water

The urinary system keeps the good salts and certain minerals in our body in balance. If we lose water, we also lose the good salts from our body. Sweat is salty. As we lose water through sweat, we also lose the good salts, which come out through the pores of our skin. When our body does not have enough water, it is called dehydration. People who are dehydrated can feel faint from lack of water and may get a headache. People who are dehydrated need to drink water containing special good salts to replace the salts that have been lost. This is called an electrolyte drink. It is important to drink plenty of water before and after exercise. Dehydration puts a lot of strain on the kidneys. We must drink 6-8 glasses of water every day so that we do not get dehydrated and do damage to our kidneys.

Water is essential for brain function, bone function, nerve function, and is necessary for body chemistry. It is required for making energy in the cells, and for digestion. Lack of water creates all kinds of illnesses, including heartburn and ulcers. Many people are dehydrated, but they don't know it. You can become dehydrated through not drinking enough water. You may not even feel thirsty, but you can still be dehydrated. Many people think that water is not tasty enough. That's because they are used to drinking other drinks like fruit juice, fizzy drinks, tea and coffee. But these drinks actually take water out of the body at the same time as putting it in. So they do not hydrate the body very well. We need to have plain water to do this.

Try to drink most of your daily water **between** meals rather than **with** meals. Drinking with meals dilutes effects of the digestive juices. It is also best to start the day with 2 glasses of water, after a long night without any water. The body needs plenty of water for cleansing and flushing the system. We need to drink 6-8 glasses of water per day.

Water or Cola drink?

Water

- Many people do not have enough water in their bodies. They are dehydrated and don't know it.
- Many people think they are hungry, when they are really thirsty. Instead of having a snack they should be having a glass of water.
- Being dehydrated will slow down the working of the body systems.
- Lack of water causes tiredness in the middle of the day.
- Not having enough body water can cause problems with concentration.
- Drinking 6 glasses of water daily decreases the risk of many illnesses.

Cola drink

Cola drink can be used for:

- Cleaning a toilet – For best effect, do not flush the toilet for one hour after pouring cola into the toilet.
- Removing rust spots from chrome car bumper-bars – Rub the bumper with a crumpled-up piece of aluminium foil dipped in cola.
- Cleaning corrosion from car battery terminals – Pour a can of cola over the terminals to bubble away the corrosion.
- Loosening a rusted bolt – Apply a cloth soaked in cola to the rusted bolt for several minutes.
- Removing grease from clothes – Empty a can of cola into a load of greasy clothes, add detergent, and run through a regular washing machine cycle. The cola will help loosen grease stains.
- Cleaning your windscreen.
- Cleaning your car.

Something to try:

Put a piece of steak in a bowl of cola for two days and see what happens.

The active ingredient in cola is phosphoric acid. Its pH is 2.8. That means it is very acidic. Leave a nail in a glass of cola for several days and see what happens. Phosphoric acid also leaches calcium from bones and is a major cause of bone weakness.

For health of the urinary system:

Drink plenty of pure water.

Summary

The main function of the urinary system is to _____. If we don't have enough water in our body, then the kidneys work with the lungs, intestines and skin to slow down loss of _____. If we don't drink enough water our blood can become _____.

A person can live without water for only ___ days.

We must drink water so that we don't become _____. We should drink _____ glasses of water per day. Fizzy drinks, tea and coffee are not good sources of water because they take water _____ of the body at the same time as putting it in.

21e – The reproductive system

Use your library to find pictures of the male and female reproductive systems. Locate these parts:

- **Female:** ovaries, uterus, uterine tubes, vagina, mammary glands
- **Male:** scrotum, testes, penis, prostate glands

The reproductive system is responsible for the continuation of the human race. The male and female systems are composed of several organs. The male testes and female ovaries produce single cells. Males produce sperm cells and females produce ova. A sperm and an ovum join together to form a new person. The testes and ovaries also secrete hormones. Hormones are little messenger substances that tell the body what to do. The main female sex hormones are estrogen and progesterone. The main male hormone is testosterone. These hormones tell the body when it is time for the reproductive system to change and develop.

Puberty is the time when there are great changes to the body. This usually happens in late primary school and teenage years. Think of some of the changes that take place in the male and female body at puberty.

The female reproductive system allows for growth of the foetus, (the tiny new baby being formed), and for feeding the new baby after birth. The foetus develops in the uterus for nine months, until it is time for birth.

Reproductive health

Nutrition is important for a healthy reproductive system because it nourishes the sexual glands and feeds the nerves and the brain.

It is also important to take care of our hormones. Our body must produce exactly the right amount of each hormone for good reproductive health. If hormones get out of balance, (too much of one or too little of another), the reproductive system may not function properly.

Unfortunately today, there are pollutants in our environment that upset hormone balance. These are called xenoestrogens, (pronounced zeno-estrogens). These are man-made chemical substances that have a similar composition to the body's estrogen. The body gets the message that these chemicals are real oestrogens.

Xenoestrogens have been shown to cause a variety of medical problems in both males and females. Many scientists are concerned that these false messengers can disrupt the process of reproduction. Studies have shown reproductive problems in wildlife.

Xenoestrogens may be found in some of these products:

- some sunscreen lotions
- some weed killers
- some insecticides
- some glues and paints
- some food preservatives e.g. 320 (BHA)
- some plastics
- food colouring FD&C Red No. 3

While we personally can't do very much to stop the pollution to our planet, we can do our best to avoid problem chemicals. We can choose safer, more natural products and use a fly swat instead of fly spray. We should not microwave foods in cheap plastic, and not put hot food into plastic. This is because some plastics contain xenoestrogens, which may go into the food when heated. It's better to put hot foods into glass, china or pottery. We can also choose foods that don't contain the not-so-healthy food additives. Use your decoding chart to find out the meaning of food additive numbers. Eat plenty of fresh fruits and vegetables to keep the body healthy. The healthy substances in fruits and vegetables will help your body to get rid of toxins.

Summary

The reproductive system is responsible for _____. The male testes produce _____. The female ovaries produce _____. A sperm and ova unite to form a _____. The testes and ovaries secrete little messenger substances called _____. Hormones give the body the signals for making changes, such as the changes that occur at _____. Hormones can be put out of balance by chemicals.

Make a list of the things you can do to minimize the effects of environmental chemicals on your body.
