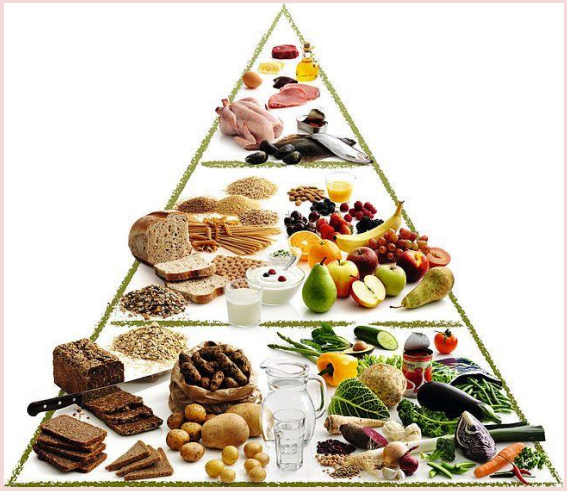
S2 Food for thought



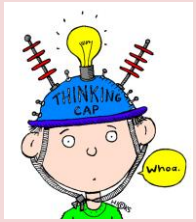
Learning Objectives

- Be able to explain why food is required
- Be able to explain how food labelling works
- Carry out calculations on data from food labels

Success criteria

I can give at least 5 reasons why food is required.
I can understand the food labels on various foods
I successfully calculated energy contents of various foods using data obtained from a graph

Why do we eat?



Think/pair/share

What are some of the reasons we need to eat food?

Hint: try and think of specific roles the food might be used for rather than a general "to keep us alive"!

Why do we eat?

1. Energy
2. Growth and repair
3. Protection from diseases
4. Heat
5. Movement

Complete Activity 1 from page 1 of your class booklet

Food labelling

By law, food packaging must show nutritional information. It can be given in a number of ways:

G715742/2 - SKŁADNIKI / INGREDIENTS: • AQUA / WATER • CYCLOPENTASILOXANE • DIMETHICONE • GLYCERIN • POLYGLYCERYL-4 ISOSTEARATE • CETYL PEG/PPG-10/1 DIMETHICONE • HEXYL LAURATE • PENTYLENE GLYCOL • DISTEARDIMONIUM HECTORITE • METHYLPARABEN • CELLULOSE GUM • ALUMINUM HYDROXIDE • MAGNESIUM SULFATE • PHENOXYETHANOL • DISODIUM STEAROYL GLUTAMATE • TRISTEARIN • ACETYLATED GLYCOL STEARATE • ACRYLATES COPOLYMER • BUTYLPARABEN. [+/- MAY CONTAIN: • CI 77891 / TITANIUM DIOXIDE • CI 77492, CI 77499, CI 77491 / IRON OXIDES] Code F.I.L. : B12815/2

Nutrition Facts

Serving Size 1 cup (228g)
Serving Per Container 2

Amount Per Serving	
Calories 250	Calories from Fat 110
	% Daily Value*
Total Fat 12g	18%
Saturated Fat 3g	15%
Trans Fat 1.5g	
Cholesterol 30mg	10%
Sodium 450mg	20%
Total Carbohydrate 31g	10%
Dietary Fiber 3g	0%
Sugars 5g	
Protein 5g	
Vitamin A	4%
Vitamin C	2%
Calcium	20%
Iron	4%

* Percent Daily Values are based on a 2,000 calorie diet. Your Daily Values may be higher or lower depending on your calorie needs.

	Calories:	2,000	2,500
Total Fat	Less than	65g	80g
Sat Fat	Less than	20g	25g
Cholesterol	Less than	300mg	300mg
Sodium	Less than	2,400mg	2,400mg
Total Carbohydrate		300g	375g
Dietary Fiber		25g	30g

Food labelling

By law, food packaging must show nutritional information. It can be given in a number of ways but usually has the following in common:

1. **Quantity of each food group** in the product and in 100g (so different foods can be more easily compared)
2. How much **Energy** will be gained by eating the product (given in kilocalories & kilojoules). An average man should consume no more than 10000kJ/day, and a woman 8000 kJ/day.
3. **Allergy** advice- so people can avoid foods that contain ingredients they are allergic to (eg nuts)

Complete Activity 2 from page 2 of your class booklet

Learning Objectives

Classify food into the 4 main groups and explain the elements, basic structure, energy content, functions and examples of each food group.

Success criteria

I produced a table describing the elements, basic structure, energy content, functions and examples of the 4 main food groups.

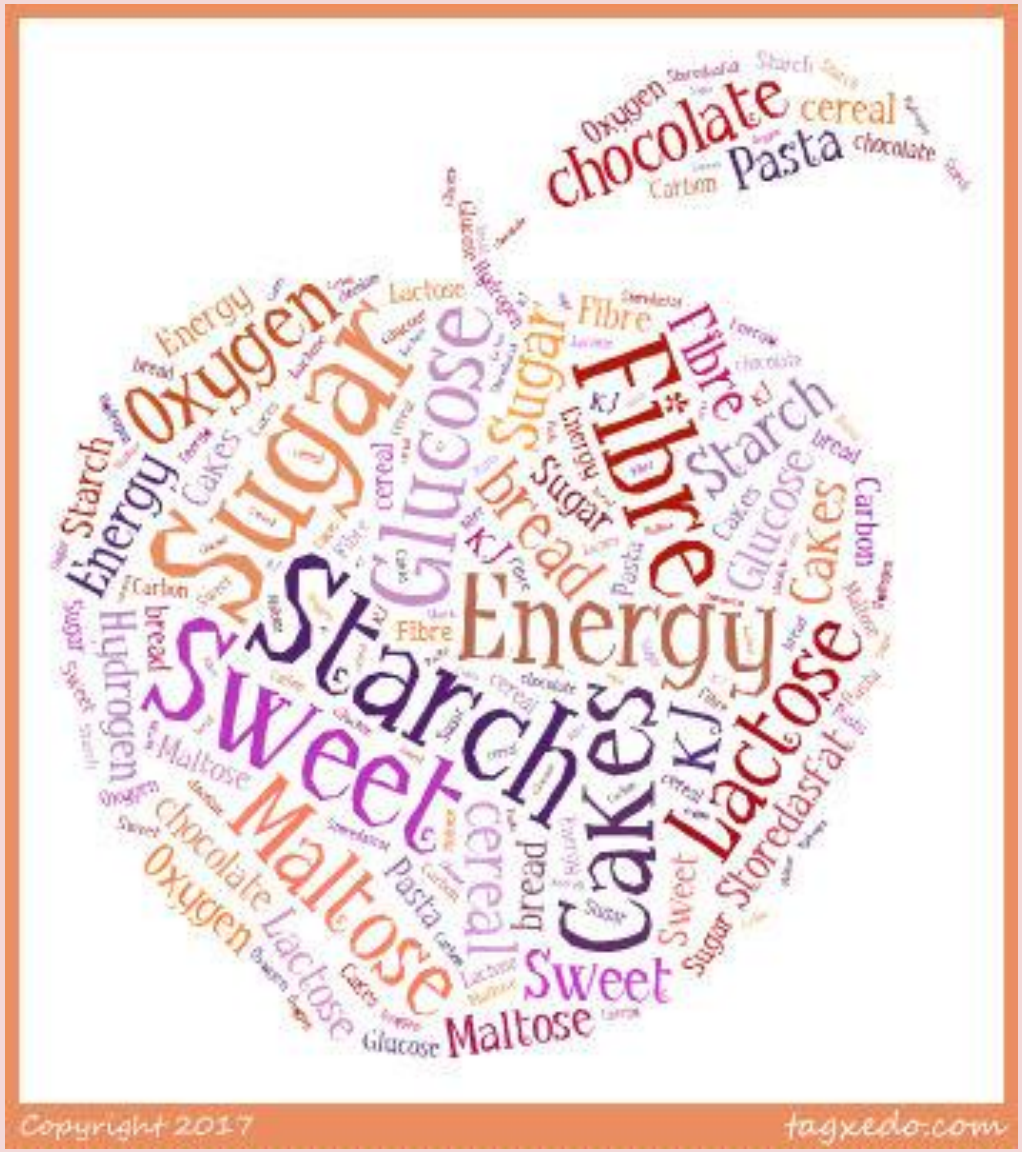
Food groups

What are the main food groups in our food?

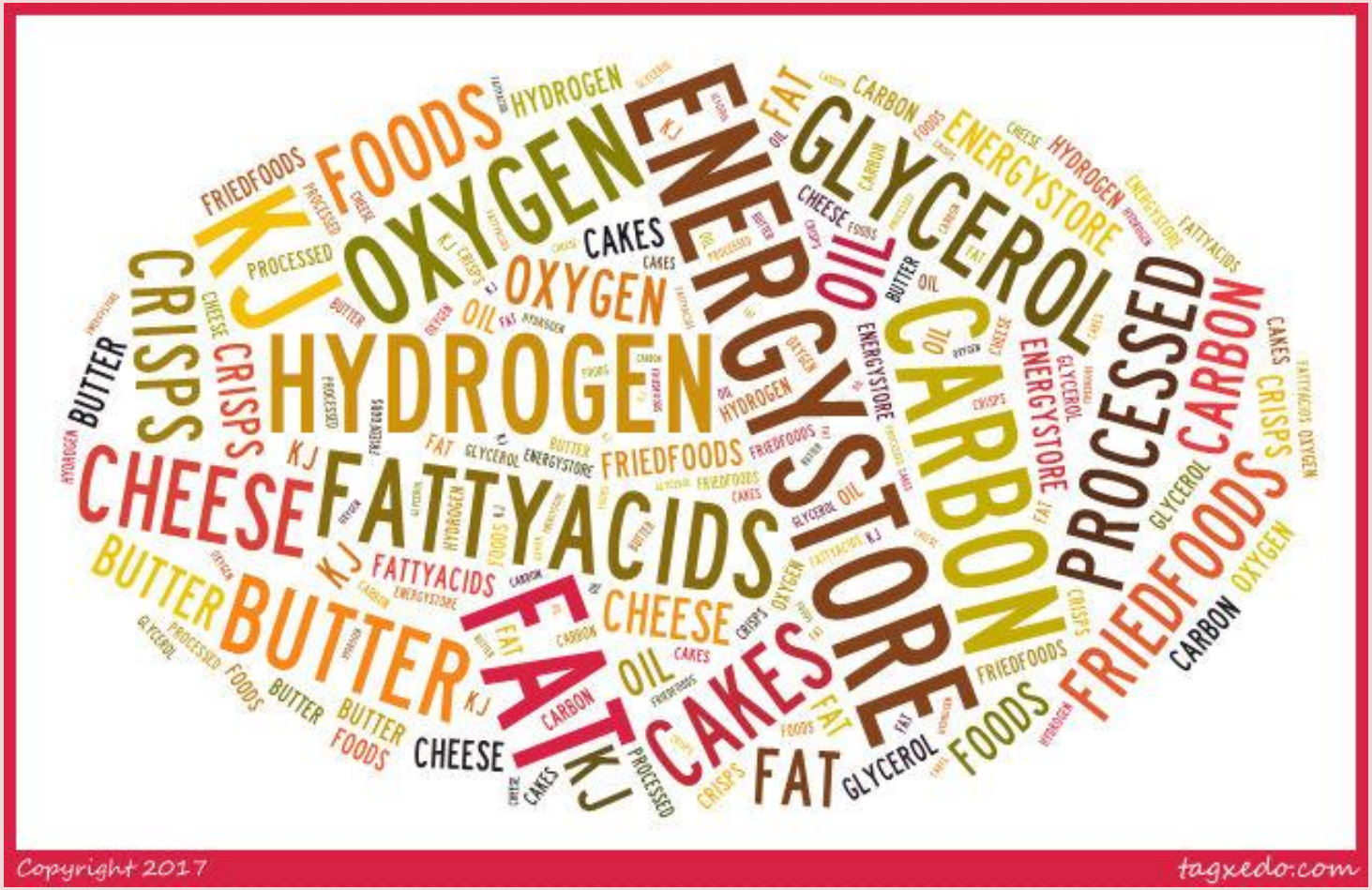
Our food contains a mixture of different food groups. In Science, we classify food groups as follows:

1. Carbohydrates
2. Fat
3. Protein
4. Vitamins & minerals

Carbohydrates



Fat


HYDROGEN
OXYGEN
ENERGYSTORE
CARBON
FATTYACIDS
GLYCEROL
FOODS
KJ
CHEESE
BUTTER
FAT
OIL
CAKES
CRISPS
PROCESSED
FRIEDFOODS
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Protein


TOFU
EGGS
NITROGEN
AMINOACIDS
GROWTH
PROTEIN
OXYGEN
CHICKEN
CARBON
SOYA
FISH
KJ
MEAT
HYDROGEN
QUORN
REPAIR
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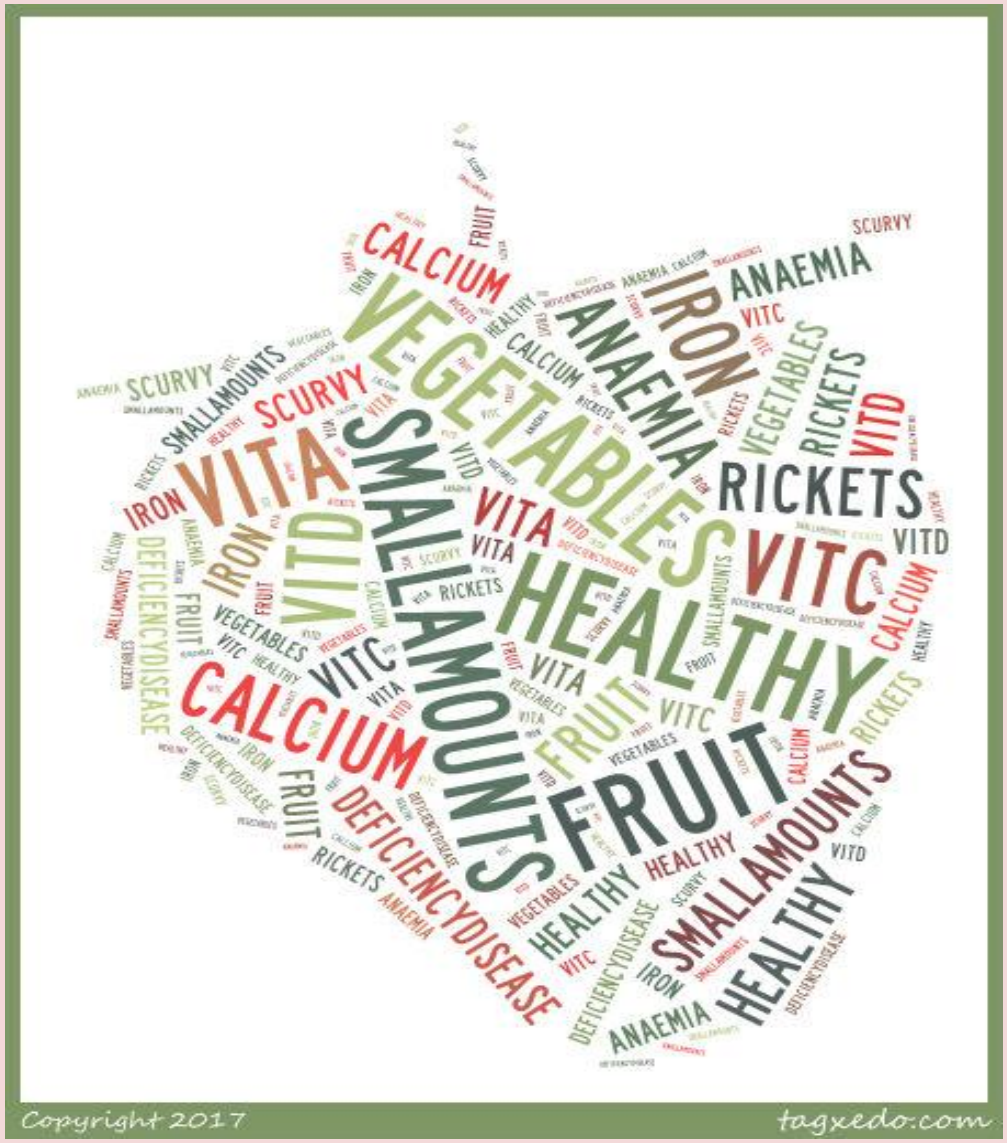
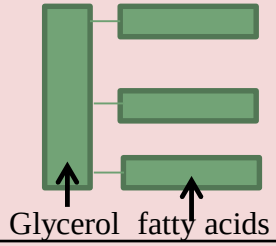
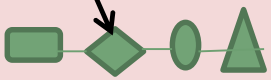
Vitamins & Minerals



Activity 3

Now complete activity 3 from page 3 of your class booklet.

Food Group	Elements	Structure	Energy	Function	Example
Fat					
Carbohydrate					
Protein					
Vitamin					
Mineral					

Food Group	Elements	Structure	Energy	Function	Example
Fat	Carbon Hydrogen Oxygen		38kJ/g	Energy store	Butter Oil Fried foods
Carbohydrate (sugars & starch)	Carbon Hydrogen Oxygen	Glucose molecules 	19kJ/g	Energy (sugars) Fibre	Jam Cake Vegetables
Protein	Carbon Hydrogen Oxygen Nitrogen	amino acids 	19kJ/g	Growth (make new cells) Repair(damaged material)	Chicken Fish Eggs Tofu
Vitamin				General health eg Vit D- healthy bones	Milk
Mineral				General health Eg IRON- for new red blood cells	Eggs Spinach

* Fibre is undigestible carbohydrate usually made of cellulose from plant cells*

Learning Objectives

- Describe the food tests for each food group

Success criteria

I successfully carried out food tests on a number of different foods and identified which food groups they contained

Food tests

It's not possible to tell by looking at a food which food groups it contains, so Scientists have devised a series of tests to show their presence in food.

	Carbohydrates Sugar		Proteins Meat	Fats Butter
Name of test	Iodine solution	Benedict's solution	Biuret's Solution	Filter paper
Detects	Starch	Glucose	Protein	Fat
Positive colour change	Brown to Blue/black	Blue to Brick red	Blue to Lilac	Grease mark
No change	No Starch	No Glucose	No Protein	No Fat

↑ Requires heat

Note: It is not possible to carry out the tests for vitamins & minerals easily in school.

Experiment to test foods

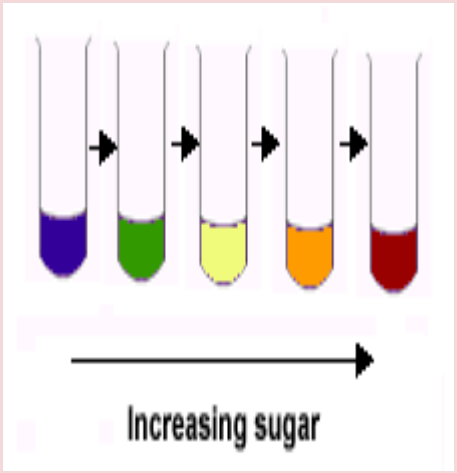
Aim: To identify the food groups present in food samples

Method:

Follow the instructions on page 4 of your class booklet

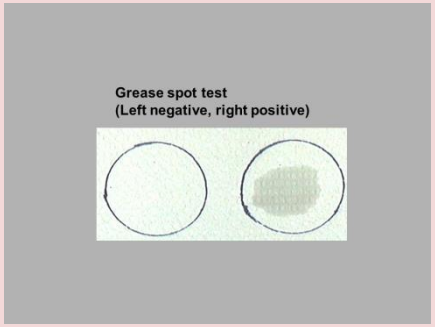
Iodine test:

Benedict's test:



Biuret test:

Grease spot test:



Results

	Iodine solution		Benedict's solution		Biuret solution		Grease Spot present?
Food sample	Start colour	Final colour	Start colour	Final colour	Start colour	Final colour	
Cereal Biscuit Crisps							

Results

	Iodine solution		Benedict's solution		Biuret solution		Grease Spot present?
Food sample	Start colour	Final colour	Start colour	Final colour	Start colour	Final colour	
Cereal	Brown	Black	Blue	Green	Blue	Blue	No
Biscuit	Brown	Black	Blue	Orange	Blue	Blue	Yes
Crisps	Brown	Black	Blue	Blue	Blue	Blue	Yes
Milk	Brown	Brown	Blue	Blue	Blue	Lilac	Yes

Conclusion

State the food groups present in the foods tested.

Results

	Iodine solution		Benedict's solution		Biuret solution		Grease Spot present?
Food sample	Start colour	Final colour	Start colour	Final colour	Start colour	Final colour	
Cereal	Brown	Black	Blue	Green	Blue	Blue	No
Biscuit	Brown	Black	Blue	Orange	Blue	Blue	Yes
Crisps	Brown	Black	Blue	Blue	Blue	Blue	Yes
Milk	Brown	Brown	Blue	Blue	Blue	Lilac	Yes

Conclusion

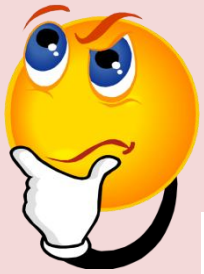
Cereal contains, **starch** and some **sugar**.
Biscuit contains **starch**, **sugar** and **fat**.
Crisps contain **starch** and **fat**.
Milk contains **protein** and **fat**.
No food tested contains all the food groups required so a variety of foods should be eaten for good health.

Learning Objectives

- Define the terms diet and balanced diet
- Know how to devise a balanced meal

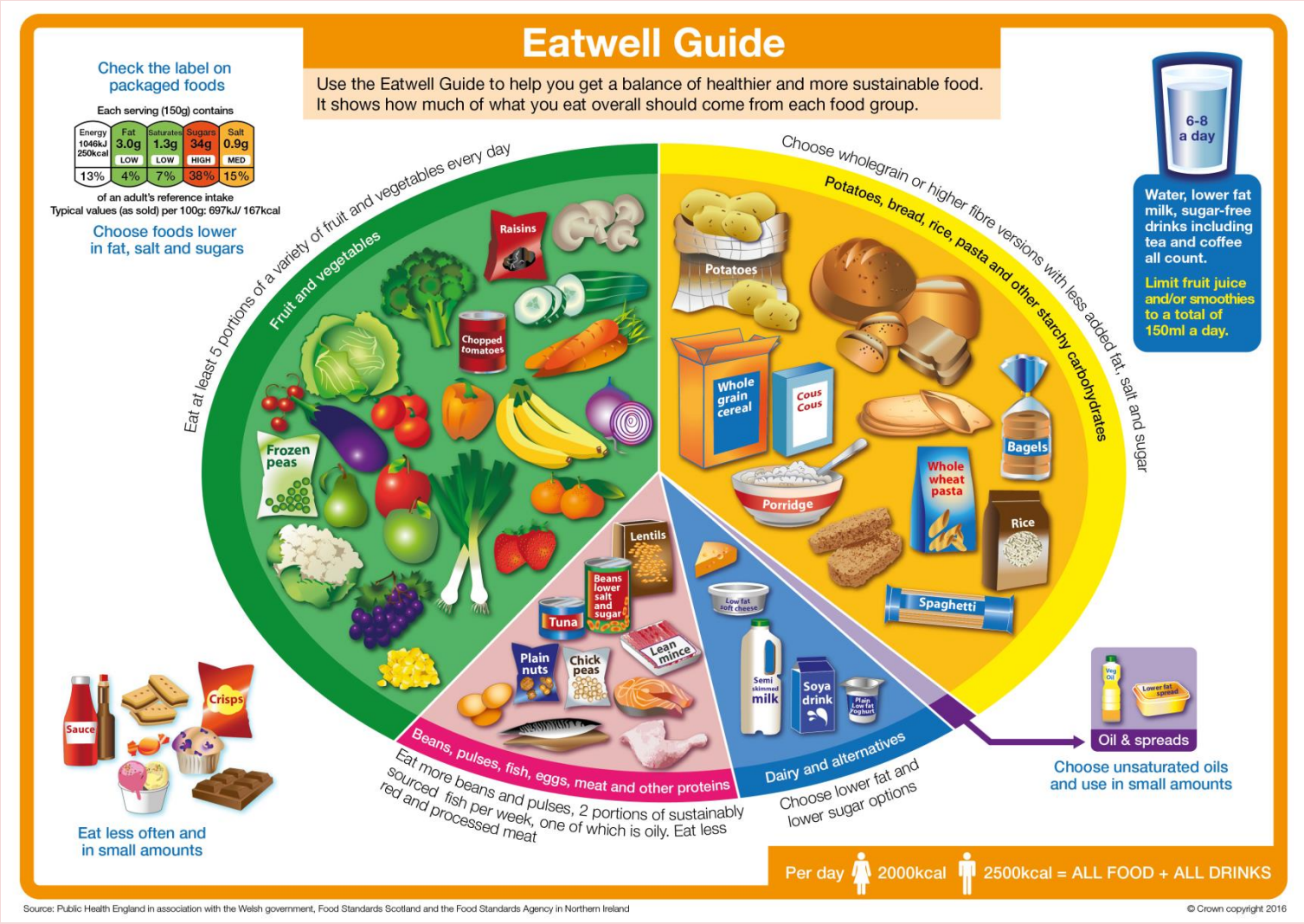
Success criteria

I successfully wrote a definition for the terms DIET and BALANCED DIET and then used that to devise a balanced meal for a person.



Diets

What should you eat?



Diets

Definition

Diet (n); The food and drink that a person normally consumes.

Balanced diet ; ? What do you think the definition would say

Balanced diet; contains food from the **four different food groups** to make a **person healthy**.

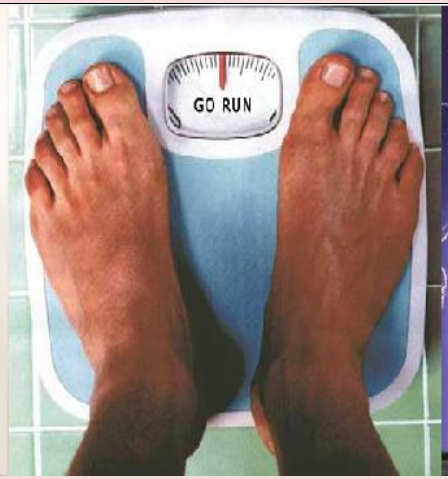
Who has a balanced diet?

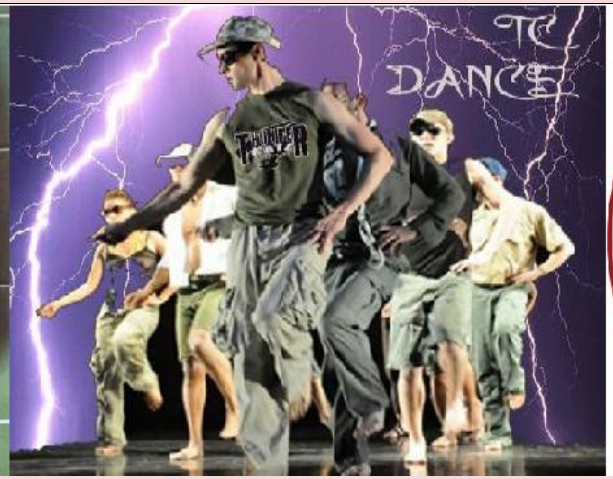
	Alan	Nicola	Stephen	Jane
Breakfast	1 bowl of Alpen half pint of milk 1 slice of toast and margarine 1 boiled egg 1 cup of tea (+ milk and sugar)	1 cup of tea (+ skimmed milk)	1 large bowl of Coco Pops half pint of milk 2 slices of toast and butter 1 bar of chocolate 1 can of cola	1 Weetabix and sliced banana half pint of semi-skimmed milk 1 slice of toast and margarine 1 cup of tea (+ semi-skimmed milk)
Lunch	steak pie peas mashed potato sponge and custard	1 can of Diet Coke 1 bag of cheese and onion crisps	1 hot dog chips 1 ice cream 1 chocolate flake 1 can of cola 1 bag of salted nuts	mince cabbage jacket potato 1 orange 1 pear
Evening meal	mushroom soup roast chicken chips turnip 1 pear	chicken salad 1 cup of tea (+ skimmed milk)	2 fried hamburgers chips beans fresh cream trifle 2 chocolate biscuits 2 cans of Irn Bru	grilled fish chips broccoli 1 fruit yoghurt 1 apple 1 can of diet cola

Preparing a balanced diet

Prepare a balanced meal for one of the following people:

A: A growing child	**B**: Person trying to lose mass	**C**: Dance teacher	**D**: You





Eatwell Guide

Use the Eatwell Guide to help you get a balance of healthier and more sustainable food. It shows how much of what you eat overall should come from each food group.

Check the label on packaged foods

Each serving (150g) contains

Energy	Fat	Saturates	Sugars	Salt
1046kJ 250kcal	3.0g LOW	1.3g LOW	34g HIGH	0.9g MED
13%	4%	7%	38%	15%

of an adult's reference intake
Typical values (as sold) per 100g: 697kJ/ 167kcal

Choose foods lower in fat, salt and sugars

Eat at least 5 portions of a variety of fruit and vegetables every day

Fruit and vegetables

Raisins
Chopped tomatoes
Frozen peas

Choose wholegrain or higher fibre versions with less added fat, salt and sugar

Potatoes, bread, rice, pasta and other starchy carbohydrates

Potatoes
Whole grain cereal
Cous Cous
Porridge
Bagels
Whole wheat pasta
Rice
Spaghetti

Beans, pulses, fish, eggs, meat and other proteins

Lentils
Beans lower salt and sugar
Tuna
Lean mince
Plain nuts
Chick peas

Eat more beans and pulses, 2 portions of sustainably sourced fish per week, one of which is oily. Eat less red and processed meat

Dairy and alternatives

Low fat soft cheese
Semi skimmed milk
Soya drink
Plain Low fat Yoghurt

Choose lower fat and lower sugar options

Oil & spreads

Veg Oil
Lower fat spread

Choose unsaturated oils and use in small amounts

6-8 a day

Water, lower fat milk, sugar-free drinks including tea and coffee all count.

Limit fruit juice and/or smoothies to a total of 150ml a day.

Sauce
Crisps

Eat less often and in small amounts

Per day 8000kJ 10000kJ ALL FOOD + ALL DRINKS

Source: Public Health England in association with the Welsh government, Food Standards Scotland and the Food Standards Agency in Northern Ireland

Learning Objectives

- State that energy requirements differ from person to person.
- Look at some of the things the body uses energy for
- State that energy balance occurs when energy input equals energy output and explain the effect of energy imbalance

Success criteria

- I successfully identified some of the factors that affect energy requirements.
- I can describe what BMR & working energy are and give the relationship between them in an equation.
- I can describe what happens if someone eats too much or too little energy on a regular basis.

Energy requirements 1

Activity:

Rank the activities from least to most energy used

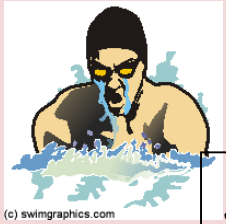
Ext: How many kilojoules per hour?

Tennis

Ironing

Jogging

Walking briskly



Swimming

Were you right?

Activity	kJ per hour
Ironing	570
Walking briskly	1200
Swimming	1600
Tennis	1900
Jogging	2500

Energy requirements 1

Energy requirements vary due to a number of factors.

Look at the table of energy requirements for different people and see if you can come up with a list of factors that affects how much energy a person needs.

person	daily energy requirement (kJ)
2-year-old child	5000
6-year-old child	6500
12–15-year-old girl	9600
12–15-year-old boy	11700
woman (light work)	9500
woman (pregnant)	10000
woman (heavy work)	12500
man (light work)	11500
man (moderate work)	13000
man (very heavy work)	15500

Activity 5

Complete activity 5 from page 6 of your class booklet

Size

Larger people require more energy to keep their bodies functioning and to move around

Lifestyle

The more activity a person does, the more energy is required.

Age

As you grow up your body gets larger and requires more energy, however, above about 40 years old your chemical reactions slow down so less energy is needed.

Gender

Males usually require more energy than females because they tend to be larger in size.

Activity 6

Complete activity 6 from page 7 of your class booklet

1. What does your body use energy for?

Keep warm, keep heart beating & lungs breathing

2. What term is used to describe … the amount of energy needed to … stay alive?

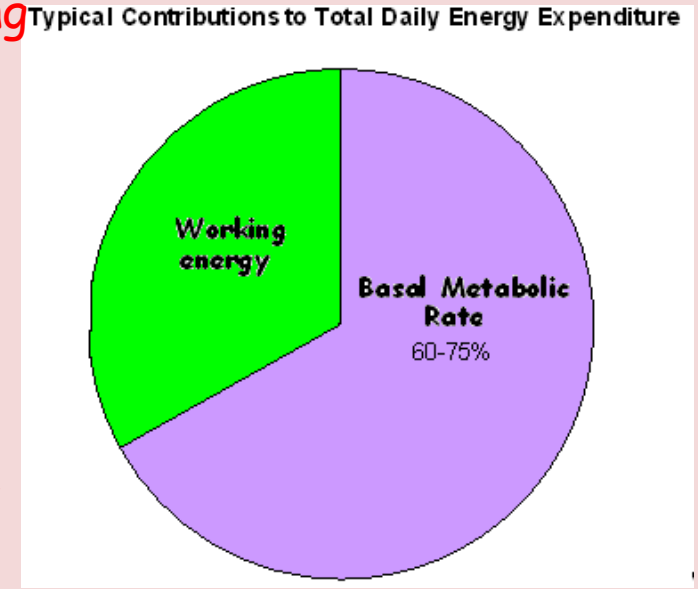
Basal Metabolic Rate (BMR)

3. What is working energy?

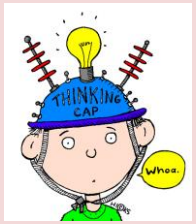
Energy to move around, digest food & exercise

4. Write an equation to show how to calculate the TOTAL ENERGY needed.

Total Energy= Basal Metabolic Rate + Working energy



Energy balance

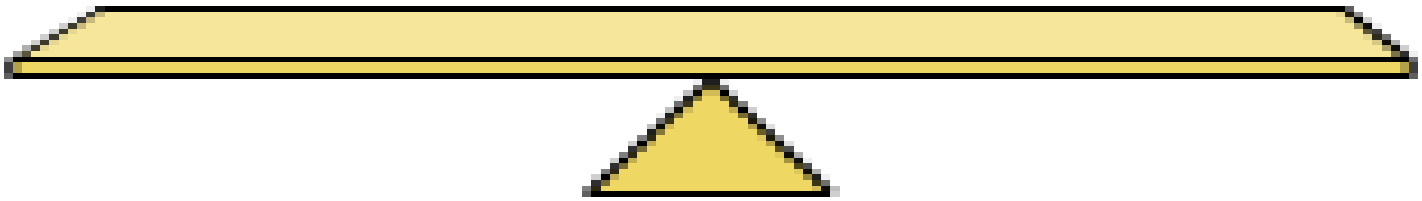


Think/pair/share

1. What will happen to a person if they eat:
   a) More energy than they use on a regular basis?

   b) Less energy that they use on a regular basis?

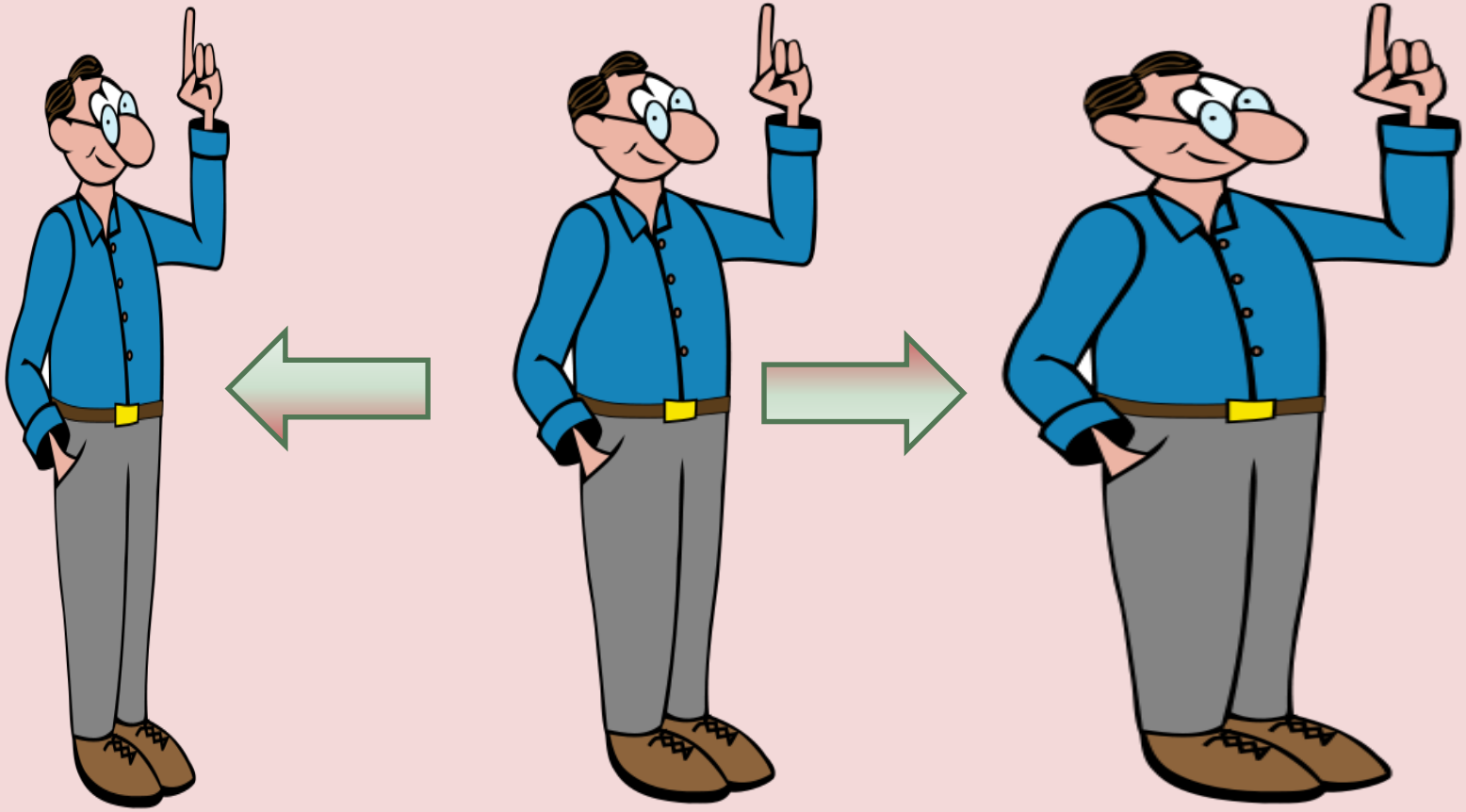
Click on a button to learn about balancing energy intake with energy needs.



lose weight | maintain weight | gain weight

Activity 7

Complete activity 7 from page 8 of your class booklet



Learning Objectives

Define and calculate BMI from graphs and using a formula.

Success criteria

- I can use the BMI formula to calculate a person's BMI.
- I can use a graph to estimate a person's BMI.
- I can identify if a person has a healthy BMI.

BMI

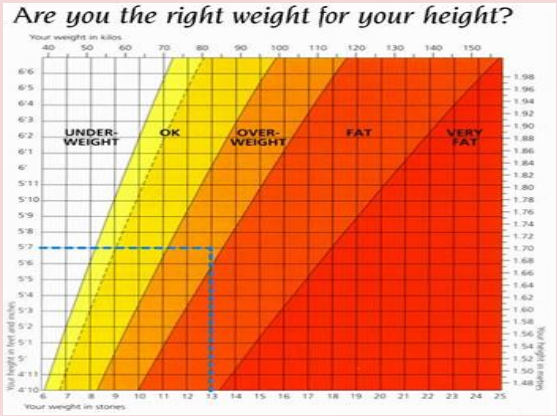
BMI (Body Mass Index) is a method used to measure if a person's mass is ideal for their height.

There are 2 main ways this can be calculated:

1. Equation:

$$BMI = \frac{\text{Body mass (kg)}}{\text{Height}^2 \text{ (m)}}$$

2. BMI graph



Complete Activity 8 & 9 from page 9
And 10 of your class booklet

Activity 9

Name	Mass (Kg)	Height (m)	BMI	Category
Jack	50	1.75	16	Underweight
Jill	80	1.40	41	Very obese
Janet	60	1.60	23	Ideal
John	75	1.70	26	Overweight

Remember to square the height!

Round BMI to nearest whole number

Copy the table of BMI values & category (opinion of experts) from page 10 of your class booklet.

Learning Objectives

Give causes and examples of malnutrition.

Success criteria

- I can name at least 3 different examples of diseases caused by malnutrition.
- I can describe the cause of at least two of these.

Malnutrition

Malnutrition is caused by too little or too much of any of the 4 food groups.

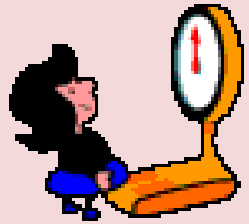
There are several classes of malnutrition:

1. Obesity — Energy input greater than energy output
2. Underweight — Energy input less than energy output
3. Starvation — Total lack of food over long period of time
4. Deficiency diseases — Lack of vitamin or mineral

Do you know the cause of each of the above types of malnutrition?

Complete Activity 10a from page 11 of your class booklet.

Health problem 1: Obesity



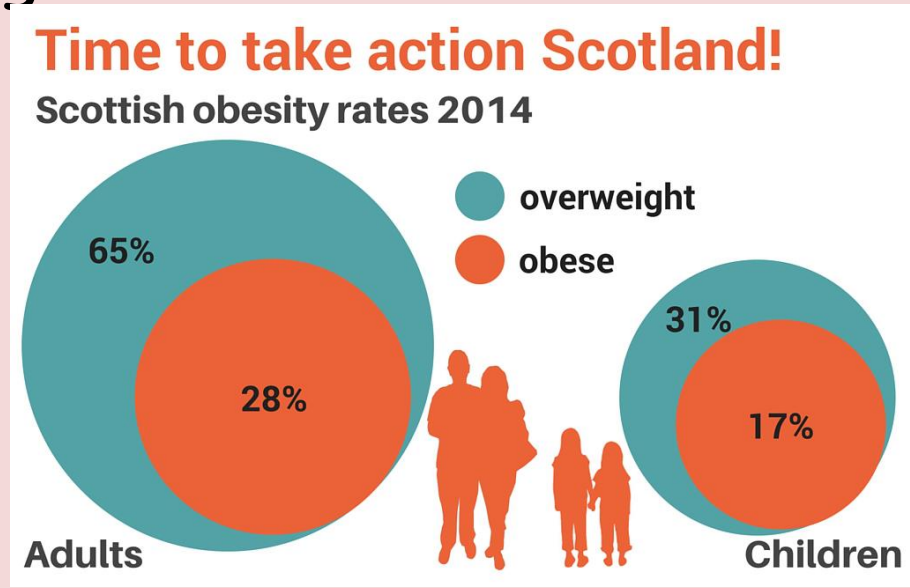
A person gains weight:

When energy in food eaten is more than energy used.

Obesity occurs when:

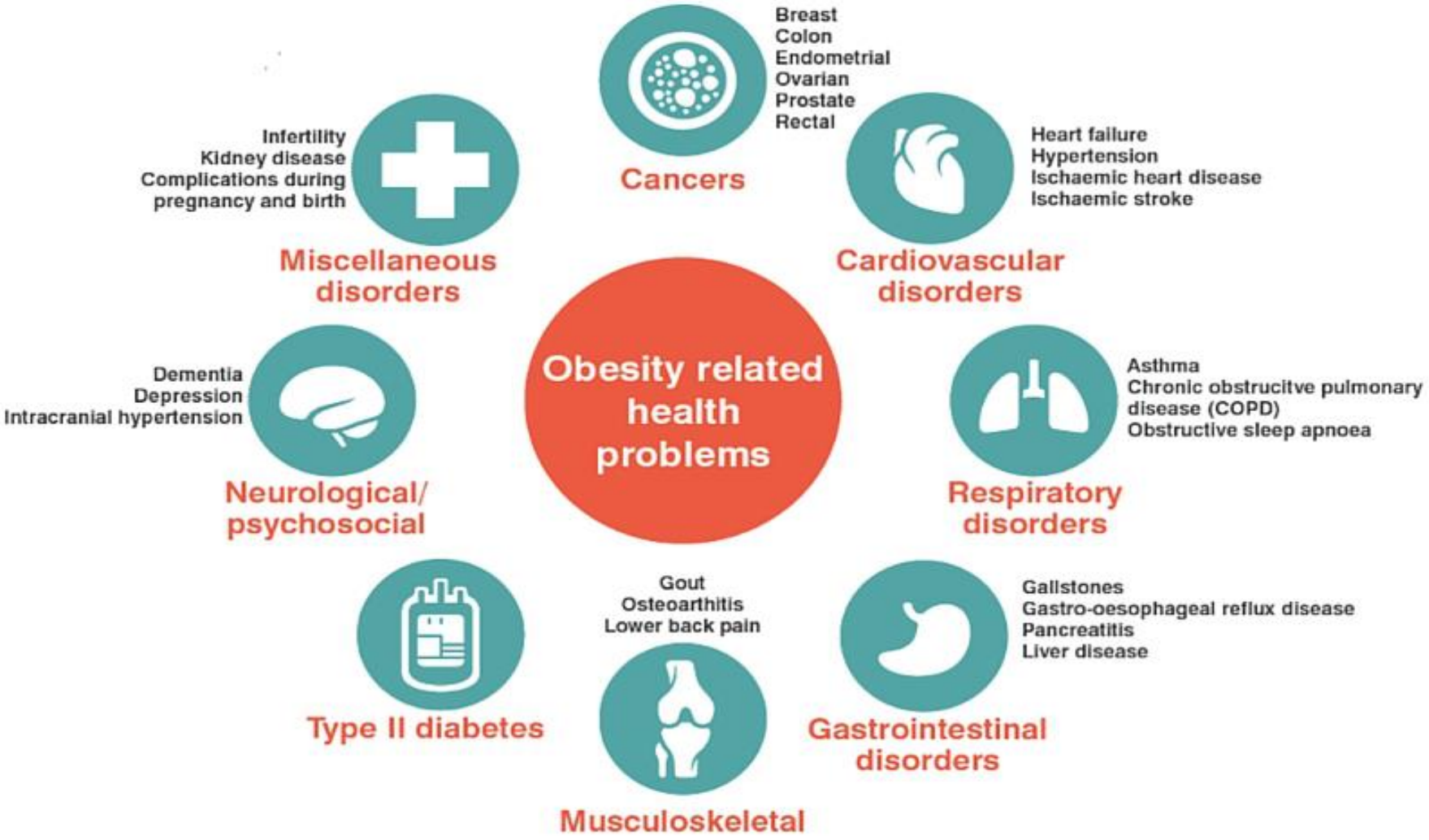
A person is more than 15% heavier than ideal body mass for their height

BMI is greater than 30

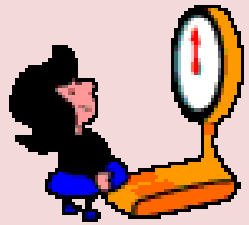


Time to tackle obesity Scotland

#healthierscotland #obesityaction #activehealth



Health problem 2: Underweight



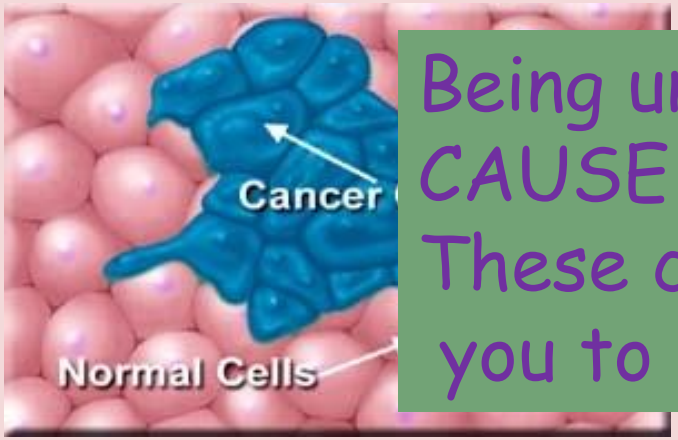
A person loses weight:

When energy in food eaten is less than energy used.

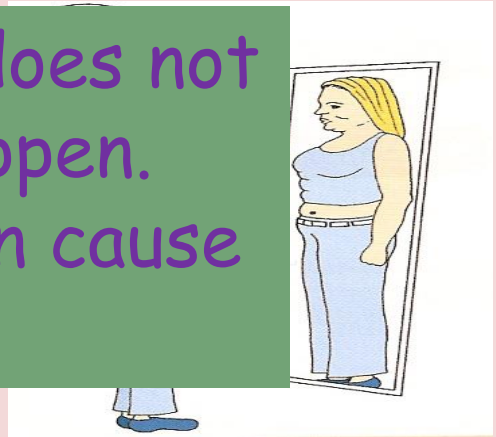
BMI is below 20

Being underweight can be a sign of other conditions:

1. Cancer

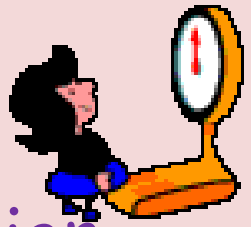


2. Anorexia



Being underweight does not CAUSE these to happen. These conditions can cause you to lose weight.

Health problem 3: Starvation



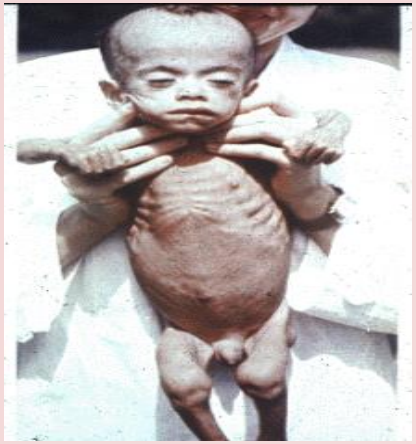
A person is classed as suffering from starvation if:

They have a severe or total lack of nutrients needed to maintain life

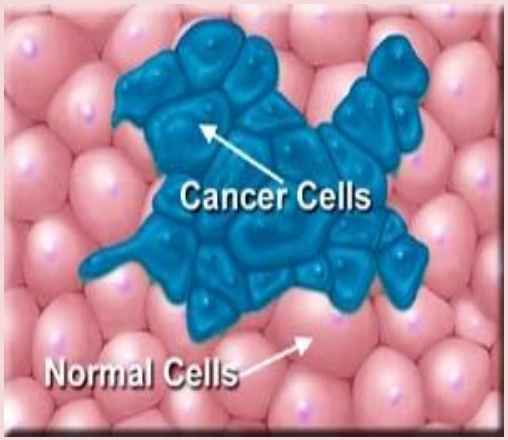
BMI is below 15

Causes include:

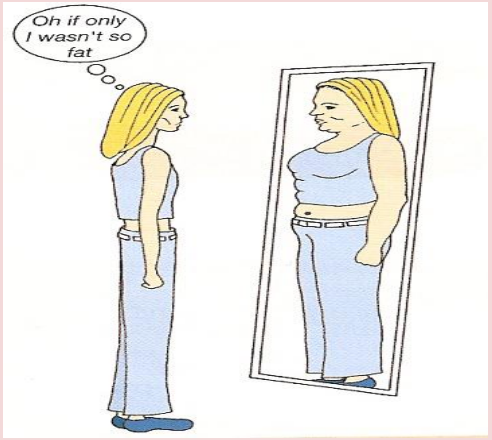
1. Famine



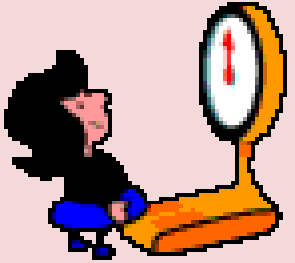
2. Cancer



3. Anorexia



Anorexia

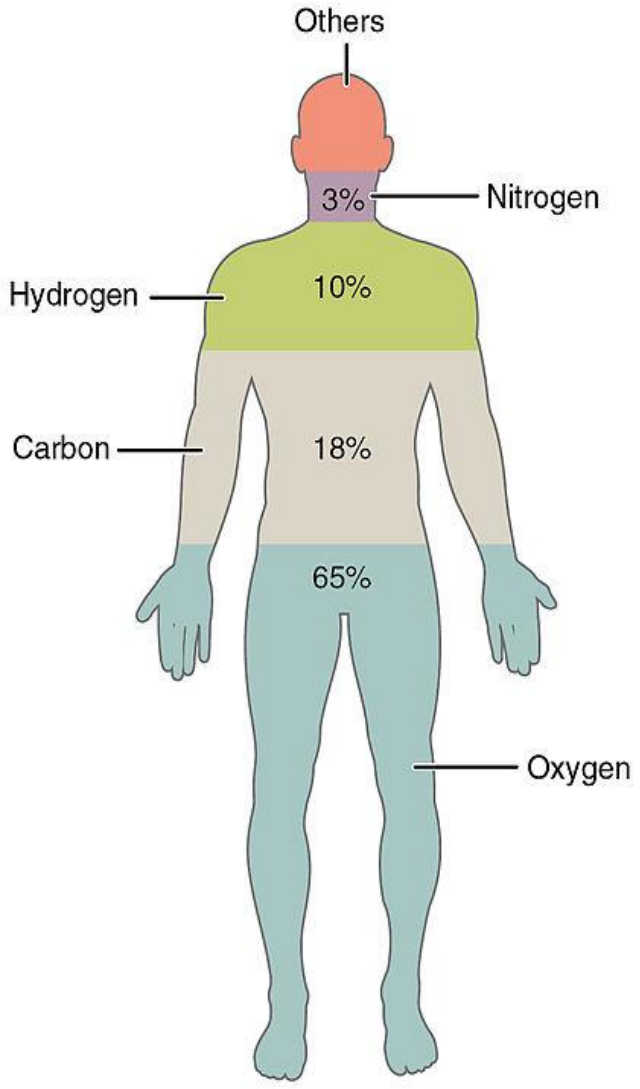


Anorexia is not caused by a lack of food. It is a **psychological** disease.

Discuss what you think this means.

What do you think?

Health problem 4: Deficiency diseases



Element	Symbol	Percentage in Body
Oxygen	O	65.0
Carbon	C	18.5
Hydrogen	H	9.5
Nitrogen	N	3.2
Calcium	Ca	1.5
Phosphorus	P	1.0
Potassium	K	0.4
Sulfur	S	0.3
Sodium	Na	0.2
Chlorine	Cl	0.2
Magnesium	Mg	0.1
Trace elements include boron (B), chromium (Cr), cobalt (Co), copper (Cu), fluorine (F), iodine (I), iron (Fe), manganese (Mn), molybdenum (Mo), selenium (Se), silicon (Si), tin (Sn), vanadium (V), and zinc (Zn).		less than 1.0

Mineral deficiency diseases

Table 9.2.

Mineral	Daily requirement	Major source	Deficiency Disease	Functions
Sodium	2.5 g	Common salt, fish, meat, eggs, milk	Muscle cramps	Associated with contraction of muscles transmission of nerve impulses in nerve fibre, controls water balance in the body.
Potassium	5-7 g	milk, banana, vegetables and meat	Weakness of muscles, paralysis	Involves in chemical activities inside cell. Contraction of muscles.
Calcium	1 gram	milk, egg, cheese, green vegetables, fish	Rickets (soft bones)	Essential for hardening the bones and teeth, coagulation of blood, muscle contraction
Phosphorus	1 gram	milk, cheese, green leafy vegetables, bajra, liver, nuts, beans and grains	bad teeth and bones	building strong bones and teeth.
Iron	25 mg (boys) 35 mg (girls)	Liver, kidney egg yolk, bajra, apple, banana, green vegetables	anaemia	Essential for the formation of haemoglobin in red blood cells, for tissue oxidation.
Iodine	20 g	Salt water, fish, iodized common salt sea food	Goitre	Essential for the formation of thyroxine.

Complete Activity 10 b from page 12 of your class booklet.

Mineral deficiency diseases

mineral	result of serious deficiency of mineral	rich source of mineral
calcium	weak bones and soft teeth	milk
iron	anaemia (shortage of red blood cells)	red meat, green vegetables

Vitamin deficiency diseases

Use the information on Vitamins from page 12 of your booklet to complete a similar table on vitamin deficiency diseases.

Vitamin	Deficiency disease	Rich source of vitamin

Vitamin deficiency diseases

vitamin	deficiency disease resulting from shortage of vitamin	rich source of vitamin
A	night-blindness	carrots
C	scurvy (poor healing of wounds; soft, bleeding gums)	oranges
D	rickets (soft bones that become deformed easily) -	whole milk

Learning Objectives

To define digestion .

To describe the two main types of digestion.

To carry out an experiment using visking tubing to show why digestion is necessary

Success criteria

- I can write a definition for digestion.
- I can describe the two main types of digestion.
- I can safely carry out an experiment to show why our food must be digested

Digestion

Our bodies are unable to get vitamins, minerals and other food groups out of our food without first **DIGESTING** it.

What happens to food when it is DIGESTED?

Copy and complete the definition of digestion from page 12 of your class booklet. Use the following wordlist:

small

insoluble

large

soluble

breakdown

bloodstream

Types of digestion

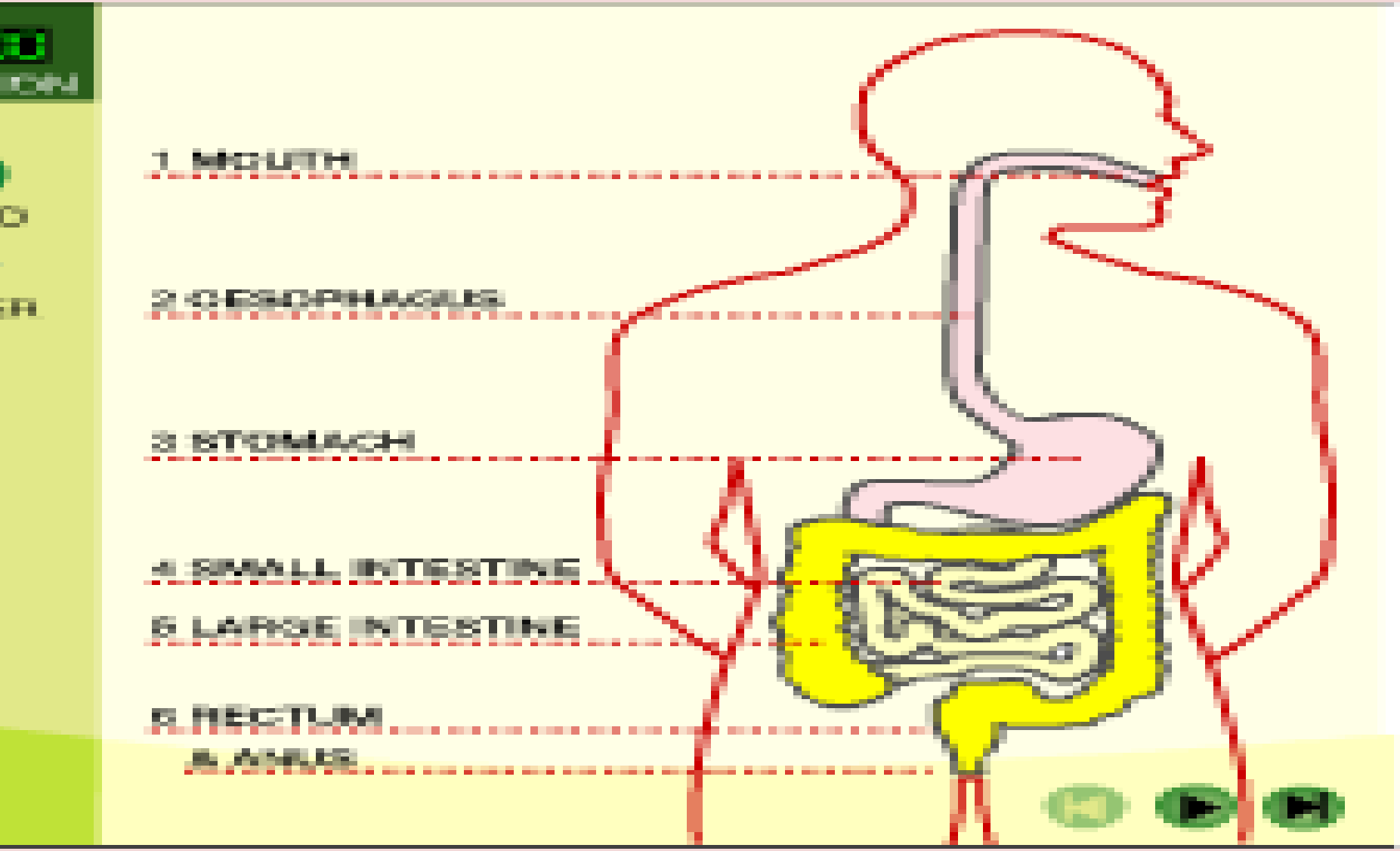
What are the main methods we use to digest our food?

There are two main types of digestion:

1. **Mechanical** (by the action of teeth)

2. **Chemical** (by enzymes)

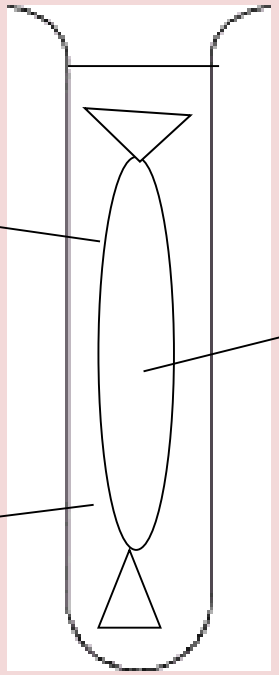
The digestive system



Experiment to show the need for digestion

AIM: To show the need for digestion in a model gut

Diagram:



Method (set up the following experiment)

1. Tie a knot at one end of a length of visking tubing.
2. Fill with 5ml of starch solution & 5ml glucose solution.
3. Tie the other end of the tubing then rinse the outside well under the tap.
4. Put the visking tubing in a boiling tube then cover with distilled water. Start the stopwatch.
5. Take a sample of the outside water and put a few drops into a dimple tray. Test for starch using Iodine solution.
6. Take another sample into a test tube and test for glucose using Benedict's solution (remember to heat in a water bath).
7. Repeat steps 5&6 after 20 minutes.
8. Record all your results in a table.

Method (copy and complete the method below)

1. The experiment was set up as shown in the diagram.
2. The outside of the bag was first _____rinsed_____to remove any solutions on the outside of the bag.
3. The stopwatch was started and a sample taken from the outside water was put in a dimple tray and tested with _____Iodine_____ _____solution_____ to test for starch.
4. A second sample was added to a test tube and tested for _____glucose_____using Benedict's solution (remember to heat in a water bath).
5. Steps 3&4 were repeated after 20 minutes.
6. All results were recorded in a table.

Results

Time (mins)	Colour of Iodine solution	Colour of Benedict's solution
0		
20		

Conclusion

1. Which substance passed through the visking tubing?
2. Why do you think this happened?
3. Why was the visking tubing rinsed before putting it in the distilled water?
4. Why is digestion of starch necessary in our bodies?

Conclusion (answers)

1. Which substance passed through the visking tubing? **GLUCOSE**
2. Why do you think this happened?
   The glucose molecules were smaller than the starch molecules and were able to pass through the tiny holes in the visking tubing.
3. Why did you rinse the visking tubing before putting it in distilled water?
   To remove any glucose or starch on the outside of the visking tubing bag.
4. Why is digestion of starch required in our bodies?
   To make the starch molecules smaller so they can fit through the walls of the intestines and into the bloodstream.

Learning Objectives

Investigate mechanical digestion by teeth.

State the 4 main types of teeth and describe their function

Identify the main parts that make up the structure of a tooth

Success criteria

I can name the 4 main types of teeth and identify them on a diagram

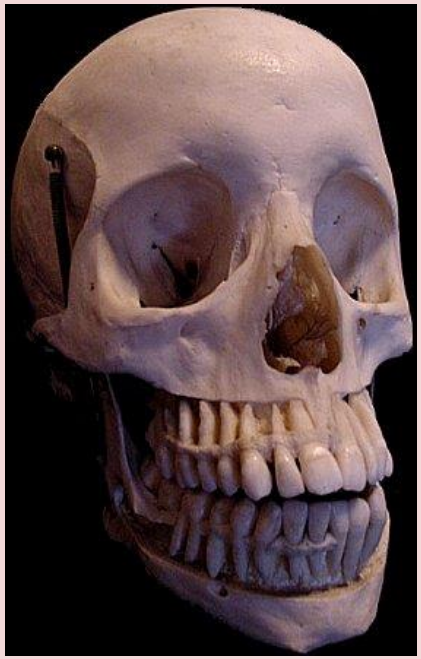
- I can describe the function of each type of tooth
- I can label the main structures in a tooth

Types of digestion

There are 2 main types of digestion:

1: Mechanical (crushing)

2: Chemical (enzymes)



How many teeth should an adult human have?

How many types are there?

Complete activity 11 & 12 on page 14 of your class booklet

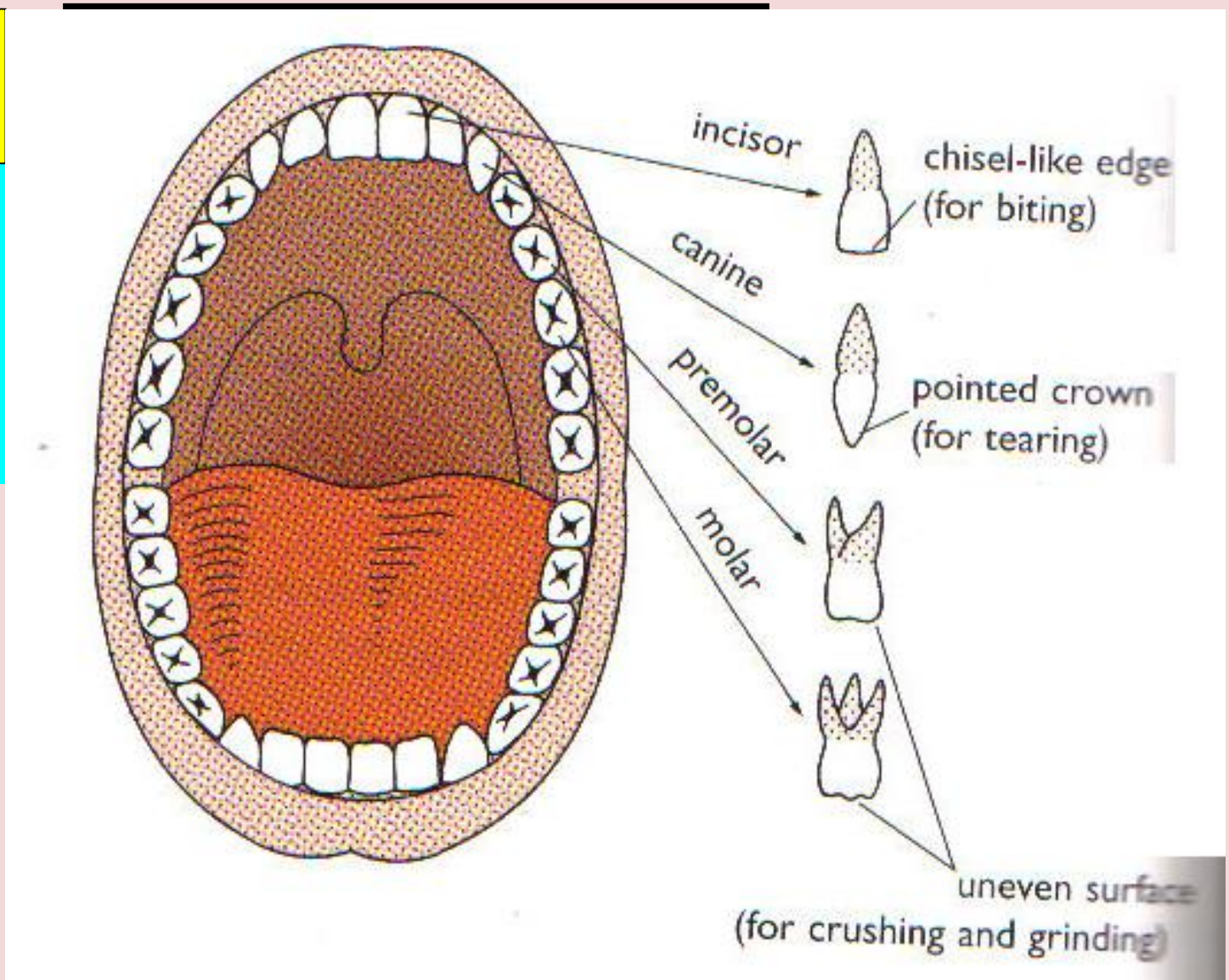
Mechanical digestion (teeth)
Human dentition

Child has:
20 milk teeth:

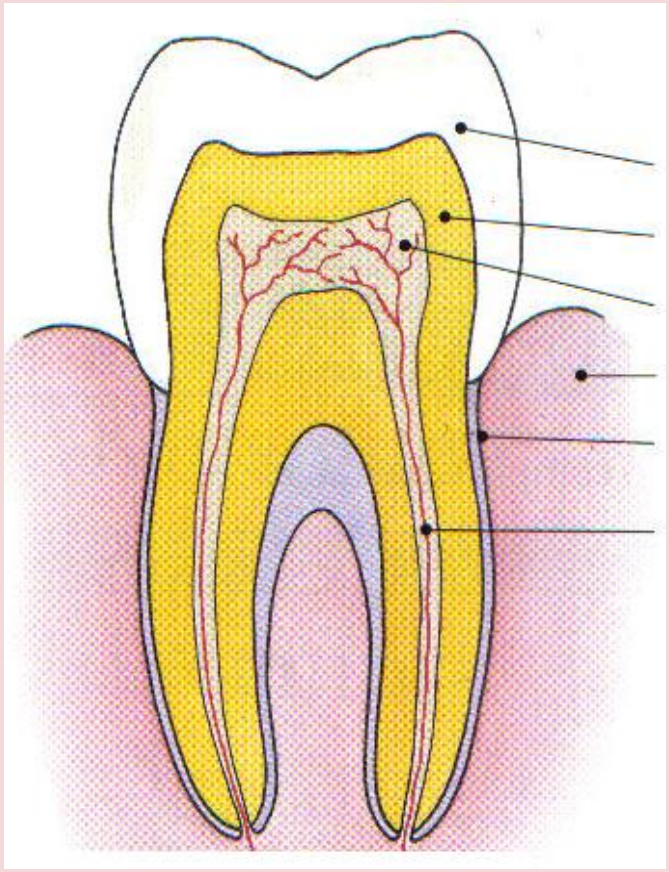
Also called deciduous teeth

Reason:
They fall out

Adult has:
32 permanent teeth

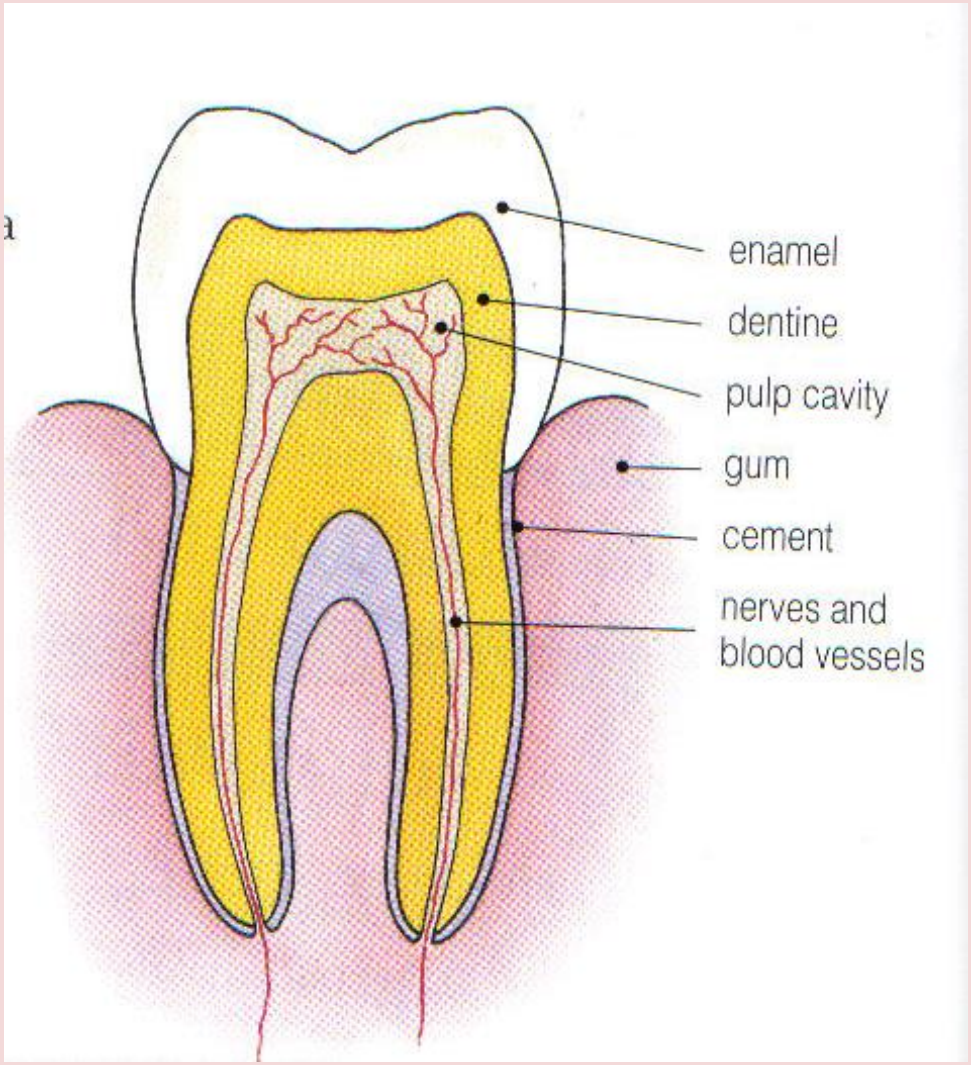


Structure of a tooth



Complete activity 13 on page 14 of your class booklet

Structure of a tooth



What kind of tooth is this?

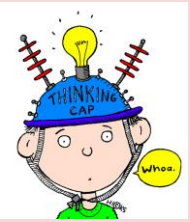
Learning Objectives

1. Describe the teeth in other animals
2. Describe the cause and prevention of tooth decay

Success criteria

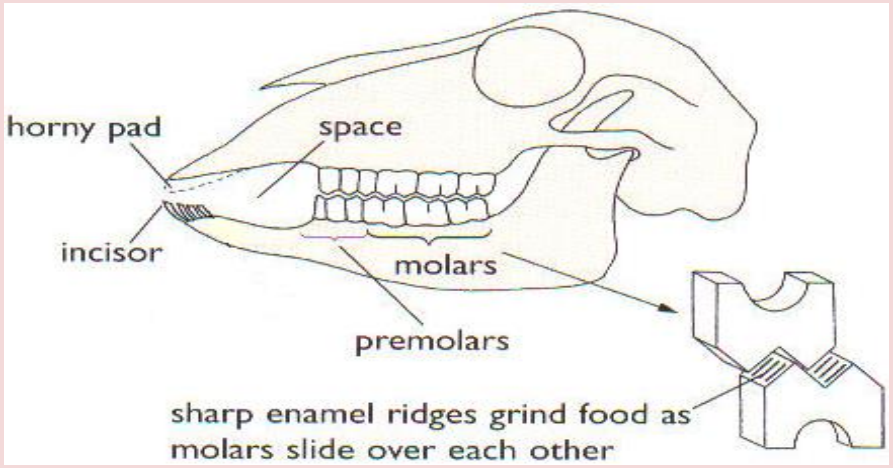
- I can identify the type of diet an animal might have by looking at their teeth.
- I can give a special feature of the teeth of a herbivore, carnivore and omnivore
- I can explain the role of bacteria, plaque and acid in tooth decay and describe 4 different ways to prevent tooth decay

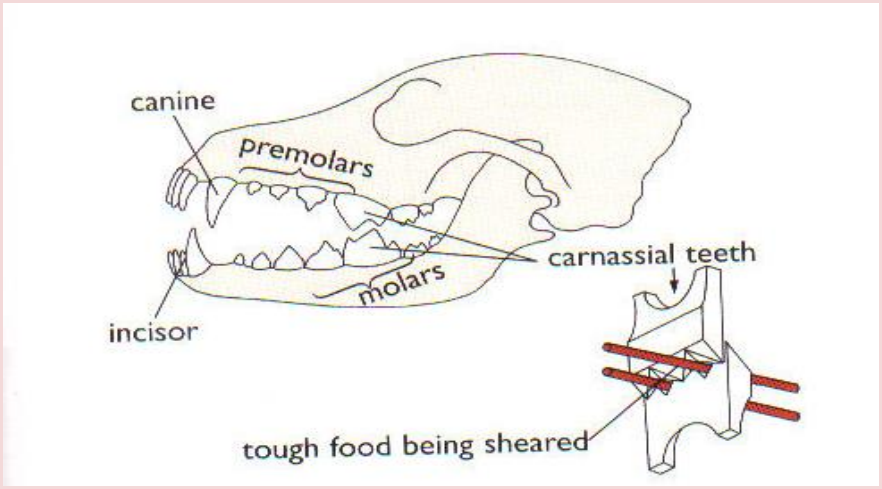
Teeth of other animals

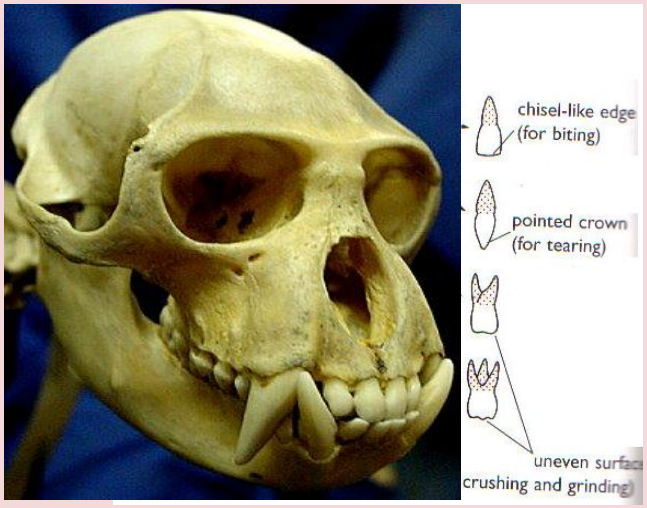


Think/pair/share

Which animal do these teeth belong to?
What kind of diet would each have?
Why do you think this?







Activity 14 page 14 of your class booklet

Copy & complete the following table into your class jotter

Animal	Type of diet	Teeth types present	Teeth types missing	Special information
Sheep			Canine	Molars & premolars have sharp ridges. Jaws move from side to side when chewing to grind food between ridges
	Carnivore		None	Larger canines for ripping meat Extra large molar teeth called carnassial teeth to crack bone
Monkey	Omnivore	Canine Incisor Premolar Molar		Have a range of different types of teeth to cope with a varied diet

Activity 14 page 14 of your class booklet

Answers

Animal	Type of diet	Teeth types present	Teeth types missing	Special information
Sheep	Herbivore	Incisor Premolar Molar	Canine	Molars & premolars have sharp ridges. Jaws move from side to side when chewing to grind food between ridges
Dog	Carnivore	Canine Incisor Premolar Molar	None	Larger canines for ripping meat Extra large molar teeth called carnassial teeth to crack bone
Monkey	Omnivore	Canine Incisor Premolar Molar	None	Have a range of different types of teeth to cope with a varied diet

Tooth Decay

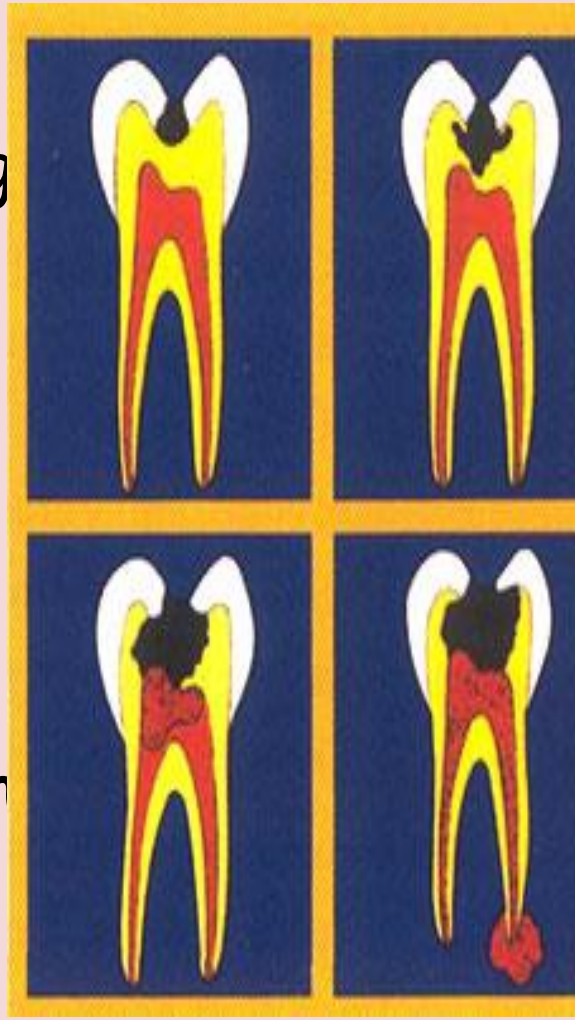
What causes decay like this?

Tooth Decay

1. Plaque forms:
   Plaque is a soft sticky substance that accumulates on teeth consisting of bacteria and food debris.

2. Bacteria:
   Bacteria feed on sugary foods and convert them to acid.

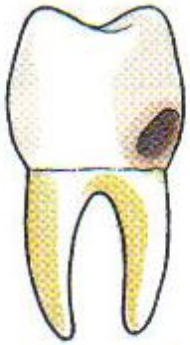
3. Acid:
   Attacks the enamel of healthy teeth causing decay and cavities



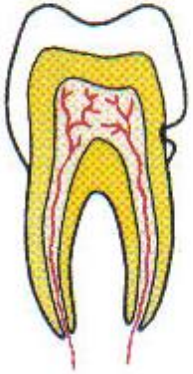
Activity 15

Complete activity 15 from page 16 of your class booklet

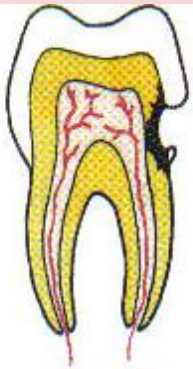
1 Bacteria grow on the food (especially sugary food) and form plaque.



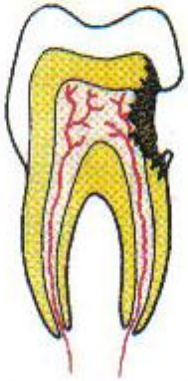
2 The bacteria make acid. This acid attacks the enamel and makes a small hole (a **cavity**).



3 Food collects in the cavity and bacteria make more acid. This acid attacks the enamel and the cavity gets bigger.

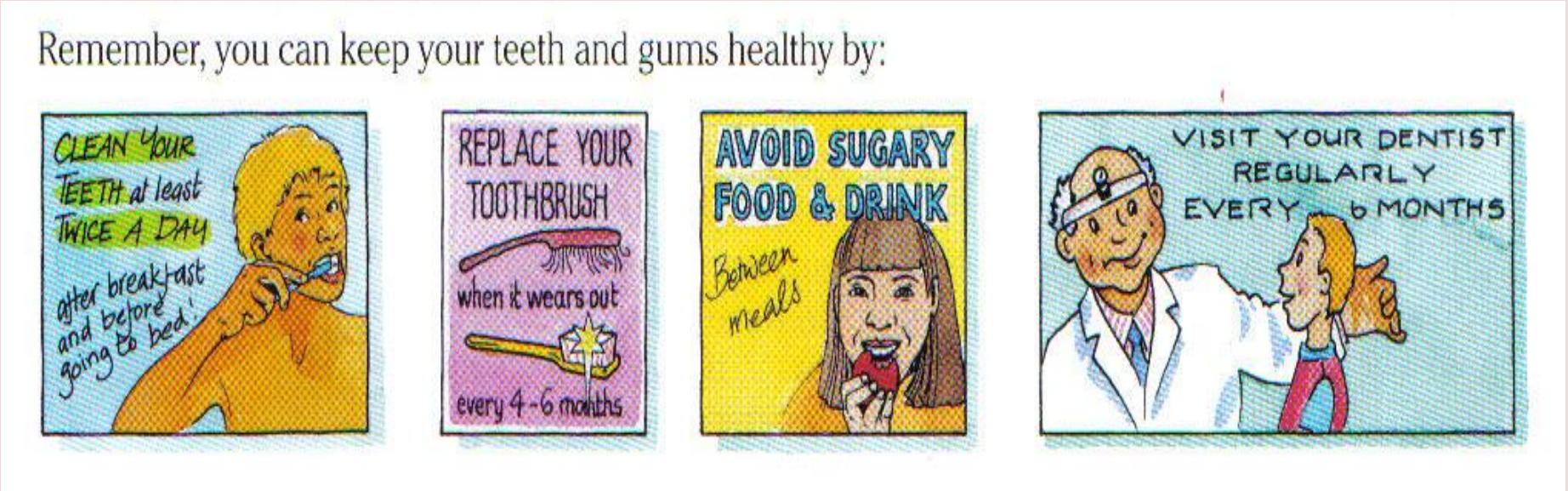


4 Once through the enamel the cavity quickly spreads through the dentine to the pulp. The nerve is now affected. It can be very painful.



How to prevent tooth decay

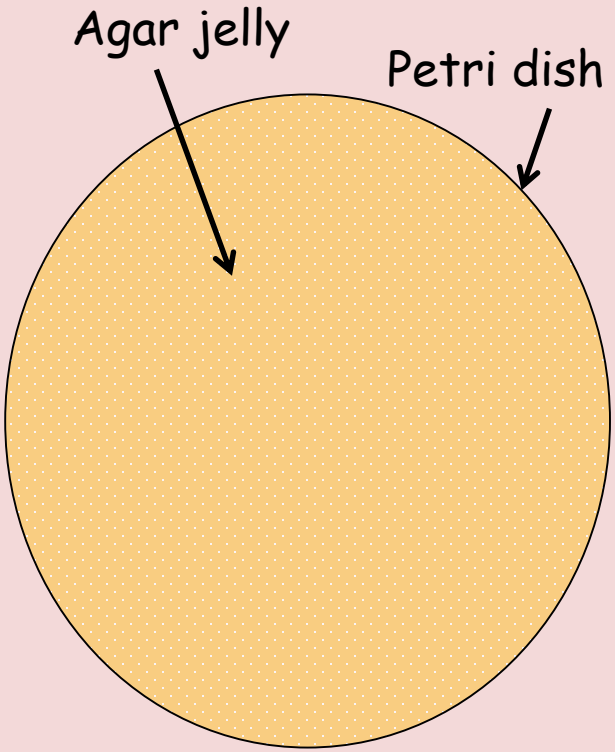
Make a list of some of the ways tooth decay can be prevented

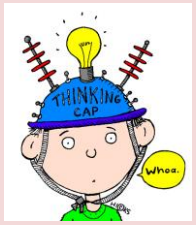


Complete Activity 16 from p16 of your class booklet

Investigating different toothpastes

Aim: To determine which type of toothpaste removes the most bacteria

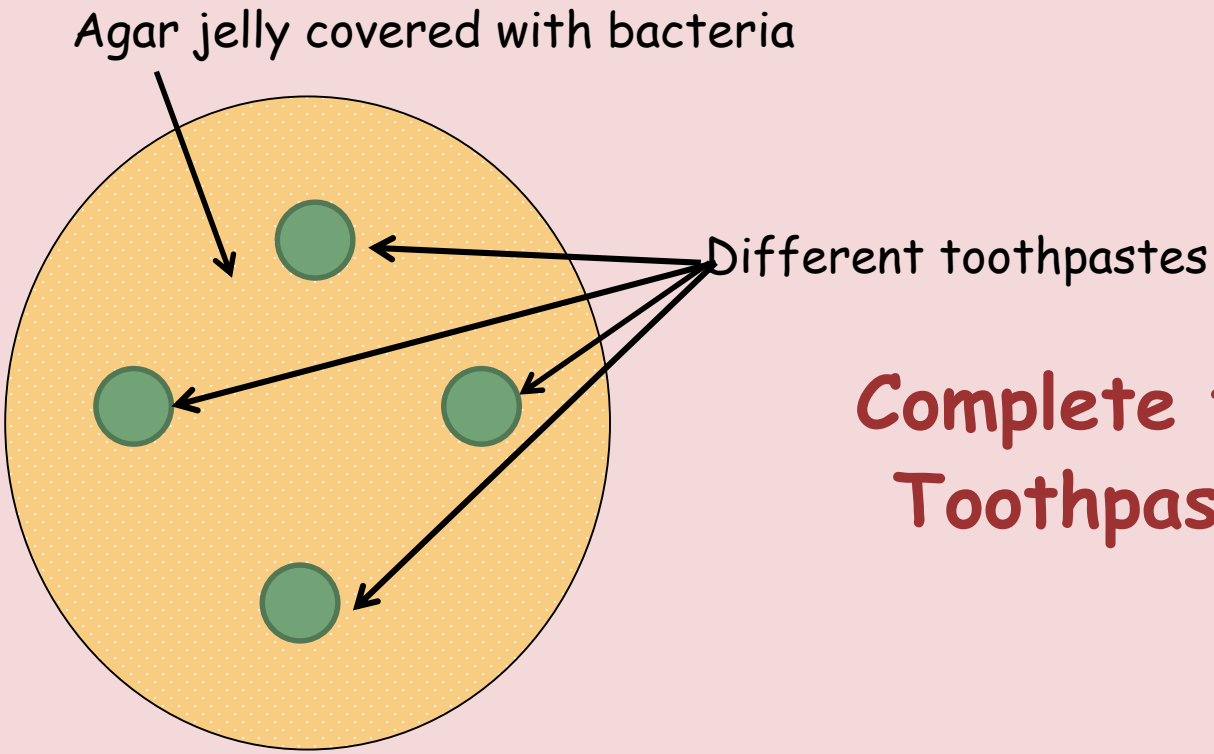




What was this equipment used for in a previous section?

Investigating different toothpastes

Look at the results for the experiment.



Complete the worksheet Toothpaste experiment

Learning Objectives

1. To define the role of enzymes in chemical digestion.
2. To carry out an experiment to show enzyme action

Success criteria

- I can name some digestive enzymes and their jobs
- I can safely carry out an experiment to show the job of one particular enzyme

Chemical digestion (enzymes)

Copy and **complete** the following from p17 :

Enzymes are_____ catalysts. Their job is to increase the _____ of _____ reactions. They remain _____ at the end of the reaction. The enzymes in the digestive system speed up the rate at which food is broken down. They work like scissors to cut the bonds between the _____ molecules. Each type of food has its own _____.

unchanged

enzyme

biological

chemical

speed

food

Chemical digestion (enzymes)

Answers :

Enzymes are_____ catalysts. Their job is to increase the _____ of _____ reactions. They remain _____ at the end of the reaction. The enzymes in the digestive system speed up the rate at which food is broken down. They work like scissors to cut the bonds between the _____ molecules. Each type of food has its own _____.

unchanged

enzyme

biological

chemical

speed

food

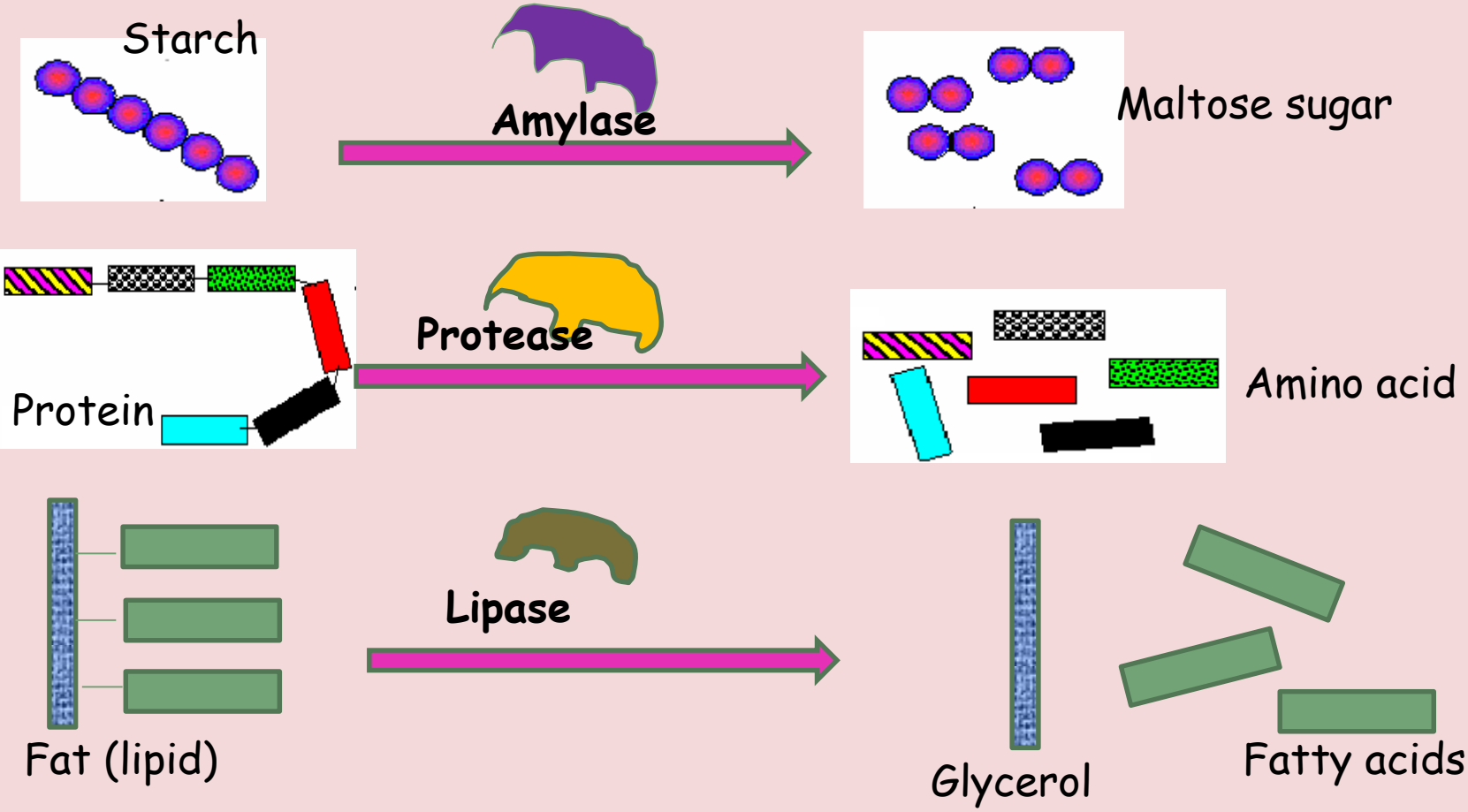
Recapping food groups

Think back to food groups. Can you match the food type to the building blocks that make it up?

FOOD TYPE	BUILDING BLOCKS
Protein	Fatty acids & glycerol
Carbohyhdrate	Glucose
Fats	Amino acids

Digestive enzymes

Because each type of food is made of different building blocks, different shaped enzymes are needed to break apart (digest) each one.



Naming Enzymes

- Enzymes are usually named after the substance they act on

  eg Maltase acts on maltose

  Protease acts on protein

- Their name usually ends in - ASE (although there are exceptions)

What could the name of an enzyme be that could digest skin?

Copy and complete the diagram from p17 of your class booklet

How might the following help you remember some enzymes and what they work on?

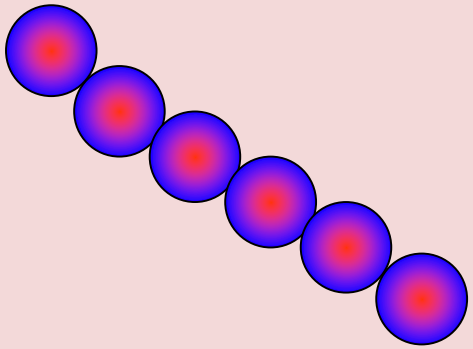
SAMS — **S**tarch → **A**mylase → **M**altose **S**ugar

PPAA — **P**rotein → **P**rotease → **A**mino **A**cids

FLFAG — **F**at → **L**ipase → **F**atty **A**cids & **G**lycerol

Experiment to show amylase action

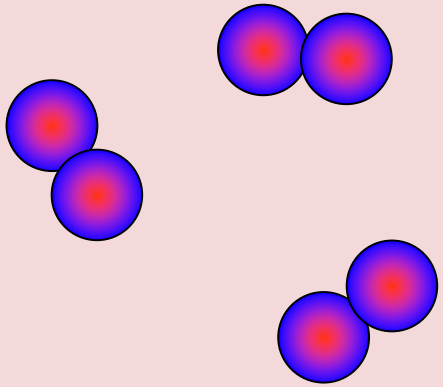
Starch



etc..

Amylase

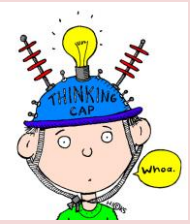
Maltose



TESTS

Iodine solution

Benedict's solution

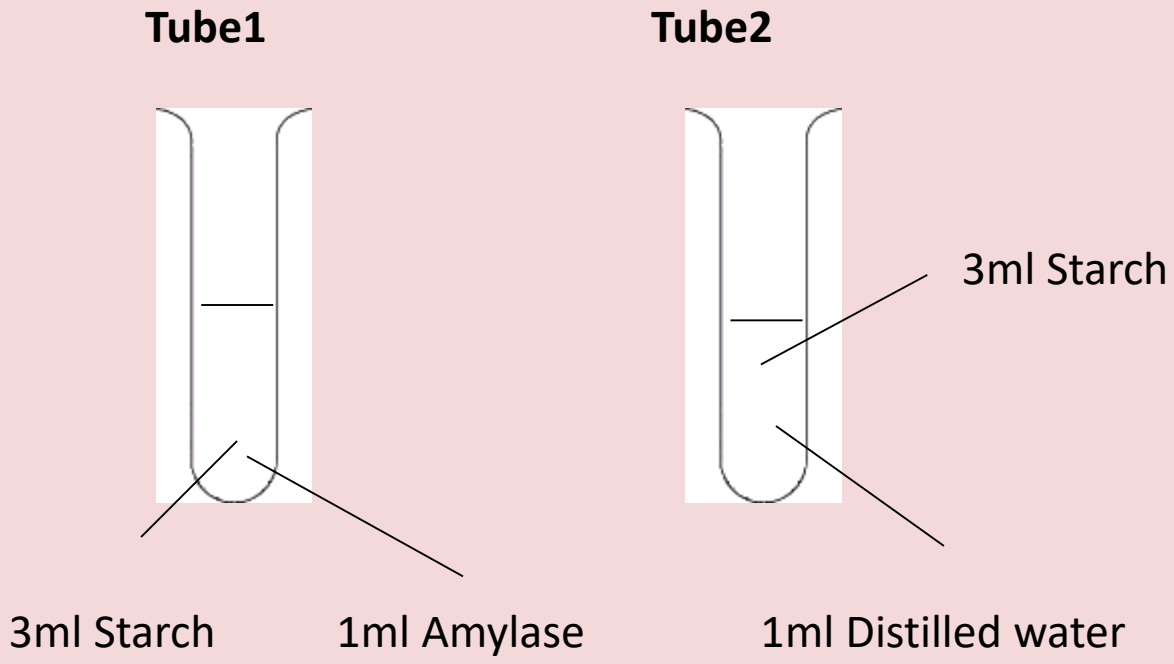


With your partner, can you design an experiment to PROVE amylase breaks down STARCH to MALTOSE

Experiment to show amylase action

Aim: To show the action of amylase on starch

Diagram:

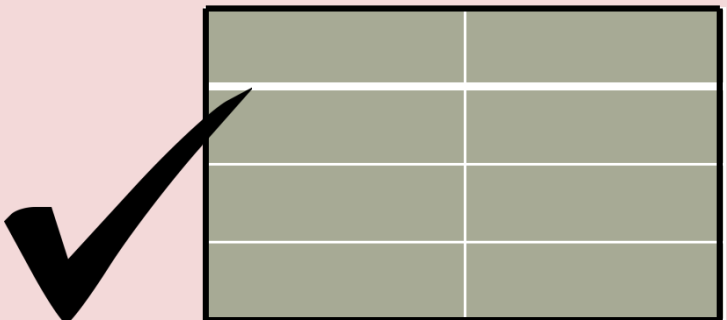


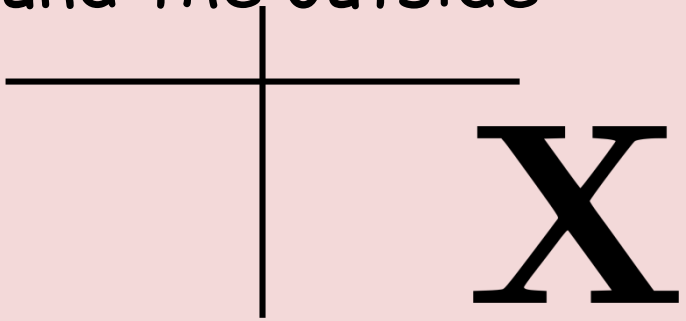
Follow the method on p18 of your class booklet

Method

Write a method for your experiment and draw a results table.

1. Diagrams are drawn using pencil & ruler
2. Methods are written in past tense & impersonal voice
3. Results tables are drawn with pencil & ruler with lines around the outside





Results

Time (mins)	Colour of Iodine solution	
	With amylase	Without amylase
0		
2		
4		
6		
8		
10		

Results

Time (mins)	Colour of Iodine solution	
	With amylase	Without amylase
0	Black	Black
2	Black	Black
4	Black	Black
6	Brown	Black
8	Brown	Black
10	Brown	Black

Complete the conclusion questions from p18 of your class booklet

Conclusion

Answers

1. Which tube(s) contained starch at the beginning of the experiment?

   Both tubes

2. Which tube(s) contained starch at the end?

   Tube without amylase

3. What had happened to the starch in tube 1?

   Amylase broke it down to sugar

4. Why was tube 2 included in the experiment?

   As a CONTROL – to show it was amylase breaking down starch

5. Why were the tubes put in a water bath at 37°C

   This is the same temperature as the body, where amylase normally works

Learning Objectives

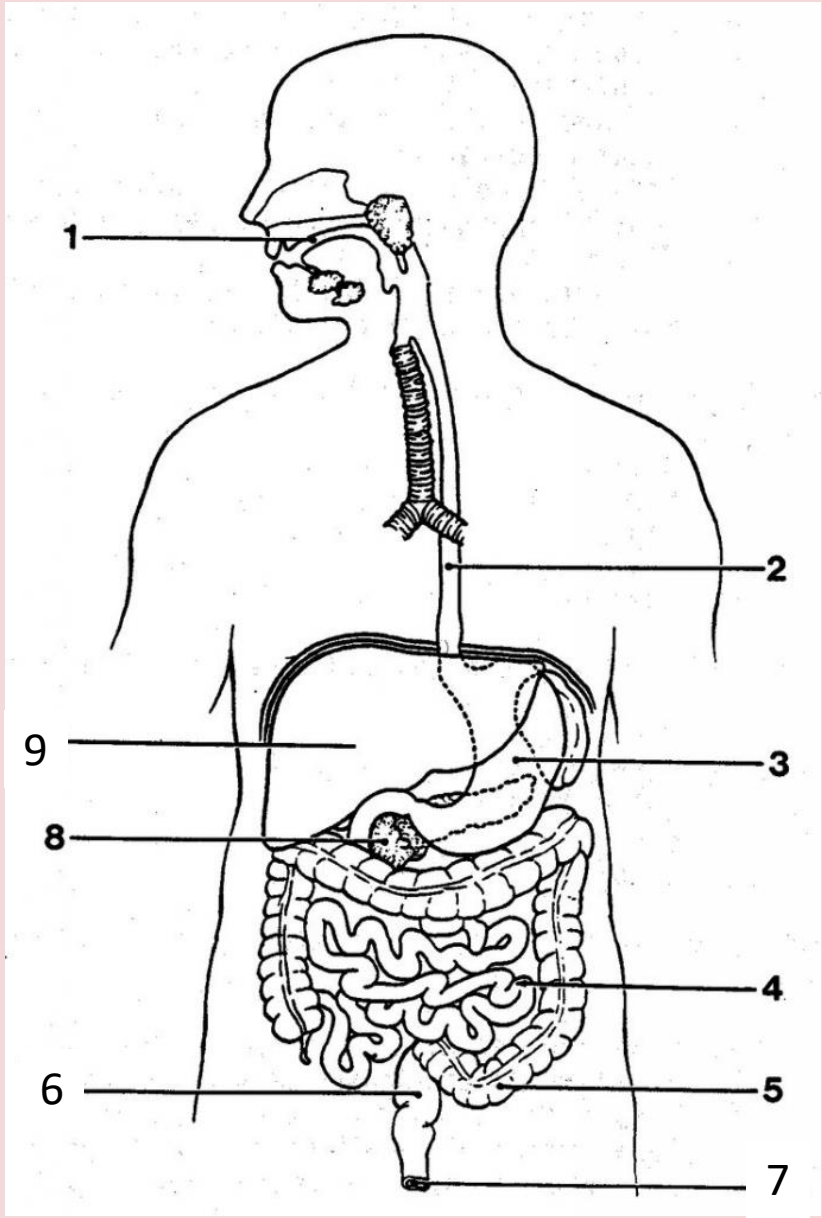
1. Identify the main parts of the digestive system and state their function
2. Describe how food is moved along the digestive system

Success criteria

- I can name the main parts of the digestive system and locate them on a diagram
- I can define peristalsis

Digestive System

Stick in the diagram of the digestive system.
Label parts 1-7 in blue/ black ink.
Label parts 8&9 in a different colour.
(food does not actually enter Parts 8 & 9 but they help in digestion)



Digestive System (Answers)

Mouth

Oesophagus

Stomach

Small Intestine

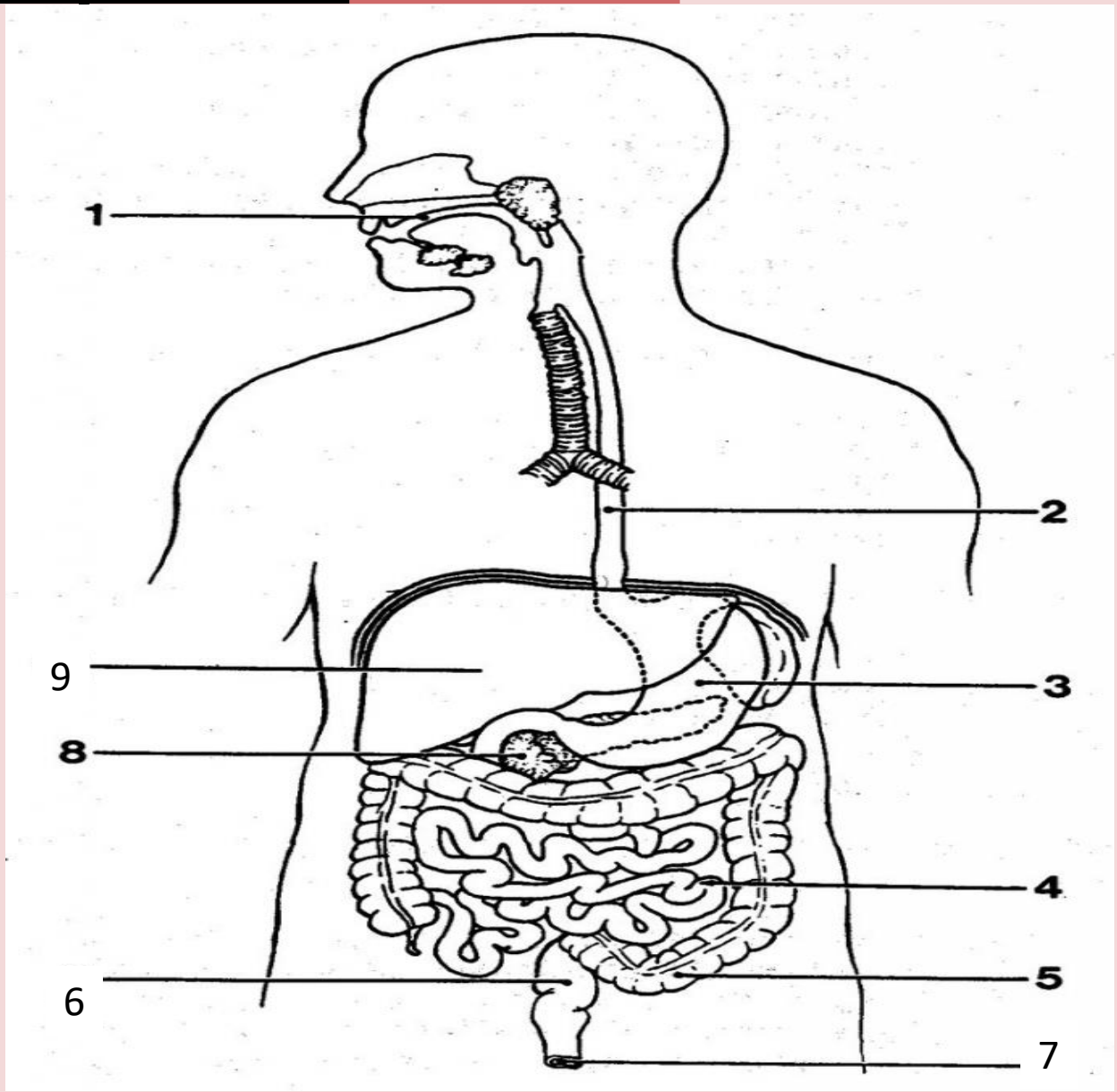
Large Intestine

Rectum

Anus

Pancreas

Liver



Talking task

You will be sorted into 5 groups

- Each group will be given a task.
- You will then have two lessons to prepare yourselves
- You will then make a presentation to your classmates who will be assessing you on:

Resources

Information

Originality

Fun

Clarity

Success criteria

I can work independently to research part of the digestive system

I can work as part of a team to produce an informative talk

I can talk with confidence to an audience of classmates

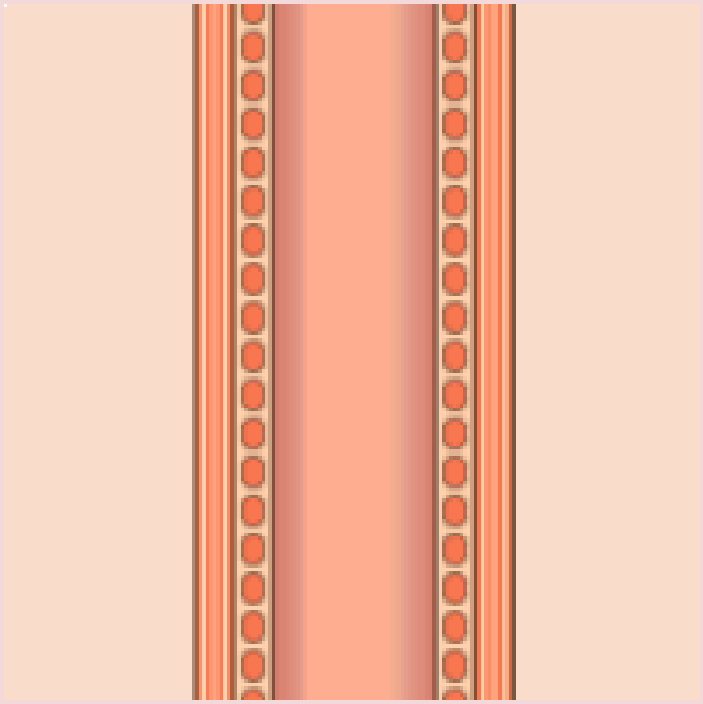
The Mouth Answers

1. Describe 2 things that happens to food in the mouth. Chewed & saliva/amylase added
2. Name the types of digestion that occur in the mouth. Mechanical & Chemical
3. Copy & complete the following:

Food is swallowed when it is pushed to the back of the mouth by the tongue.

It then enters the oesophagus.

The oesophagus



It takes around 30 s for food to pass through the oesophagus.

Food gets pushed along by a series of muscular movements called

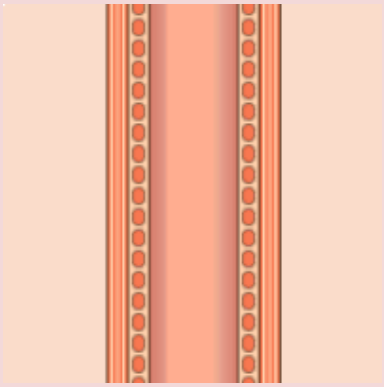
PERISTALSIS.

Use p 19 of your class booklet to write a definition of peristalsis.

Peristalsis

Answers

The movement of partially digested food along the whole of the digestive system by waves of muscular contraction from the oesophagus to the anus.



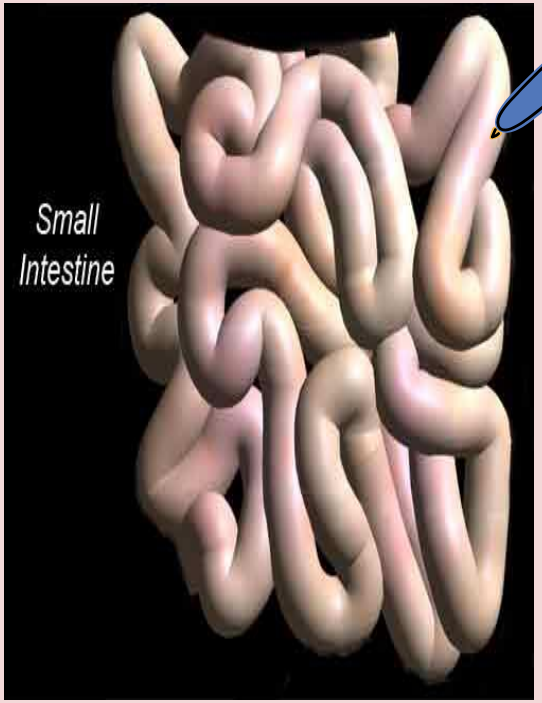
https://www.youtube.com/watch?v=o18UycWRsaA
(peristalsis via endoscope- 56s)

The Stomach

Protease enzymes are added to the food as it enters the stomach.
Acid is needed for the enzyme to work.
The muscle walls of the stomach contract to churn & mix the food, enzyme & acid.

Complete the stomach activity from p 19 of your class booklet.

The small intestine



The small intestine is very **LONG**. This allows time to complete the digestion of food.

The pancreas sends lots of different enzymes to complete the breakdown of food into:

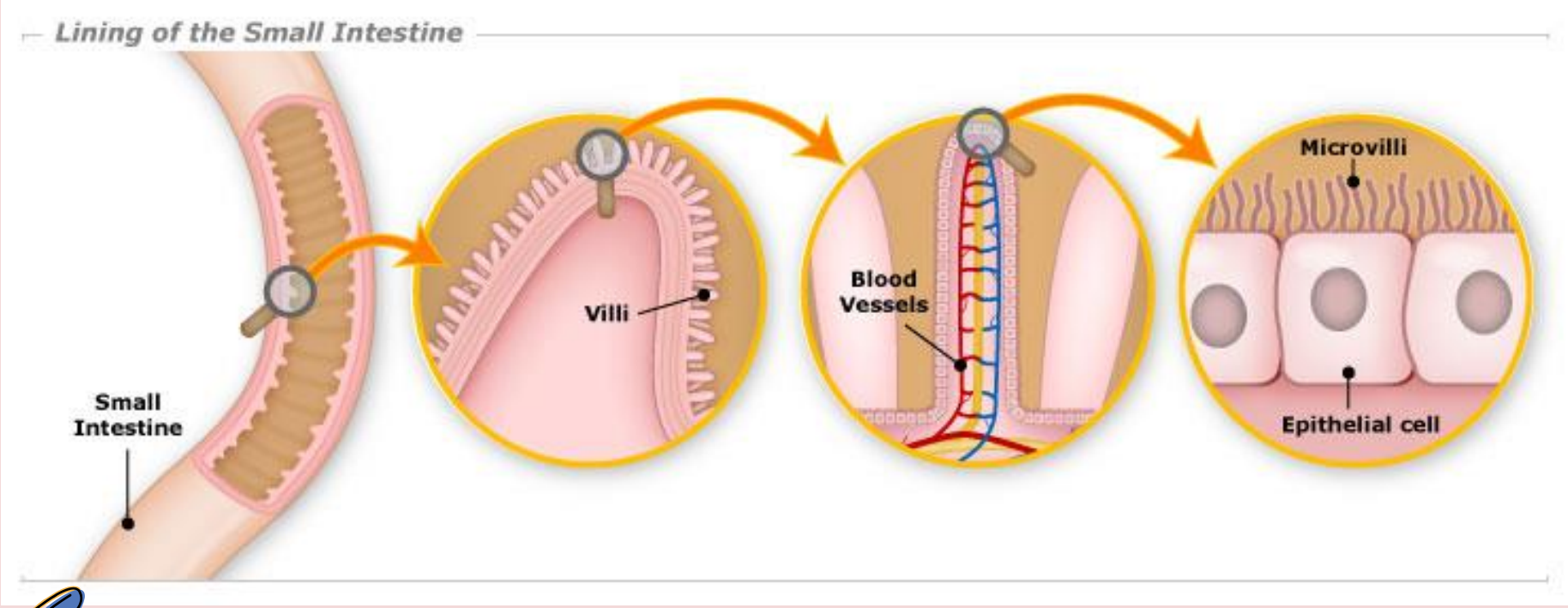
Proteins → amino acids

Carbohydrates → glucose

Fats → fatty acids + glycerol

Do you remember the names of the enzymes?

The small intestine



The lining of the small intestine is also covered with **tiny projections**. These **increase** the **surface area to absorb** the digested food into the blood.

The large intestine

Undigested food (fibre) now passes into the large intestine.

Water is **removed** and a solid waste material called **FAECES** is produced. This is **stored** in the RECTUM then **passed out** through the ANUS.

Complete the large intestine questions from p20 of your class booklet.

The liver

Once the digested food is in the blood, it is taken to the liver.

Consider the following opinions about why digested food goes to the liver:

I think food goes to the liver to be removed from the body

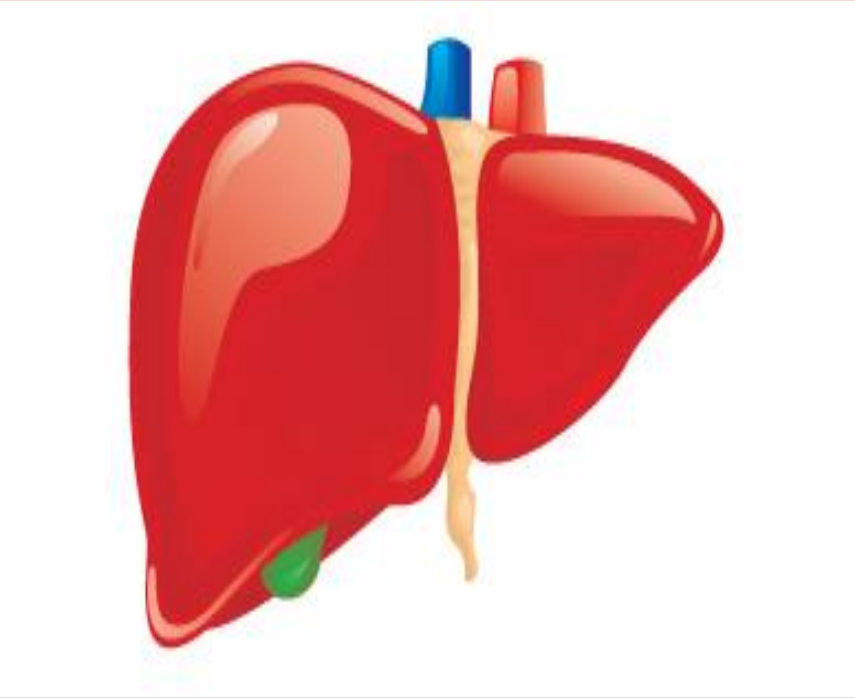
I think food goes to the liver to finish being digested

I think food goes to the liver to be sorted & stored

Which statement do you agree with? Why?

The liver

The digested food molecules travel in the blood to the **LIVER**. Here they are either sent out to cells that need them, or stored until they are required.



Revision quiz

What have you learned?