



PRIMARY

Natural Science

TEACHER'S RESOURCE BOOK



 Richmond

 SANTILLANA

Natural Science

TEACHER'S RESOURCE BOOK

Natural Science 6 is a collective work, conceived, designed and created by the Primary Education department at Santillana, under the supervision of **Teresa Grence Ruiz**.

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Introduction

Natural Science 6 Teacher's Resource Book

provides a wide variety of photocopiable worksheets designed to complement **Natural Science 6 Student's Book** and **Natural Science 6 Teacher's Book**. It is divided into 10 topics in order to cover the main concepts of both the National Curriculum and the curriculum established by the Community of Madrid.

These worksheets facilitate a flexible approach in the classroom. Students in the same class can be given different worksheets. Students can expand on the material learnt in class. Or students can use the worksheets to revise. These worksheets can also be assigned as homework.

There are four categories of worksheets:

Reinforcement, Extension, Assessment and **tests**, and **Investigate**.

Answer keys are provided in the Aula Virtual and on the website: <http://www.evocacion.es>

Worksheets

Reinforcement worksheets

There are two pages of **Reinforcement worksheets** for each topic. These worksheets are designed to provide additional support for students in need of further practice. They can be used after the relevant section in the Student's Book, before the *Final activities* sections, or as extra preparation for the Unit assessment. Students can complete the worksheets with or without consulting their Student's Books, in the classroom or at home, individually or in pairs.


The locomotor system REINFORCEMENT

Name _____ Date _____

1 Read and write the words.

- Hard and rigid organs that consume nutrients and grow.
- Organs that can change in length and shape.
- Soft, elastic tissue that covers the ends of bones.
- These hold bones together and are made of flexible tissue.
- These connect bones and muscles, and are made of flexible tissue.
- These are structures where bones meet.

2 Use five words from Activity 1 to label the picture. Then, answer the questions.




- Is this a fixed joint or a movable joint?
- Which bones meet at this joint?

3 Circle eight parts of the locomotor system and classify them. Then, add two more examples of each.

<p>bones</p> <p>_____</p> <p>_____</p> <p>_____</p> <p>_____</p>	<table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <tr><td>A</td><td>B</td><td>C</td><td>D</td><td>E</td><td>F</td><td>G</td><td>H</td></tr> <tr><td>I</td><td>J</td><td>K</td><td>L</td><td>M</td><td>N</td><td>O</td><td>P</td></tr> <tr><td>Q</td><td>R</td><td>S</td><td>T</td><td>U</td><td>V</td><td>W</td><td>X</td></tr> <tr><td>Y</td><td>Z</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td></tr> <tr><td>7</td><td>8</td><td>9</td><td>0</td><td>.</td><td>,</td><td>!</td><td>?</td></tr> <tr><td>;</td><td>:'</td><td>"</td><td>~</td><td>^</td><td>&</td><td>*</td><td>~</td></tr> <tr><td>~</td><td>~</td><td>~</td><td>~</td><td>~</td><td>~</td><td>~</td><td>~</td></tr> </table> <p>muscles</p> <p>_____</p> <p>_____</p> <p>_____</p> <p>_____</p>	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	1	2	3	4	5	6	7	8	9	0	.	,	!	?	;	:'	"	~	^	&	*	~	~	~	~	~	~	~	~	~
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REINFORCEMENT

4 Look at the picture and answer the questions.







- What kind of movement is this?
- Which muscle pulls a bone? Which bone?
- What are muscles that work in pairs called?
- What joints can you identify?

5 Complete the table about injuries to the locomotor system. Then, answer the questions.

most common injuries	type of damage	cause

- Which type of injury requires a plaster cast?
- Which injury is most common in joints?
- Which type may result from lifting heavy objects?

6 Tick (✓) the activities that help to keep the locomotor system healthy, and cross (X) the ones that do not.

Extension worksheets

There are two pages of **Extension worksheets** for each topic. These worksheets can be used for fast finishers or to expand on the material covered in class.

Circulation and excretion EXTENSION



Name _____ Date _____

What's your blood type?

All human blood contains the same components: plasma, red blood cells, white blood cells and platelets. However, blood can be different types. There are four main groups of blood: type A, type B, type AB and type O. Your blood type depends on whether there are certain proteins on your red blood cells. Blood types are inherited from parents or other ancestors.

Some red blood cells have a protein on the surface called the Rh factor. A person whose blood has this protein is Rh positive (Rh+). A person whose blood does not have this protein is Rh negative (Rh-).

Most people can only receive blood or donate it to people who have the same blood type. However, people with type O, Rh- blood are called universal donors. Their blood can be given to anyone. Similarly, people with type AB, Rh+ blood are called universal recipients. They can receive blood of any type.

1 Read the text and answer the questions.

- What are the main components of blood?
- What are the main blood types?
- What is the difference between Rh+ and Rh-?
- How many different blood type/Rh factor combinations exist? What are they?
- Who are universal donors and who are universal recipients? Explain.

2 Find out what blood types you have in your family. Are there any universal donors or recipients? Report back to the class.

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Circulation and excretion EXTENSION

Name _____ Date _____


Water, water everywhere!

More than half of our body weight is water. There is water in our blood, our cells, and in all body fluids. We cannot survive without it.

We take in water by drinking and eating. We lose water by urinating, sweating, and even breathing! When we take in less water than we lose, we can become dehydrated. This means that our body doesn't have enough water to work properly. Children and the elderly have to be especially careful, as they get dehydrated more easily.

Dehydration usually happens when we exercise hard, in hot weather, or when we are sick with a fever, diarrhea or vomiting. Symptoms of dehydration include a dry mouth, lack of urine for several hours, dry skin, fatigue and dizziness. Even feeling thirsty can be an early sign of dehydration.

Dehydration can be prevented by taking in lots of fluids, especially water. So remember to drink water before, during and after physical activity, especially on hot days.



1 Read the text and complete the index card.

Dehydration
Description: _____
Cause: _____
Symptoms: _____
Prevention: _____

2 Search the Internet for information about serious dehydration and write a few sentences.

3 Design a poster about the importance of water and display it in your classroom.

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Assessment worksheets

There are two pages of **Assessment worksheets**, one for each topic. They can be given out once the topic has been completed, as a revision test, or to check progress during the year.

Circulation and excretion ASSESSMENT

Name _____ Date _____

1 Complete the crossword about the circulatory system.

- They allow nutrients and oxygen to pass into the body cells.
- They protect the body from germs and disease (three words).
- They help to stop bleeding from wounds.
- They carry blood away from the heart.
- It pumps blood around the body.
- They carry blood back to the heart.
- It transports nutrients and waste around the body.
- They carry oxygen from the lungs to all body cells (three words).

2 Complete the diagram with the chambers of the heart and what happens in them.

3 Complete the texts about circulation.

Pulmonary circulation
Blood goes to the _____ to expel _____ and to obtain _____ and bring it back to the _____.

Systemic circulation
Blood with _____ and _____ goes to all body cells and returns to the _____ with _____ and other _____ products.

ASSESSMENT

4 Circle the correct word.

- Blood that is high in carbon dioxide enters the right / left atrium.
- Blood releases carbon dioxide / oxygen in the air sacs.
- Blood that is high in oxygen leaves the heart through the left ventricle / atrium.
- Blood travels through the arteries / veins and reaches the capillaries of each organ.
- Vegetable / animal fats are recommended for a healthy circulatory system.
- Foods that are rich in calcium / iron are good for the circulatory system.

5 Complete the diagram about the excretory system. Then, describe how waste substances are eliminated from the blood.

_____ → Urinary system → _____ → _____

6 Tick (✓) the photos that show other ways waste products are eliminated from the blood. Then, answer the question.

• Our body constantly loses water through excretion. How much water should we drink daily to compensate for this?

Tests and Investigate

There is a **multiple-choice test** for each topic. The tests provide students with the opportunity to revise the main concepts of each topic and to assess the knowledge they have acquired.

There is one **Investigate worksheet** for each topic. These worksheets provide opportunities for students to carry out simple investigative tasks, either in the classroom or at home.

The locomotor system TEST

Name _____ Date _____

1 Bones contain mineral substances, such as...

- vitamin E.
- calcium.
- iron.

2 Bones are held together by...

- ligaments.
- tendons.
- cartilage.

3 The ribs protect the...

- heart, lungs, stomach and pancreas.
- heart, lungs, stomach and liver.
- heart, lungs, stomach and liver.

4 Pectorals and abdominals are muscles in the...

- torso.
- head.
- limb.

5 When a muscle receives an order, it...

- relaxes and pulls the bones attached to it.
- contracts and pulls the bones attached to it.
- contracts and separates from the bone.

6 A sprain is an injury that involves damage to...

- the bones.
- the tendons.
- the ligaments.

7 Bone growth mainly requires...

- calcium and vitamin C.
- calcium and protein.
- calcium and vitamin D.

8 In order to keep our locomotor system healthy, we need to...

- do regular physical activity.
- relax our muscles during sport.
- sleep 8 hours per day.

9 Physical activity helps us to...

- develop our memory skills.
- develop elasticity and strengthen our muscles and bones.
- grow our bones.

10 Bad posture can cause...

- chest pain.
- abdominal pain.
- back pain.

Circulation and excretion INVESTIGATE

Name _____ Date _____

Test your heart rate recovery

Instructions

- Work in pairs. You need a skipping rope and a timer.
- You are going to test how fast you recover after exercise. A healthy heart has a fast recovery rate.
- First, measure your resting heart rate by taking your pulse. Your partner times you for 15 seconds and multiplies the result by 4. Then, skip for 1 minute, and take your pulse again. Next, rest for 1 minute and take your pulse once more. Keep checking your pulse each minute until you reach your resting pulse rate.
- Switch roles and repeat step 3.
- Record your results in the table.

	resting pulse rate	pulse rate after skipping	pulse rate after 1 min rest	pulse rate after 2 min rest	pulse rate after 3 min rest
student 1					
student 2					

6 Analyse your results and answer the questions.

- Were the resting pulse rates different?
- Were the pulse rates after skipping different?
- Who had a faster recovery rate?

7 Now write a conclusion.

Name _____ Date _____

1 Match the photos to the nutrients. Then, write why each nutrient is necessary.

vitamins and minerals - carbohydrates - proteins - fats

A



B



C



D



2 Complete the four processes of nutrition and their corresponding systems, and match. Then, answer the question.

digestion

circulatory system

excretion

respiratory system

• Where else does excretion take place? _____

3 Complete the diagrams about the stages of digestion. Then, write where each stage takes place.

food + saliva ► bolus

bolus + _____ ► chyme

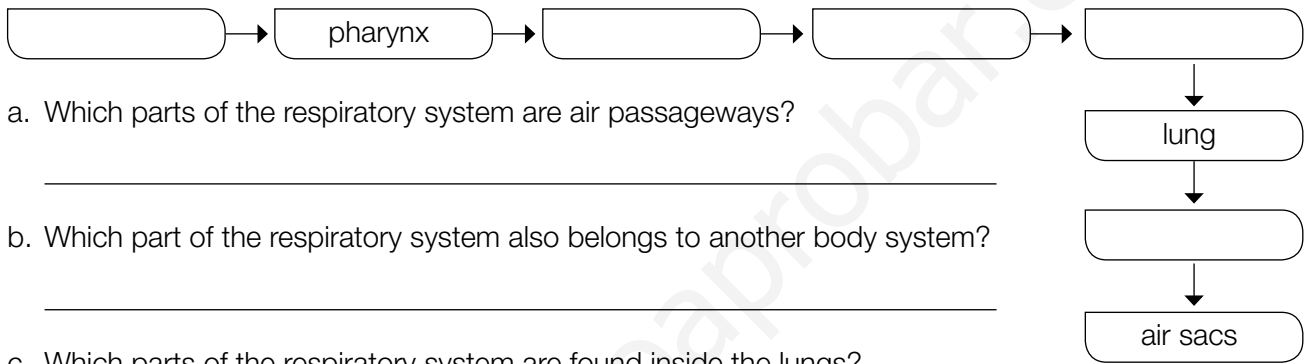
chyme + intestinal juices + _____

+ pancreatic juice ► _____

4 Write a healthy eating habit for each word or phrase.

fats and sugar - variety - fibre

5 Complete the diagram to show the path air travels through when we inhale. Answer the questions.



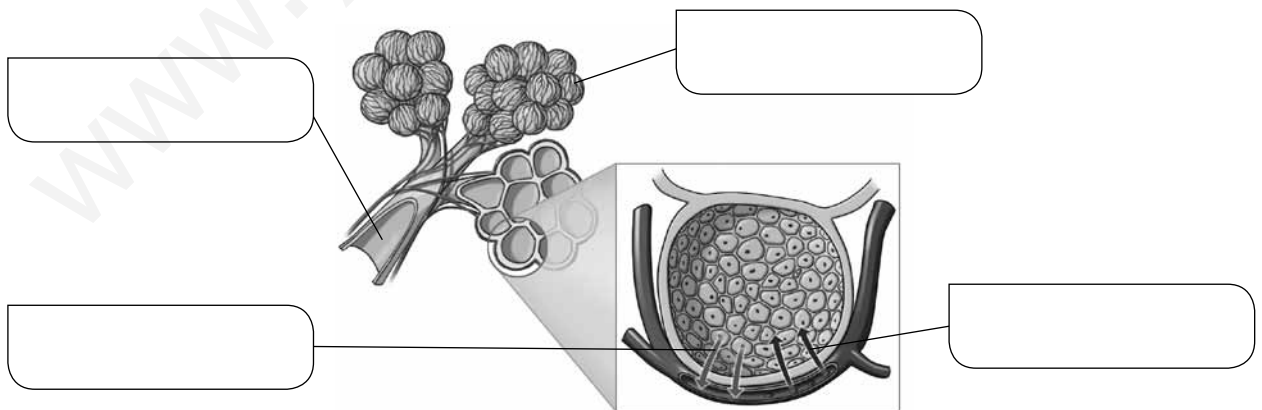
a. Which parts of the respiratory system are air passageways?

b. Which part of the respiratory system also belongs to another body system?

c. Which parts of the respiratory system are found inside the lungs?

d. Where does gas exchange take place?

6 Label the illustration with these words: *bronchiole*, *air sac*, *oxygen*, *carbon dioxide*. Then, write sentences to explain gas exchange.



Name _____ Date _____

Prepare a balanced diet

RECOMMENDED FOOD AND SERVINGS			
Food	Girls	Boys	Number of servings
	13 to 15 years	13 to 15 years	
Dairy	¼ L	¼ L	4 times a day
Meat, chicken	125 g	150 g	3 times a week
Fish	175 g	200 g	4 times a week
Eggs	one	one	3-4 times a week
Potatoes	200 g	250 g	once a day
Pulses	70 g	80 g	3 times a week
Vegetables	100 g	120 g	2-4 times a day
Fruits	300 g	300 g	3-4 times a day
Bread	400 g	400 g	once a day
Rice	70 g	80 g	2 times a week
Pasta	70 g	80 g	2 times a week
Sweets, pastries, soft drinks	60 g	60 g	once a day

SOURCE: *Healthy nutrition and prevention of eating disorders* by Consuelo López Nomdedeu.

SERVING SIZE EQUIVALENTS:

¼ L = one glass

300 g of fruit = one large piece (orange, apple, peach...)

100 g of vegetables, rice, pasta = one medium-sized serving

125 g of bread = one portion

150 g of meat = one medium-sized portion

1 Study the information above, and answer the questions.

- What type of food should you eat more of every day? _____
- Which types of food should you eat 4 times a day? _____
- How often should you eat meat, chicken and pulses? _____

2 In your notebook, make a list of all the food you ate yesterday. Give approximate amounts. Then, answer the questions.

- How many of the foods in the table above did you eat? _____
- Did you eat foods not included in the table? Which ones? _____

Name _____ Date _____

The power of breathing

Are you breathing right now? Of course you are! We are all breathing all the time, but we don't usually think about it.

In general, we take short, shallow breaths. However, when we are stressed, angry or anxious, our breathing gets faster and more superficial.

Learning to breathe deeply and consciously is extremely useful. Conscious deep breathing helps us obtain more oxygen and gives us energy. It also calms the mind, allows us to concentrate better, and helps us relax.

Conscious breathing is easy to learn, but requires practice. Here are some useful techniques:

Exercise 1: Take a deep breath through your nose. Breathe out softly through your mouth. Wait a few seconds. Repeat several times.

Exercise 2: Take a slow breath through your nose for about 4 seconds. Hold it for 2 seconds. Breathe out through your nose for 4 seconds. Repeat several times.

Exercise 3: Take a slow breath through your nose for about 4 seconds while inflating your belly. Hold your breath for 2 seconds. Then, slowly breathe out through your mouth while deflating your belly. Wait a few seconds. Repeat several times.



1 Read the text and answer the questions.

- How do we usually breathe? _____
- What happens to our breathing when we are stressed? _____
- How can we improve the quality of our breathing? _____
- What are the benefits of conscious deep breathing? _____

2 Practise the three breathing techniques and complete the table.

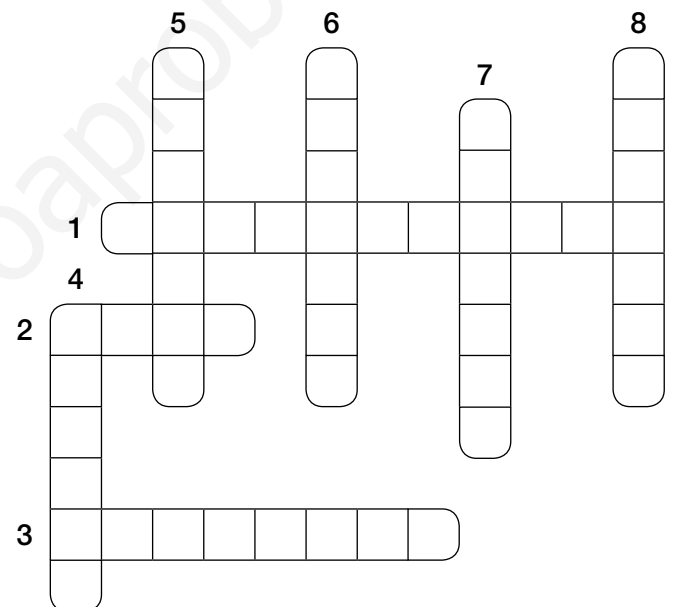
breathing technique	Was it easy or difficult?	What did you feel?
exercise 1		
exercise 2		
exercise 3		

4 Read and write *T* (true) or *F* (false). Then, correct the false sentences.

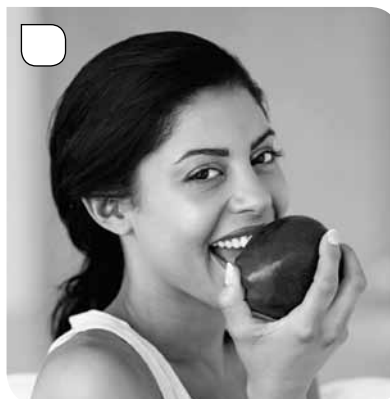
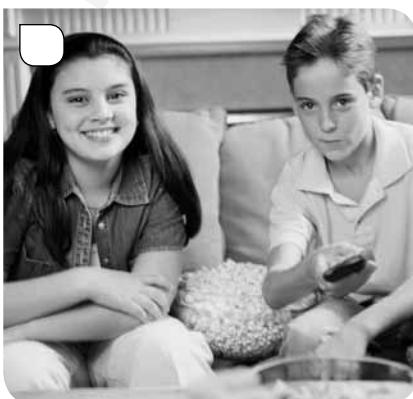
- a. Fibre is found in foods that come from animals.
- b. Eating different foods provides a variety of nutrients.
- c. Having several meals a day is a healthy habit.
- d. We should eat foods that are high in fats and sugar.

5 Complete the crossword about the respiratory system.

1. Very small air passageways that lead to the air sacs.
2. Organ which contains bronchioles and air sacs.
3. Air passageways where air enters the body when we inhale.
4. Air passageway between the pharynx and the trachea.
5. Air passageway shared with the digestive system.
6. Air passageway which is divided into two branches at the lungs.
7. Air passageways which take the air to each lung.
8. Moist surfaces in the lungs where gas exchange takes place (two words).



6 Tick (✓) the photos that show ways to keep the respiratory system healthy.



Name _____ Date _____

- 1 We obtain all the energy and building materials we need through...**

a. digestion. b. nutrition. c. respiration.
- 2 Food contains the following nutrients: ...**

a. proteins, carbohydrates, fats, vitamins and minerals, and fibre.
 b. proteins, carbohydrates, fats, vitamins and minerals, and energy.
 c. proteins, carbohydrates, fats, vitamins and minerals, and water.
- 3 The processes involved in nutrition are...**

a. digestion, respiration, circulation and excretion.
 b. digestion, respiration, circulation and growth.
 c. digestion, reproduction, circulation and excretion.
- 4 The helper glands include...**

a. the salivary glands, the mouth and the pharynx.
 b. the salivary glands, the stomach and the oesophagus.
 c. the salivary glands, the liver and the pancreas.
- 5 The bolus is...**

a. a portion of food before it enters the mouth.
 b. a milky liquid produced in the small intestine.
 c. the mixture of food and saliva produced by chewing.
- 6 Villi in the small intestine help to...**

a. break down the bolus. b. absorb nutrients. c. eliminate waste.
- 7 A healthy diet should include foods high in...**

a. fibre. b. fats. c. sugar.
- 8 The air passageways in the respiratory system are...**

a. the nostrils, pharynx, larynx, trachea, lungs and bronchioles.
 b. the nostrils, pharynx, larynx, trachea, bronchi and bronchioles.
 c. the nostrils, pharynx, larynx, trachea, bronchi and air sacs.
- 9 Gas exchange takes place in the...**

a. bronchi. b. air sacs. c. bronchioles.
- 10 You can keep your respiratory system healthy by...**

a. eating carbohydrates. b. doing homework. c. drinking water.

Name _____ Date _____

What foods contain starch?

Instructions

Starch is the most common carbohydrate in food. Like other carbohydrates, starch provides energy. Find out about starch content in different foods.

1. Work in pairs. You need the following things:

- a piece of bread
- a piece of ham
- a slice of boiled potato
- a slice of carrot
- a slice of banana
- a spoonful of cooked rice
- a biscuit
- some butter
- some iodine solution
- some aluminium foil



2. Place each food on a piece of aluminium foil.
3. Make predictions about the starch content for each food and write them in the table.


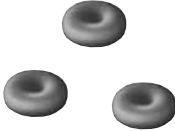

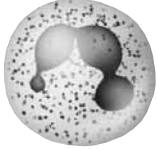
	bread	ham	potato	carrot	banana	rice	biscuit	butter
prediction	yes							
result	yes							

4. Test for starch content by adding a few drops of iodine solution to each food. Wait a few minutes.
5. Observe the foods. If a black stain appears where you added the iodine solution, the food contains starch.
6. Record your results in the table above. Compare them to your predictions.
7. Make two lists: *starchy foods* and *non-starchy foods*.



Name _____ Date _____

1 Complete the table about blood. Then, answer the question.

component				
name				
function				

- How is blood transported throughout the body? _____

2 Draw a diagram of the heart and label its parts. Then, use arrows to show where blood enters and leaves the heart.



3 Use the words to complete the sentences. Then, write *P* (pulmonary circulation) or *S* (systemic circulation).

gas exchange - nutrients - oxygen - lungs - carbon dioxide

- It obtains the _____ the body cells need.
- Blood with _____ and other waste products returns to the heart.
- It allows for _____ in the lungs.
- Blood with _____ and oxygen travels to all body cells.
- It allows for carbon dioxide to be expelled through the _____.

4 Use the words to write advice for a healthy circulatory system.

carbohydrates - iron - salt - smoke - exercise

5 Write the parts of the excretory system. Then, answer the question.

- a. They produce urine and return nutrients to the blood. _____
- b. They carry urine from the kidneys to the bladder. _____
- c. It stores urine until it leaves the body. _____
- d. Urine leaves the body through this tube. _____

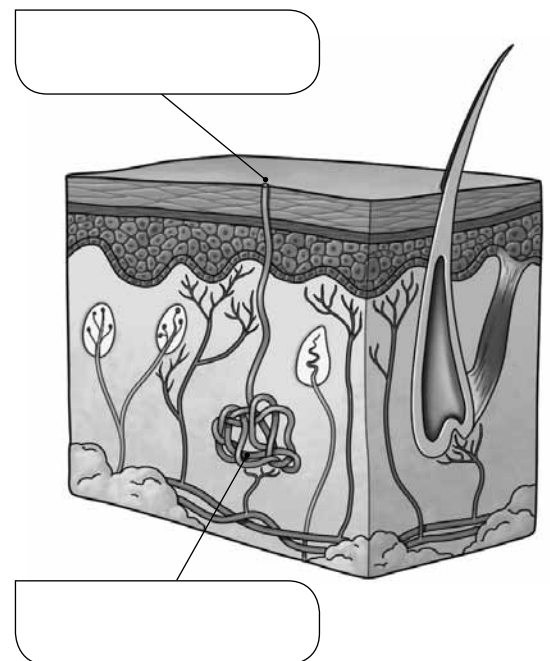
- Excretion is the elimination of waste products from the blood. Why do we say that excretion also takes place in the respiratory system?

6 Label the diagram. Then, answer the questions.

a. Where is sweat formed?

b. What does your body mainly lose when you sweat?

c. What two things should you do after you sweat?



Name _____ Date _____

What's your blood type?



All human blood contains the same components: plasma, red blood cells, white blood cells and platelets. However, blood can be different types. There are four main groups of blood: type A, type B, type AB and type O. Your blood type depends on whether there are certain proteins on your red blood cells. Blood types are inherited from parents or other ancestors.

Some red blood cells have a protein on the surface called the Rh factor. A person whose blood has this protein is Rh positive (Rh+). A person whose blood does not have this protein is Rh negative (Rh-).

Most people can only receive blood or donate it to people who have the same blood type. However, people with type O, Rh- blood are called *universal donors*. Their blood can be given to anyone. Similarly, people with type AB, Rh+ blood are called *universal recipients*. They can receive blood of any type.



1 Read the text and answer the questions.

a. What are the main components of blood?

b. What are the main blood types?

c. What is the difference between Rh+ and Rh-?

d. How many different blood type/Rh factor combinations exist? What are they?

e. Who are *universal donors* and who are *universal recipients*? Explain.

2 Find out what blood types you have in your family. Are there any universal donors or recipients? Report back to the class.

Name _____ Date _____

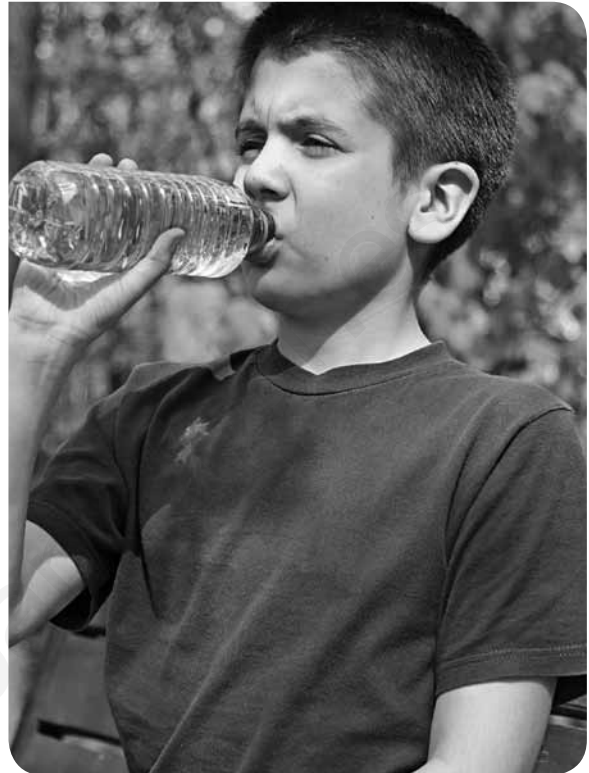
Water, water everywhere!

More than half of our body weight is water. There is water in our blood, our cells, and in all body fluids. We cannot survive without it.

We take in water by drinking and eating. We lose water by urinating, sweating, and even breathing! When we take in less water than we lose, we can become *dehydrated*. This means that our body doesn't have enough water to work properly. Children and the elderly have to be especially careful, as they get dehydrated more easily.

Dehydration usually happens when we exercise hard, in hot weather, or when we are sick with a fever, diarrhea or vomiting. Symptoms of dehydration include a dry mouth, lack of urine for several hours, dry skin, fatigue and dizziness. Even feeling thirsty can be an early sign of dehydration!

Dehydration can be prevented by taking in lots of fluids, especially water. So remember to drink water before, during and after physical activity, especially on hot days.



1 Read the text and complete the index card.

Dehydration

Description: _____

Causes: _____

Symptoms: _____

Prevention: _____

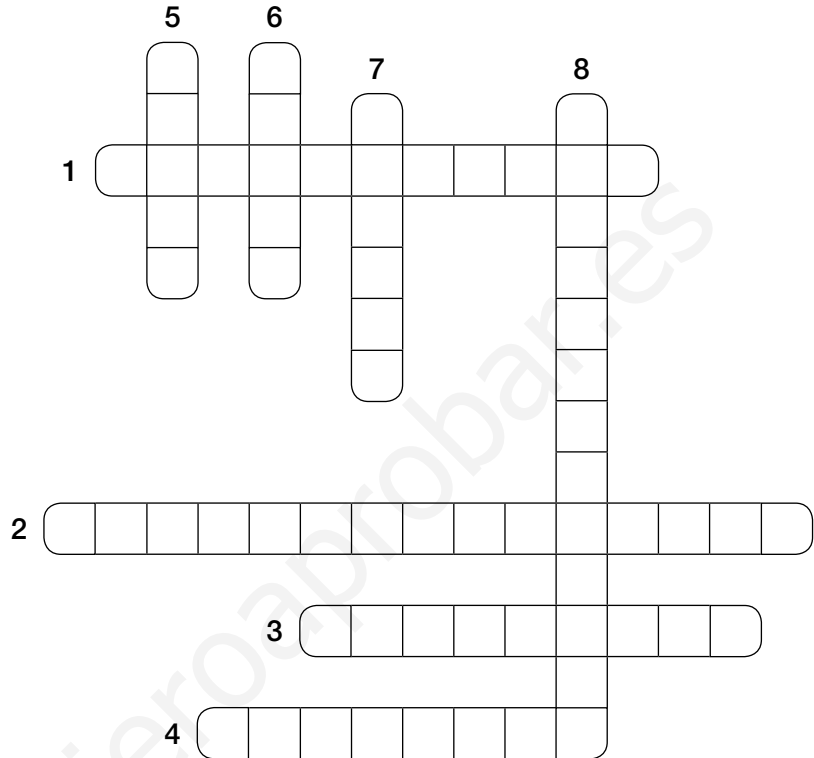
2 Search the Internet for information about serious dehydration and write a few sentences.

3 Design a poster about the importance of water and display it in your classroom.

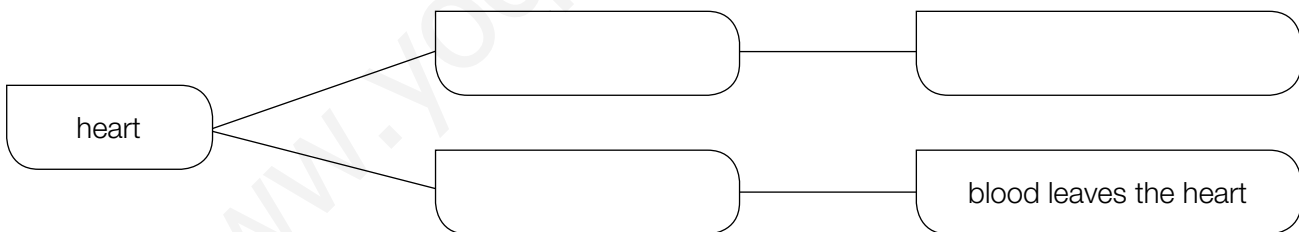
Name _____ Date _____

1 Complete the crossword about the circulatory system.

1. They allow nutrients and oxygen to pass into the body cells.
2. They protect the body from germs and disease (three words).
3. They help to stop bleeding from wounds.
4. They carry blood away from the heart.
5. It pumps blood around the body.
6. They carry blood back to the heart.
7. It transports nutrients and waste around the body.
8. They carry oxygen from the lungs to all body cells (three words).



2 Complete the diagram with the chambers of the heart and what happens in them.



3 Complete the texts about circulation.

Pulmonary circulation

Blood goes to the _____ to expel _____, and to obtain _____ and bring it back to the _____.

Systemic circulation

Blood with _____ and _____ goes to all body cells and returns to the _____ with _____ and other _____ products.

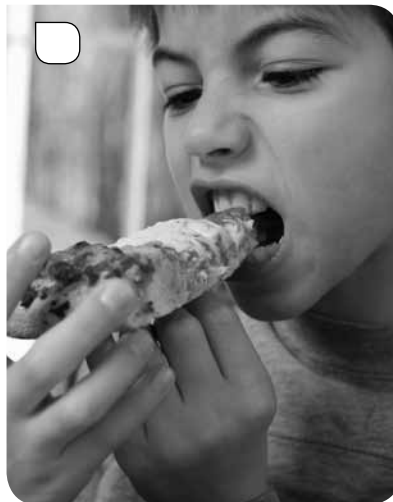
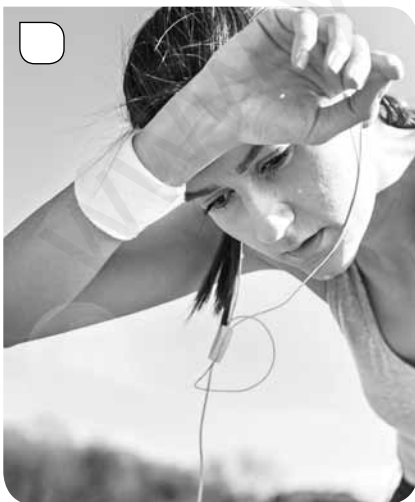
4 Circle the correct word.

- a. Blood that is high in carbon dioxide enters the *right / left* atrium.
- b. Blood releases *carbon dioxide / oxygen* in the air sacs.
- c. Blood that is high in oxygen leaves the heart through the left *ventricle / atrium*.
- d. Blood travels through the *arteries / veins* and reaches the capillaries of each organ.
- e. *Vegetable / animal* fats are recommended for a healthy circulatory system.
- f. Foods that are rich in *calcium / iron* are good for the circulatory system.

5 Complete the diagram about the excretory system. Then, describe how waste substances are eliminated from the blood.



6 Tick (✓) the photos that show other ways waste products are eliminated from the blood. Then, answer the question.



- Our body constantly loses water through excretion. How much water should we drink daily to compensate for this?

Name _____ Date _____

- 1** The circulatory system consists of blood, blood vessels and the...
 - a. lungs.
 - b. kidneys.
 - c. heart.
- 2** The components of blood are plasma, red blood cells, white blood cells and...
 - a. fluid.
 - b. platelets.
 - c. water.
- 3** Blood vessels include...
 - a. arteries, veins and capillaries.
 - b. arteries, veins and atria.
 - c. arteries, veins and ventricles.
- 4** Blood enters the heart through the...
 - a. chambers.
 - b. atria.
 - c. ventricles.
- 5** The circulatory system consists of...
 - a. a single circuit.
 - b. two connected circuits.
 - c. two separate circuits.
- 6** Pulmonary circulation allows for...
 - a. blood to release carbon dioxide and obtain oxygen in the lungs.
 - b. blood to release oxygen and obtain carbon dioxide in the lungs.
 - c. blood that is high in oxygen to reach the capillaries of each organ.
- 7** The exchange of nutrients, gases and waste products happens in the...
 - a. veins.
 - b. capillaries.
 - c. arteries.
- 8** Excretion takes place in...
 - a. the excretory system, the circulatory system and the sweat glands.
 - b. the excretory system, the respiratory system and the digestive system.
 - c. the excretory system, the respiratory system and the sweat glands.
- 9** The parts of the excretory system are...
 - a. the kidneys, the ureters, the bladder and the urethra.
 - b. the lungs, the ureters, the bladder and the urethra.
 - c. the sweat glands, the ureters, the bladder and the urethra.
- 10** For a healthy excretory system, we should drink plenty of water and...
 - a. get at least ten hours of sleep.
 - b. keep our skin clean.
 - c. avoid noisy parts of the city.

Name _____ Date _____

Test your heart rate recovery

Instructions

1. Work in pairs. You need a skipping-rope and a timer.
2. You are going to test how fast you recover after exercise. A healthy heart has a fast recovery rate.
3. First, measure your resting heart rate by taking your pulse. Your partner times you for 15 seconds and multiplies the result by 4. Then, skip for 1 minute, and take your pulse again. Next, rest for 1 minute and take your pulse once more. Keep checking your pulse each minute until you reach your resting pulse rate.
4. Switch roles and repeat step 3.
5. Record your results in the table.



	resting pulse rate	pulse rate after skipping	pulse rate after 1 min rest	pulse rate after 2 min rest	pulse rate after 3 min rest
student 1					
student 2					

6. Analyse your results and answer the questions.
 - a. Were the resting pulse rates different? _____
 - b. Were the pulse rates after skipping different? _____
 - c. Who had a faster recovery rate? _____

7. Now write a conclusion.

Name _____ Date _____

1 Name three secondary sexual characteristics. Then, answer the questions.

men _____

women _____

- What is the difference between primary and secondary sexual characteristics? _____

- In which stage of life do secondary sexual characteristics develop? _____

2 Find eight parts of the male and female reproductive systems and classify them. Then, add the missing parts of each system.

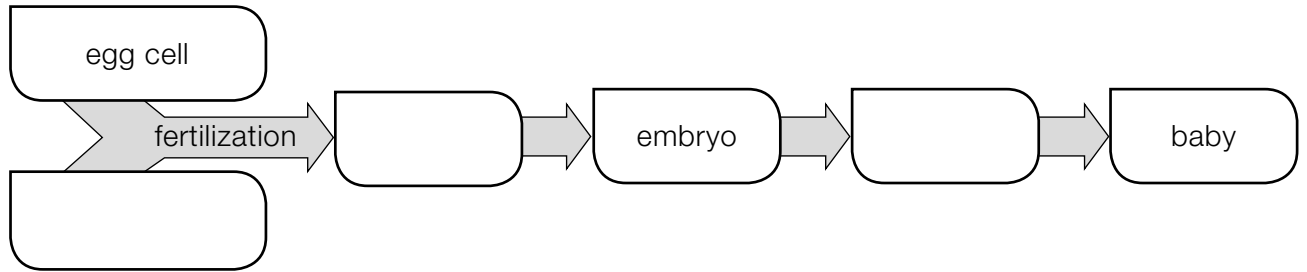
male	<table border="1" style="border-collapse: collapse; width: 100%; text-align: center;"><tr><td>r</td><td>s</td><td>t</td><td>m</td><td>b</td><td>s</td><td>r</td><td>v</td><td>b</td><td>s</td></tr><tr><td>s</td><td>p</td><td>e</td><td>r</td><td>m</td><td>d</td><td>u</td><td>c</td><td>t</td><td>s</td></tr><tr><td>t</td><td>e</td><td>s</td><td>t</td><td>y</td><td>a</td><td>i</td><td>m</td><td>t</td><td>o</td></tr><tr><td>p</td><td>r</td><td>t</td><td>o</td><td>v</td><td>a</td><td>o</td><td>i</td><td>e</td><td>l</td></tr><tr><td>u</td><td>t</td><td>e</td><td>r</td><td>u</td><td>s</td><td>v</td><td>t</td><td>h</td><td>j</td></tr><tr><td>r</td><td>i</td><td>s</td><td>u</td><td>l</td><td>v</td><td>a</td><td>c</td><td>i</td><td>l</td></tr><tr><td>e</td><td>x</td><td>d</td><td>s</td><td>v</td><td>o</td><td>r</td><td>h</td><td>r</td><td>e</td></tr><tr><td>t</td><td>c</td><td>z</td><td>v</td><td>a</td><td>g</td><td>i</td><td>n</td><td>a</td><td>p</td></tr><tr><td>h</td><td>t</td><td>a</td><td>k</td><td>p</td><td>e</td><td>e</td><td>c</td><td>i</td><td>l</td></tr><tr><td>r</td><td>s</td><td>p</td><td>e</td><td>n</td><td>i</td><td>s</td><td>z</td><td>n</td><td>d</td></tr><tr><td>a</td><td>x</td><td>q</td><td>m</td><td>b</td><td>r</td><td>q</td><td>g</td><td>p</td><td>o</td></tr></table>	r	s	t	m	b	s	r	v	b	s	s	p	e	r	m	d	u	c	t	s	t	e	s	t	y	a	i	m	t	o	p	r	t	o	v	a	o	i	e	l	u	t	e	r	u	s	v	t	h	j	r	i	s	u	l	v	a	c	i	l	e	x	d	s	v	o	r	h	r	e	t	c	z	v	a	g	i	n	a	p	h	t	a	k	p	e	e	c	i	l	r	s	p	e	n	i	s	z	n	d	a	x	q	m	b	r	q	g	p	o	female
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3 Match. Then, use the words to write sentences.

ovaries	male sex cells	ova
testes	female sex cells	spermatozoa

- *The ovaries contain* _____
- _____

4 Complete the diagram. Then, answer the questions.



- When is a mature egg cell released? _____
- Where does fertilization take place? _____
- Where does most of the growth of the embryo happen? _____

5 Use the words to complete the sentences.

oxygen - protein - alcohol - amnion - placenta - iron -
 Cesarean section - embryo - umbilical cord - smoke

- a. The embryo is surrounded by a sac called the _____.
- b. The _____ supplies nutrients and _____ from the mother to the embryo.
- c. The _____ and the placenta are connected by the _____.
- d. Pregnant women should eat a diet that is high in _____, calcium and _____.
- e. Pregnant women should not drink _____ or _____.
- f. A _____ is performed when there are complications during labour.

6 Cross out (X) the odd one out. Then, write *pregnancy*, *birth* or *lactation*.

- | | | | | |
|----------------|---------------|----------------|----------|-------|
| a. labour | fertilization | contractions | dilation | _____ |
| b. third stage | placenta | umbilical cord | amnion | _____ |
| c. breast | milk | zygote | mother | _____ |

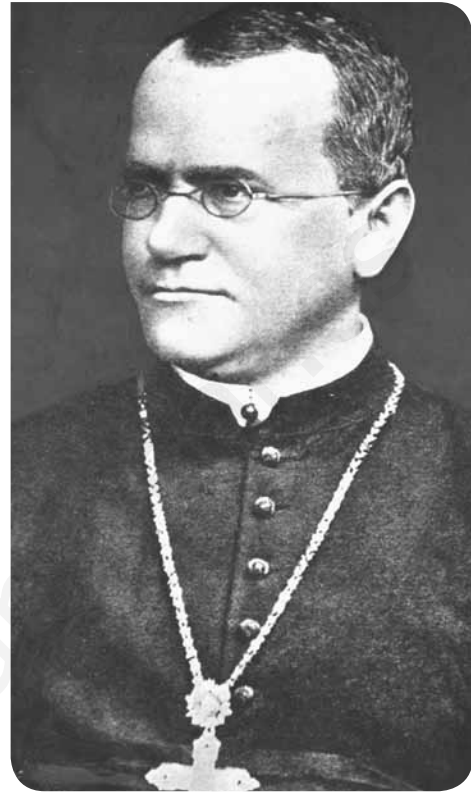
Name _____ Date _____

Mendel: the father of genetics

Genetics is the study of heredity, which is the transmission of genetic information from parents, or other ancestors, to their offspring. Until the 18th century, people did not know why children looked like their parents.

Gregor Mendel was an Austrian monk born in 1822. He was interested in finding out how living things pass physical characteristics, or traits, from one generation to the next. He carried out experiments with pea plants that showed particular traits. Mendel discovered that, after cross-pollinating plants, the traits were passed on intact from one generation to the next. For example, he pollinated a green pea plant with pollen from a yellow pea plant. To his surprise, Mendel observed that the new plants did not produce greenish yellowish peas, but only green peas or yellow peas. In other words, the trait for pea colour from the parent plants did not vary.

Mendel also learnt from his experiments that some traits showed up more often than others in the offspring plants. He called those characteristics 'dominant traits'. He named the characteristics that showed up less often 'recessive traits'.



1 Read, think and answer the questions in your notebook.

- a. Why is Mendel known as the father of genetics?
- b. Do you think Mendel's discoveries are applicable to people? Why?
- c. Do you think you have dominant traits and recessive traits? Name at least one of each.
- d. Why do you think some people resemble ancestors other than their parents?

2 Who do you look like? Complete the table.

	eye colour	hair colour	hair type	face shape	other physical characteristics
father					
mother					
me					

Name _____ Date _____

Midwives

Every day about 800 women and more than 8,000 babies die in the world from complications before birth, during birth, or soon after birth. This is mainly due to the fact that more than one third of all births happen without a midwife or a doctor present. Most of these preventable deaths take place in developing countries and in remote rural areas.



Midwives help to save the lives of many women and babies around the world. The word ‘midwife’ was originally an Old English word, meaning ‘being with woman’. They help women before, during and after giving birth. Midwives provide care during normal pregnancies and help deliver babies. They also teach new mothers how to handle their babies and how to breastfeed them.

Midwives can be men or women, although the majority are women. These professionals detect and control health problems and unusual conditions during pregnancy. They organize emergency care in the case of serious complications.

The World Health Organization promotes training and apprenticeships for midwives. WHO encourages governments worldwide to adopt policies to support the role of midwives.

1 Read the text and answer the questions.

- a. How many people die every day from complications during pregnancy and birth? _____
- b. What is the job of a midwife? _____
- c. What do midwives teach new mothers? _____
- d. Which worldwide organization supports midwives? _____

2 Search the Internet for information about the International Day of the Midwife and complete the index card.

INTERNATIONAL DAY OF THE MIDWIFE
Date: _____
Description: _____
Participating countries: _____

Name _____ Date _____

1 Complete the table. Then, answer the question.

puberty		
	boys	girls
secondary sexual characteristics	<i>facial hair</i> _____ _____ _____	<i>breasts</i> _____ _____ _____
ages		

- During puberty, how do the primary sexual characteristics change in both boys and girls?

2 Write the correct word for each definition. Then, write *F* (female reproductive system) or *M* (male reproductive system).

prostate gland - uterus - Fallopian tubes - urethra - vagina - sperm ducts

- a. Fine tubes connecting the testes to the urethra. _____
- b. Organ that produces liquids to transport spermatozoa. _____
- c. Tubes connecting the ovaries to the uterus. _____
- d. A tube that transports semen to the outside of the body. _____
- e. A tube connecting the uterus and the outside of the body. _____
- f. A hollow organ where the baby develops during pregnancy. _____

3 Use the words to describe the male and female sex cells.

tail - nutrients - large - microscope - head - round

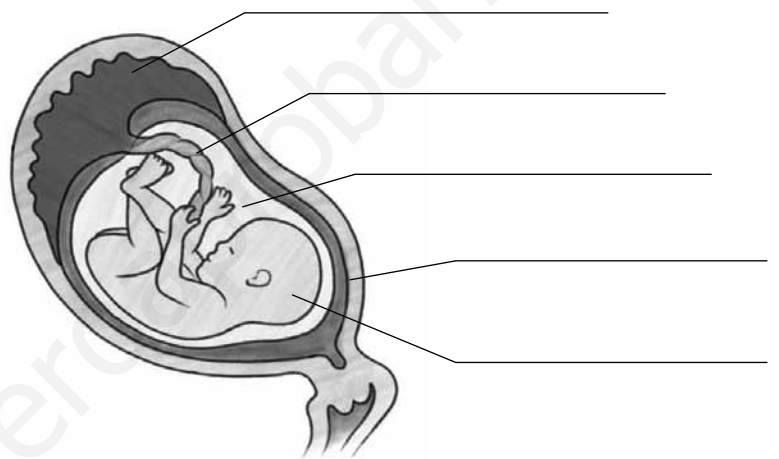
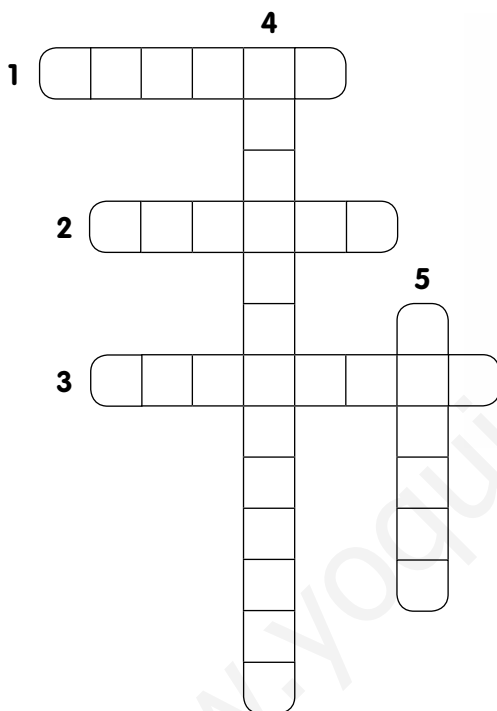
female sex cells: _____

male sex cells: _____

4 Read the sentences, underline the mistakes and correct them. Then, number the sentences in order.

- a. The embryo attaches itself to the wall of the vagina. _____
- b. When a spermatozoa joins with an ovum, an embryo forms. _____
- c. The zygote travels through the Fallopian tube to the uterus. _____
- d. The egg cell divides many times and forms an embryo. _____
- e. The spermatozoa travel through the uterus into the vagina. _____

5 Complete the crossword and label the diagram.



- 1. An embryo in the later stages of development.
- 2. Protective sac around the embryo.
- 3. New nourishing organ that forms inside the uterus.
- 4. Connects the embryo and the placenta (two words).
- 5. Hollow organ with a muscular wall.

6 Complete the stages of labour. Then, write 1 (first stage), 2 (second stage) or 3 (third stage).

- a. The _____ is expelled from the _____ through the vagina.
- b. The mother pushes hard with her _____ muscles to _____ the baby.
- c. The _____ muscles of the _____ contract.
- d. The _____ of the uterus _____ due to the uterus contractions.
- e. The _____ breaks and the liquid around the _____ is expelled.

Name _____ Date _____

- 1 Secondary sexual characteristics refer to...**

a. physical characteristics. b. reproductive organs. c. emotional changes.
- 2 The female reproductive system consists of the...**

a. ovaries, Fallopian tubes, urethra, vagina and vulva.
 b. ovaries, Fallopian tubes, uterus, vagina and vulva.
 c. ovaries, Fallopian tubes, uterus, vagina and labia.
- 3 The male reproductive system consists of the...**

a. testes, sperm ducts, prostate gland, ureters and penis.
 b. testes, sperm ducts, semen, urethra and penis.
 c. testes, sperm ducts, prostate gland, urethra and penis.
- 4 Male sex cells, or spermatozoa are...**

a. present from birth. b. mature at puberty. c. produced at puberty.
- 5 Fertilization occurs in the...**

a. uterus b. Fallopian tube. c. vagina.
- 6 A zygote forms as a result of...**

a. fertilization. b. ovulation. c. cell division.
- 7 During pregnancy, a new organ forms. It is called the...**

a. zygote. b. embryo. c. placenta.
- 8 A healthy pregnancy requires eating a balanced diet, high in...**

a. protein, carbohydrates and iron.
 b. protein, calcium and iron.
 c. protein, vitamins and minerals.
- 9 The stages of labour occur in this order:**

a. uterus contractions - delivery of the baby - delivery of the placenta.
 b. delivery of the baby - uterus contractions - delivery of the placenta.
 c. uterus contractions - delivery of the placenta - delivery of the baby.
- 10 During lactation, ...**

a. the newborn baby drinks formula milk.
 b. the baby receives milk through the umbilical cord.
 c. the mother's breasts produce milk.

Name _____ Date _____

The most, the smallest, the longest: amazing births



Instructions

1. Work in groups. You need a card and some felt-tip pens.
2. Decide on a human reproductive record you want to learn about, for example, the most babies born to one woman, the longest pregnancy, the highest number of babies in a multiple birth, the heaviest baby, the smallest baby, etc.
3. Divide the index card into two sections. Write a title.
4. Search the Internet for information about the record you have chosen in your group. Write the information as in the example. Add photographs or drawings to your index card.

THE LONGEST BABY

Who: A baby boy born to Anna Bates

Where: Ohio, USA

When: In 1879

Length: 76 cm



Name _____ Date _____

1 Match and write the sentences.

- | | |
|--------------------------|-----------------------------------|
| a. Cells are | the three basic life processes. |
| b. All living things are | to perform a particular function. |
| c. All cells carry out | made up of cells. |
| d. Living things can be | unicellular or multicellular. |
| e. Cells can specialize | the basic units of life. |

2 Label the pictures with the words in the box. Then, answer the question.

blood cells - muscle cell - intestine cell - neuron



- Which part of the plant cell absorbs sunlight? _____


3 Write two examples for each. Then, answer the question.

Plant organs _____


Animal organs _____


- What are organs made up of? _____

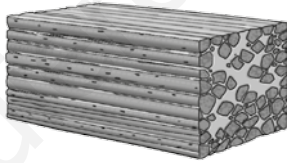
4 Circle the levels of organization and use them to label the pictures. Then, number them from the simplest to the most complex.




q	y	o	i	c	e	l	l
b	p	r	d	w	t	q	v
o	r	g	a	n	i	s	m
g	g	a	h	e	s	y	b
f	w	n	s	f	u	s	p
y	r	p	i	c	u	t	j
r	t	i	s	s	u	e	l
k	o	g	d	n	l	m	a









5 Read and write *T* (true) or *F* (false). Then, correct the false sentences.

- a. Plants have more types of tissues than animals.
- b. Muscle tissue is responsible for movement in plants.
- c. Epithelial tissue carries information to the brain in animals.
- d. Blood tissue in animals and vascular tissue in plants have a similar function.
- e. Dermal tissue is found in every part of a plant.
- f. Most of a plant is made up of ground tissue.

Name _____ Date _____

Living things come in many sizes

Size is one of the most important characteristics of living things. It affects how an organism manages to survive and how it reacts to its environment. However, there are vast differences in size among living things.

The largest animal on Earth is the blue whale, which measures about 25 metres long. The largest plant is the giant sequoia tree, which can reach up to 90 metres in height. However, the largest living thing on Earth is a fungus! It is located in a forest in Oregon (USA) and extends over 5 kilometres in length. It grows mostly underground and its visible part, commonly known as the *honey mushroom*, is edible.

The smallest living things are a type of bacteria, known as *mycoplasmas*, which are harmful to people.



1 Read the text and answer the questions.

- Why is size important for living things? _____
- Which living thing is the largest on Earth? _____
- What type of organism are the smallest living things on Earth? _____
- Which of these living things can be harmful to people? _____

2 Search the Internet for more information about the largest living thing on Earth and complete the index card. Include a picture.

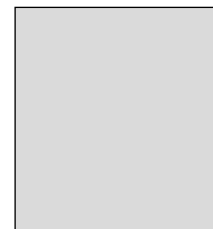
Name: _____

Kingdom: _____

Size: _____

Age: _____

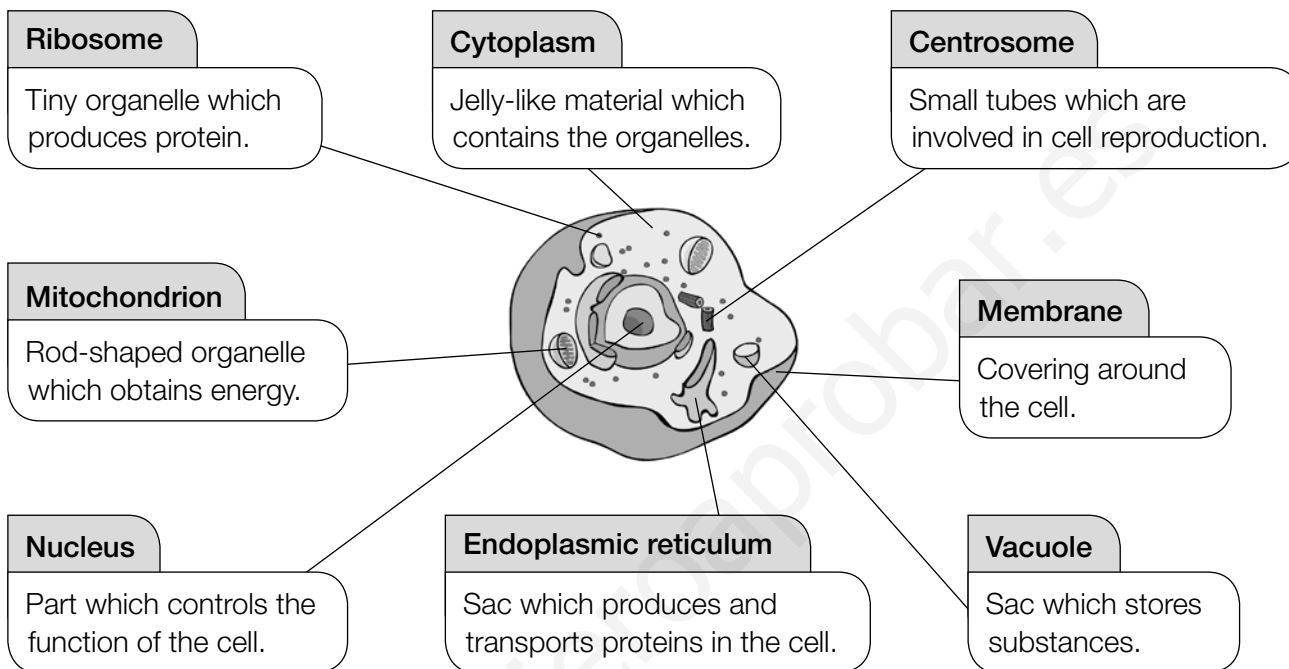
Other characteristics: _____



Name _____ Date _____

Parts of a cell

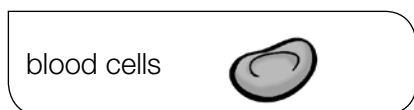
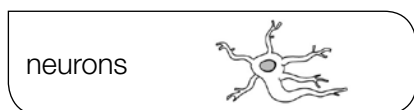
Microscopes allow scientists to study the parts of a cell. Cells have different sizes, shapes and functions, but all cells have a membrane, a nucleus and cytoplasm.



1 Look at the diagram and answer the questions.

- Which part of the cell protects it from the outside? _____
- Which part of the cell contains the organelles? _____
- Which parts of the cell are involved in cell reproduction? _____
- Which part of the cell obtains energy? _____

2 Match the cell types with their functions.



store energy

transport substances throughout the body

transmit messages and orders

Name _____ Date _____

1 Read and write the words.

- a. A basic unit of life. _____
- b. The three basic life processes. _____
- c. A living thing made up of a single cell. _____
- d. A living thing made up of many cells. _____
- e. An instrument to observe cells. _____

2 Draw an animal cell and label the main parts. Then, write.



- Write four differences between plant cells and animal cells.

3 Write the next four levels of organization of multicellular living things.

Cells ► _____ ► _____ ► _____ ► _____

- Now, use these words to explain the levels of organization.

multicellular living things - work together -
organism functions correctly



4 Complete the sentences.

- a. Cells work together at different _____.
- b. All cells in a single type of _____ perform the same function.
- c. Muscles and bones are animal _____.
- d. Organs join together to form a _____.
- e. In a _____ living thing, all the levels of organization work together.
- f. In a _____ living thing, there is only the first level of organization.

5 Draw an animal tissue and a plant tissue. Then, write their name, their function and an organ in which each tissue can be found.

type of tissue:
function:
organ:

type of tissue:
function:
organ:

6 Complete the table about animal and plant tissues. Then, answer the question.

function	animal tissue	plant tissue
provides support		
transports substances		
provides protection		

- Why don't plants have nervous tissue? _____

Name _____ Date _____

1 All cells carry out the following life processes:

- a. nutrition, organization and growing.
- b. nutrition, reproduction and sensitivity.
- c. nutrition, reproduction and changing.

2 Cells can differ...

- a. only in size.
- b. only in shape.
- c. in size and in shape.

3 All animal and plant cells have...

- a. a cytoplasm, a nucleus and a cell wall.
- b. a cytoplasm, a nucleus and a membrane.
- c. a cytoplasm, a nucleus and a chloroplast.

4 The organelles are contained in the...

- a. nucleus.
- b. cytoplasm.
- c. membrane.

5 The levels of organization in multicellular living things are:

- a. cells - tissues - organs - systems - organisms.
- b. cells - organs - tissues - systems - organisms.
- c. cells - tissues - organisms - organs - systems.

6 Organs in the digestive system work together to...

- a. move.
- b. reproduce.
- c. obtain nutrients.

7 Nervous tissue is specialized in...

- a. carrying information to the brain.
- b. protecting the skin from bacteria.
- c. carrying nutrients throughout the body.

8 Epithelial tissue forms...

- a. bones.
- b. internal organs.
- c. the skin.

9 Most of a plant is made up of...

- a. dermal tissue.
- b. ground tissue.
- c. vascular tissue.

10 Vascular tissue is found in the...

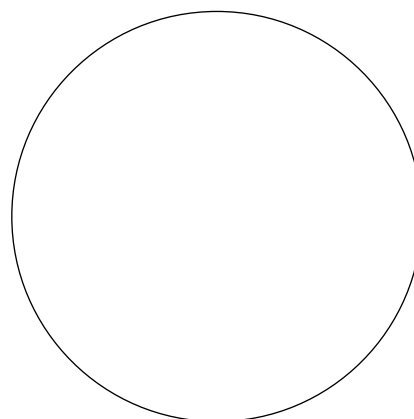
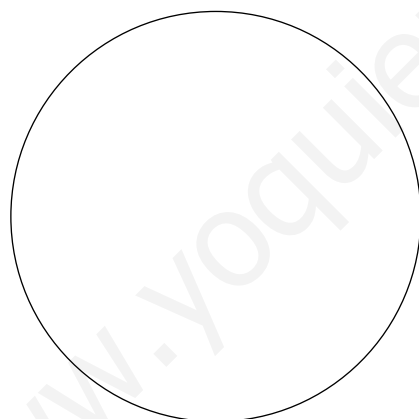
- a. leaves.
- b. flowers.
- c. xylem and phloem vessels.

Name _____ Date _____

What are the cells of an onion like?

Instructions

1. Work with a partner. You need an onion, a microscope, a microscope slide, a cover slip, a knife, a pair of tweezers, some methyl green, an eye dropper and some filter paper.
2. Using the knife and the tweezers, carefully cut open the onion and remove a very thin layer of skin from the inside. Cut out a small piece.
3. Put the onion sample on the microscope slide. Make sure it is flat.
4. Drop a few drops of methyl green on your sample. Wait five minutes. Use the eye dropper to drop water on the sample to wash away the excess methyl green.
5. Put a drop of water on the sample and cover it with the cover slip. Make sure there are no bubbles. Dry the microscope stage with filter paper.
6. Put the slide on the stage and fasten it with the stage clips. Observe the cells through the low power lens. Adjust the focus to see the sample clearly. Then, observe the cells again through one of the high power lenses and adjust the knobs to see the sample clearly.
7. Draw and colour what you see using a low power lens and a high power lens.



8. Draw one of the cells and label the main parts: *nucleus*, *cytoplasm* and *membrane*.



Name _____ Date _____

1 Read and write *T* (true) or *F* (false). Then, correct the false sentences.

- a. Animals and fungi cannot feed on other organisms.
- b. Fungi and plants can be unicellular or multicellular.
- c. Plants, algae and some bacteria can make their own food.
- d. Plants and fungi cannot move about.
- e. All fungi, protozoa and bacteria are harmful.

2 Write *M* (mammal), *B* (bird), *R* (reptile), *A* (amphibian) or *F* (fish). Then, write one characteristic of each vertebrate group.











3 Name one example of each type of invertebrate.

a. sponge _____

d. echinoderm _____

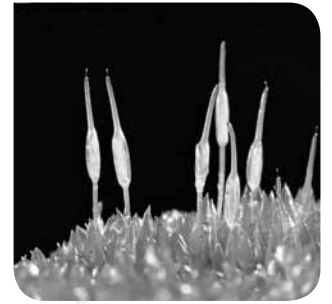
b. cnidarian _____

e. mollusc _____

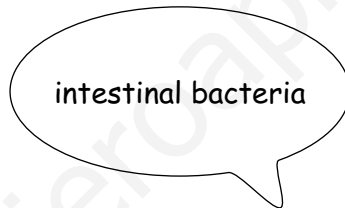
c. worm _____

f. arthropod _____

4 Write the name of each type of plant. Then, write one characteristic for each.



5 Identify the kingdom each living thing belongs to. Then, write similarities and differences between them.



6 Circle the living things and classify them.

kelp yoghurt bacteria fern dolphin wild mushroom squirrel cholera bacteria apple tree paramecium

animals	plants	fungi	monerans	protists
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____

Name _____ Date _____

An unusual mammal

The platypus is unique. It is a small, semi-aquatic mammal that lays eggs! When the females are going to have babies, they hide in burrows. There, they lay up to three eggs that hatch about ten days later. Platypuses are mammals, so the babies drink their mother's milk.

Platypuses look like beavers. Their body and tail are covered with brown, waterproof fur that keeps them warm in cold water. They have four webbed feet and a duck-like bill with no teeth.

Platypuses are originally from Australia, and they live on land. They walk and run, and can dig with the long nails they have on each foot. They are excellent swimmers and spend lots of time in streams and rivers. They eat small aquatic animals, such as worms, insect larvae and shrimps. They have a very sensitive bill that helps them feel for food on riverbeds.



1 Read the sentences and circle the correct word.

- The platypus is a *freshwater* / *saltwater* mammal.
- It lays eggs in *the water* / *burrows*.
- Its body is covered with *fur* / *feathers*.
- It has *teeth* / *a bill*.
- It is a *carnivore* / *herbivore*.

2 Search the Internet for information about another unusual animal and complete the index card.

Name: _____

Description: _____

Habitat: _____

Diet: _____

Reproduction: _____

Name _____ Date _____

A fortuitous discovery

In 1928, Scottish scientist Alexander Fleming accidentally discovered penicillin, a powerful antibiotic agent. While working at St Mary's Hospital in London, Dr Fleming grew some bacteria. He observed that the bacteria had become contaminated by a blue-green fungus. Over time, the colonies of bacteria next to the fungus disappeared! He grew the fungus in isolation and found that it produced a substance which killed several harmful bacteria. He named this chemical *penicillin*.



Over the years, penicillin has saved many lives from potentially fatal bacterial diseases. Penicillin was especially important during World War II, when an infection could kill a soldier as easily as any gunshot wound. This is why it was called the 'miracle drug'.

1 Read the text and answer the questions.

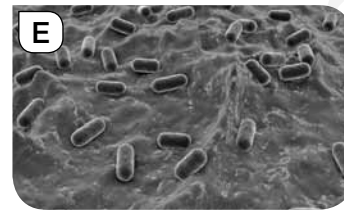
- Who was Alexander Fleming? _____
- What did he accidentally discover? _____
- Which living thing produced this substance? _____
- Where was he working? _____
- What did he observe? _____
- Why was his discovery so important? _____
- What was the nickname for penicillin? _____

2 Search the Internet for information about two other antibiotics and complete the table.

antibiotic	description	use

Name _____ Date _____

1 Identify and label the five kingdoms of living things.

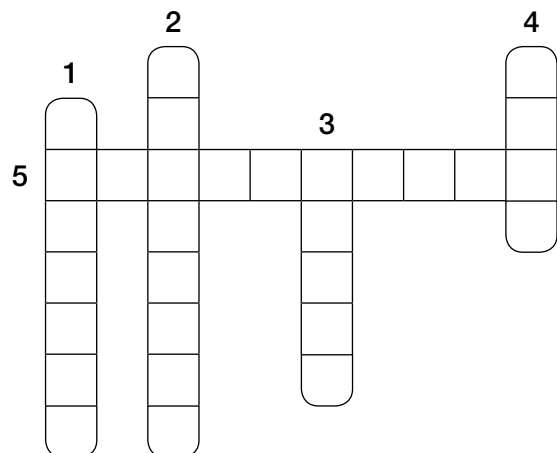


2 Write the names of the kingdoms from Activity 1 in the correct place.

- a. They cannot move about. They feed on other organisms. _____
- b. They can move about. They eat other living things. _____
- c. They can make their own food. They cannot move about. _____
- d. They can be unicellular or multicellular. Some feed on other organisms, and others make their own food. _____
- e. They are unicellular. Some feed on other organisms, and others make their own food. _____

3 Complete the crossword about vertebrate groups.

- 1. Viviparous with fur and lungs.
- 2. Oviparous with scales and lungs.
- 3. Oviparous with feathers and lungs.
- 4. Oviparous with scales and gills.
- 5. Oviparous with legs and lungs when adults.

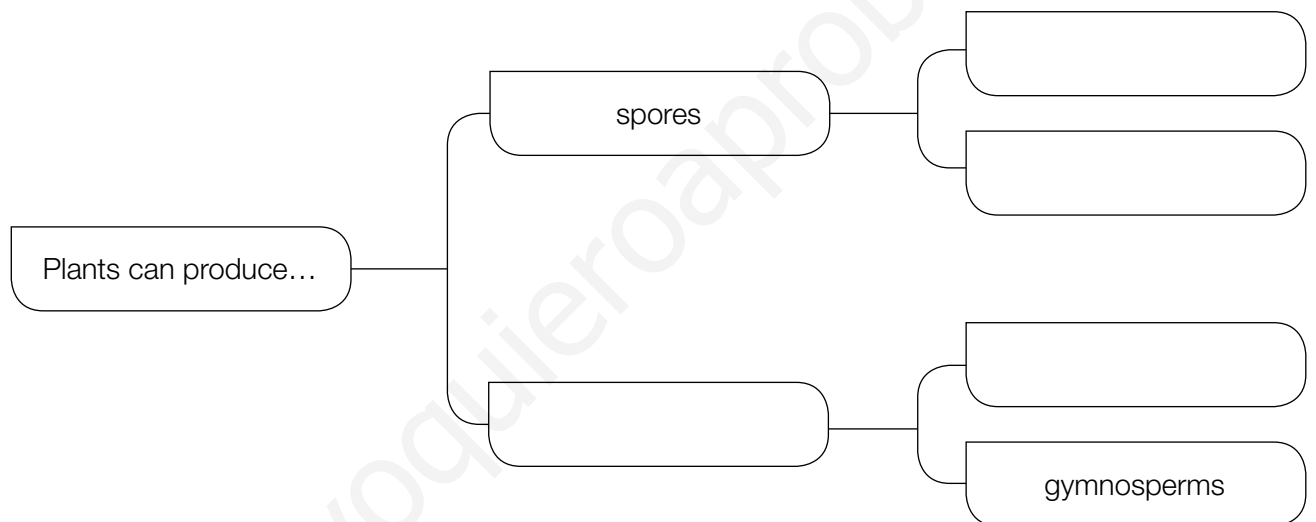


4 Read the definitions and write the invertebrate group.

- a. Marine invertebrates with poisonous tentacles: _____
- b. Invertebrates with soft bodies. Many have a shell: _____
- c. Invertebrates with an external skeleton, jointed legs and a segmented body: _____

- d. Invertebrates with long, soft bodies and no legs: _____
- e. Simple invertebrates that filter seawater to obtain food: _____
- f. Marine invertebrates that may have spines: _____

5 Complete the chart.



6 Match the columns using five different colours.

- | | | |
|------------|-------------|------------------|
| • yeast | blue cheese | |
| • bacteria | yoghurt | Fungi kingdom |
| • mould | mushroom | Protista kingdom |
| • algae | bread | Monera kingdom |
| • mushroom | sushi | |

7 Research examples of how bacteria, mould and mushrooms can be harmful.

Name _____ Date _____

1 Living things are classified into...

- a. fifty kingdoms. b. four kingdoms. c. five kingdoms.

2 Vertebrates are divided into mammals, birds, reptiles, ...

- a. arachnids, amphibians and worms.
b. fish, crustaceans and molluscs.
c. amphibians and fish.

3 Reptiles...

- a. are oviparous and breathe with lungs.
b. are oviparous and breathe with gills.
c. are viviparous and breathe with lungs.

4 Invertebrates are divided into sponges, cnidarians, ...

- a. worms, molluscs, echinoderms and arthropods.
b. worms, molluscs, arthropods and arachnids.
c. worms, molluscs, echinoderms and arachnids.

5 Mosses and ferns reproduce with...

- a. seeds. b. spores. c. sori.

6 Gymnosperms and angiosperms are...

- a. non-flowering plants.
b. plants that feed on other living things.
c. seed-producing plants.

7 Mushrooms belong to...

- a. the Animal kingdom.
b. the Monera and the Protist kingdoms.
c. the Fungi kingdom.

8 Penicillin is produced by...

- a. a bacteria. b. a fungus. c. a plant.

9 The Protista kingdom includes...

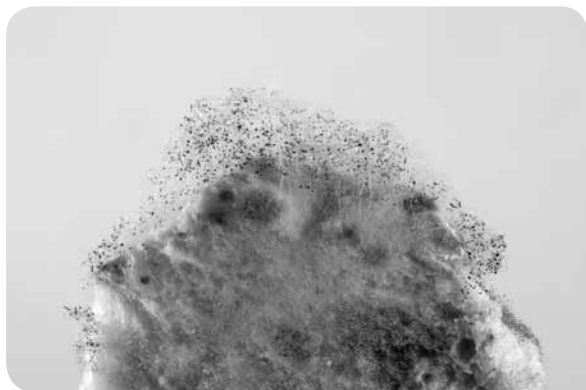
- a. algae and protozoa. b. algae and bacteria. c. algae and viruses.

10 Yoghurt is made with helpful...

- a. algae. b. viruses. c. bacteria.

Name _____ Date _____

What does mould need to grow?



Instructions

1. Work in groups. You need 4 clear plastic bags with a zip, 4 slices of bread, a permanent marker, water, a magnifying glass and a microscope.
2. Label the bags: A1, B1, A2 and B2.
3. Put two slices of dry bread in bags A1 and B1. Get the other two slices of bread slightly wet and put them in bags A2 and B2. Seal the bags tightly.
4. Place bags A1 and A2 in a sunny, warm location. Place bags B1 and B2 in the refrigerator.
5. Observe the pieces of bread over the next few days using the magnifying glass or/and microscope.
6. Record your results and draw your observations in the table.

	day 1	day 2	day 3	day 4	day 5
A1					
A2					
B1					
B2					

7. Analyse your results and answer the questions.
 - a. Did mould grow on every slice of bread? _____
 - b. Was the amount of mould the same on all slices? Which ones had the most mould? Which ones had the least? _____

 - c. Under which conditions did the mould grow best? _____

Name _____ Date _____

1 Complete the sentences. Then, number them in order.

receptors - interprets - muscles - locomotor system - responses - information - stimuli

- a. The brain sends orders to the _____
- b. Nerves send _____ from the sense organs to the brain.
- c. _____ in our sense organs detect _____.
- d. _____ and bones carry out the corresponding _____.
- e. The brain receives and _____ this information.

2 Tick (✓) the actions which involve internal coordination. Then, answer the question.

- Saliva is produced when we eat food.
 - We queue when the playground bell rings.
 - Our heart is beating at all times.
 - We cross the street when the traffic light is green.
- Which system is responsible for internal coordination? _____

3 Label the diagram.

outer ear - eardrum - cochlea - ear canal - auditory nerve - ossicles



4 Use the words in the box to write sentences about each sense organ.

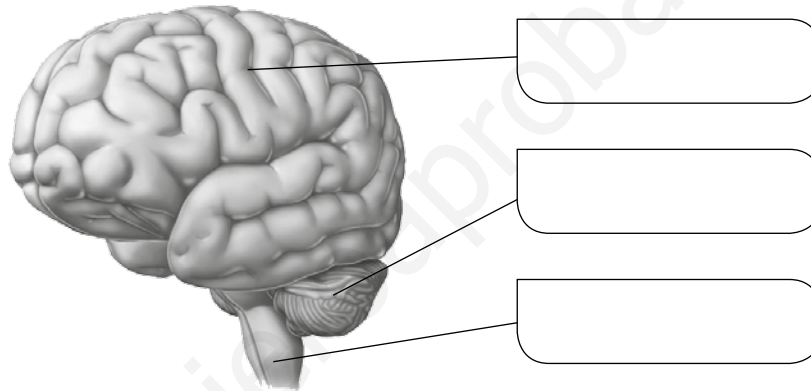
optic nerve - taste buds - olfactory epithelium - retina - taste nerves - olfactory nerve

eyes

nose

tongue

5 Label the diagram of the brain. Then, write a sentence about what each part controls.



6 Write the stages of each movement in order. Then, write *voluntary* or *reflex*.

a. Your spinal cord sends an order to your muscles. // You sneeze. // A piece of dust enters your nose. // Your nose sends a message to your spinal cord.

b. You decide to raise your hand. // Your ears send the information to your brain. // Your brain sends an order to your arm muscles. // Your teacher asks a question.

a. _____ action

b. _____ action

Name _____ Date _____

Colour blindness

Colour blindness is the inability to distinguish certain colours. It is sometimes called *daltonism* because John Dalton, a British scientist, discovered this deficiency in the late 18th century. Dalton was affected by red-green colour blindness.

There are over 250 million colour blind people in the world today. In most cases, colour blindness is an inherited trait, and males are more likely than females to suffer from it. Colour blind people can see things as clearly as other people, but have difficulty seeing red, green, blue or a mixture of these colours.

There are different types of colour blindness. The most common type is red-green colour blindness. The least common type is total colour blindness. People who are totally colour blind cannot see any colours at all. Everything is black, grey or white.

In general, people with colour blindness can lead normal lives and have all kinds of jobs, except for occupations where colour perception is essential, such as train drivers or airline pilots.



1 Read the text and complete the table.

colour blindness				
main cause	population affected	most common type	least common type	job limitations
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____

2 Search the Internet to find a test to see if you are colour blind. Do the test. What are your results?

Name _____ Date _____

Sleepwalking

Sleepwalking is a sleep disorder which consists of walking or doing other activities while asleep. These activities may include sitting up in bed, walking around the house or outdoors, climbing, or even driving! Sleepwalking episodes vary in length. They can last for just a few seconds or as long as thirty minutes.

Sleepwalkers usually have their eyes open so they can see what they are doing. However, their eyes appear glassy and unfocused. Most of the time, sleepwalkers do not remember anything when they wake up.

Sleepwalking is much more common in children than in adults. The causes of sleepwalking include fatigue, fever, certain medications and stress. Sleepwalking can also run in families. Most children stop sleepwalking when they get older.

Sleepwalking is not dangerous in itself. However, it may lead to accidents, like falling down or running into things. So, if you live with a sleepwalker, you must take precautions, such as removing obstacles and closing doors and windows. During sleepwalking episodes, do not wake sleepwalkers. Gently guide them back to their beds.



1 Read the text and complete the index card.

SLEEPWALKING

Definition: _____

Activities performed: _____

Causes: _____

Risks: _____

Precautions: _____

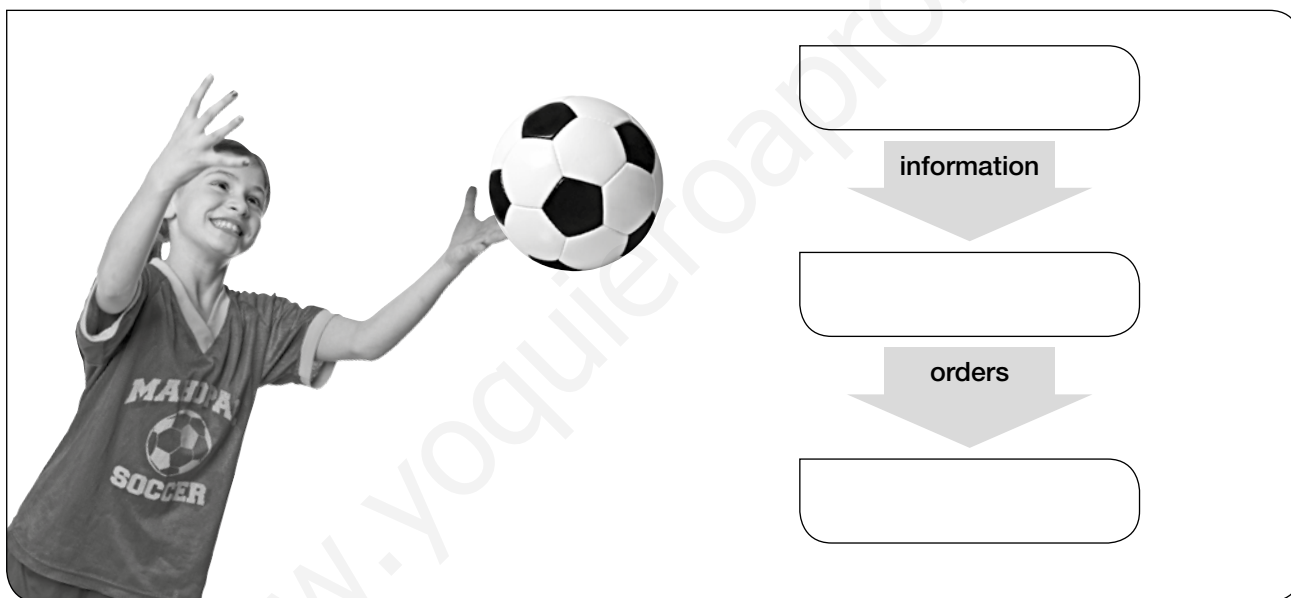
2 Do a survey in your class. How many people sleepwalk or know a sleepwalker? What does he/she do when asleep? How does the family take precautions? Write the results in your notebook.

Name _____ Date _____

1 Read the definitions and write the words.

- a. Changes in the external environment: _____
- b. Organs that capture information from the environment: _____
- c. Groups of specialized cells that are sensitive to stimuli: _____
- d. System that controls the function of sensitivity: _____
- e. System that carries out the orders from the brain: _____
- f. Part of the function of sensitivity that controls many body processes: _____

2 Complete the diagram. Then, answer the questions.



- a. Which sense organs are involved? _____
- b. What do these sense organs detect? _____
- c. Which part of the body interprets the information and decides how to act? _____
- d. Which body organs carry out the orders? _____

3 Cross out (X) the odd one out. Then, write the corresponding sense organ.

- a. cochlea retina ossicles eardrum _____
- b. nostril nasal cavity taste buds olfactory epithelium _____
- c. cornea pupil ear canal iris _____

4 Draw a neuron and label it. Then, write a sentence about each word.

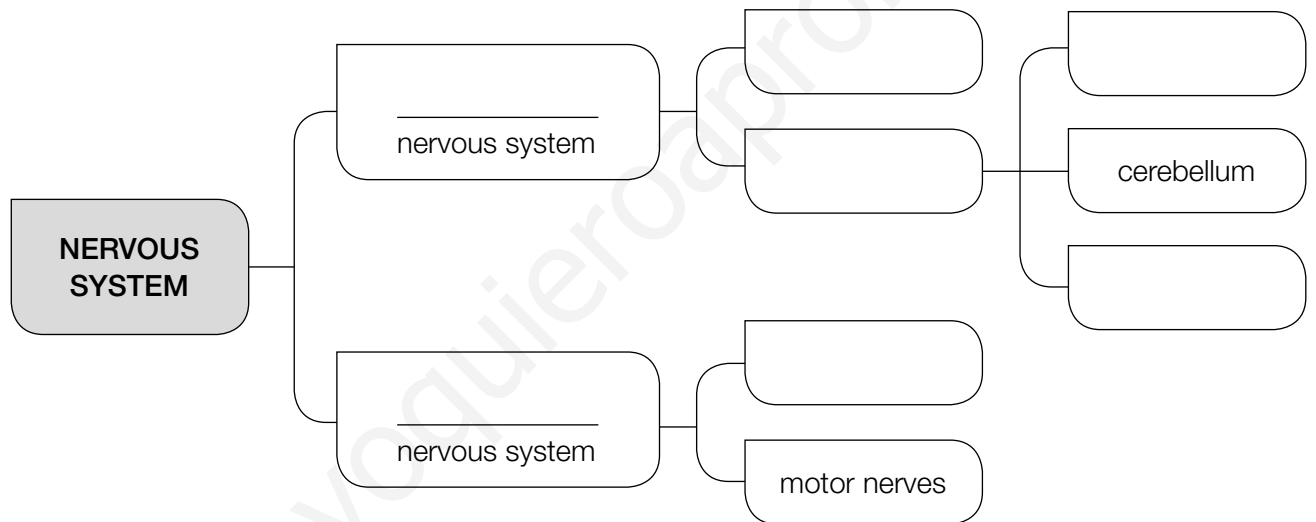
dendrites

axon

body

- _____
- _____
- _____

5 Complete the chart about the nervous system.



6 Complete the sentences.

- a. Voluntary movements are actions that we perform _____.
- b. In voluntary movements, the _____ sends an order.
- c. Voluntary movements can involve _____ and fine motor skills.
- d. Reflex movements are _____ responses.
- e. In reflex movements, the response is produced by the _____.

7 Write two examples of each type of movement from your daily life.

Name _____ Date _____

- 1** In the process of sensitivity, ...
 - a. our senses respond to stimuli.
 - b. our locomotor system grows.
 - c. our muscles send messages to the brain.

- 2** The sense organ of sight is the...
 - a. eye.
 - b. brain.
 - c. tongue.

- 3** The receptors of the ear are located in the...
 - a. auditory nerve.
 - b. ossicles.
 - c. cochlea.

- 4** The organ that detects temperature is the...
 - a. ear.
 - b. skin.
 - c. eye.

- 5** Information about different flavours is sent to the brain through receptors in the...
 - a. nostril.
 - b. retina.
 - c. taste buds.

- 6** The sense organ of smell is the...
 - a. skin.
 - b. tongue.
 - c. nose.

- 7** The brain and the spinal cord are parts of...
 - a. the cerebrum.
 - b. the central nervous system.
 - c. the peripheral nervous system.

- 8** The peripheral nervous system consists of...
 - a. sensory and motor nerves.
 - b. nervous cells.
 - c. the sense organs and the motor nerves.

- 9** Voluntary movements result from carrying out orders that...
 - a. come from the cerebrum through sensory nerves.
 - b. come from the cerebrum through motor nerves.
 - c. come from the spinal cord through motor nerves.

- 10** Reflex movements are...
 - a. automatic responses produced by the brain.
 - b. conscious responses produced by the spinal cord.
 - c. automatic responses produced by the spinal cord.

Name _____ Date _____

Are two eyes better than one to estimate distance?

Instructions

1. Work in pairs. You need a plastic cup, a small object, such as a marble, and a tape measure.
2. Place the cup on a table, near the edge. Measure the following distances from the cup: 50 cm, 100 cm and 150 cm, and mark them on the floor.
3. Take it in turns to perform the following experiment:
Stand on the 50 cm mark on the floor, with both eyes uncovered. Your partner slowly moves the marble above the cup. When you think the marble is going to fall into the cup, say 'now'. Your partner releases the marble. Next, do the same thing with your right eye covered. Finally, do it again with your left eye covered.
4. Repeat the test from the 100 cm distance and the 150 cm distance.
5. Complete the table with your results.



distance	both eyes uncovered	right eye covered	left eye covered
50 cm			
100 cm			
150 cm			

6. Analyse your results and answer the questions.
 - a. What happened when you performed the test with both eyes uncovered?

 - b. What happened when you performed the test with one eye covered?

 - c. Was it easier or harder when the distance increased?

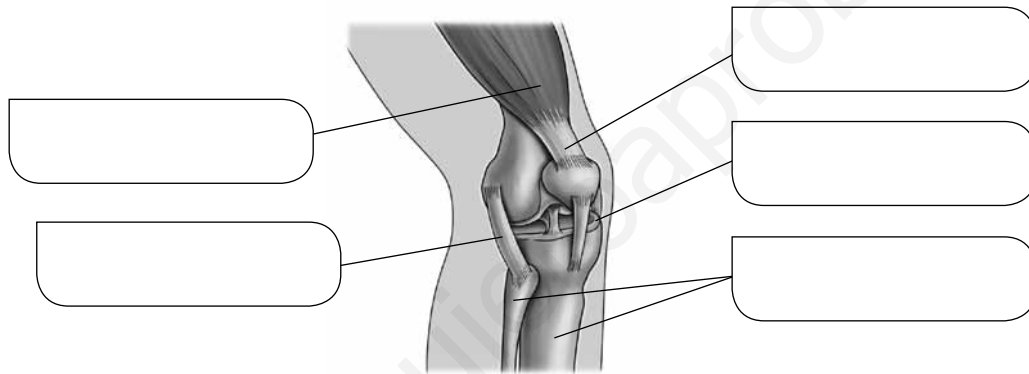
7. Now write a conclusion.

Name _____ Date _____

1 Read and write the words.

- a. Hard and rigid organs that consume nutrients and grow. _____
- b. Organs that can change in length and shape. _____
- c. Soft, elastic tissue that covers the ends of bones. _____
- d. These hold bones together and are made of flexible tissue. _____
- e. These connect bones and muscles, and are made of flexible tissue. _____
- f. These are structures where bones meet. _____

2 Use five words from Activity 1 to label the picture. Then, answer the questions.



- Is this a fixed joint or a movable joint? _____
- Which bones meet at this joint? _____

3 Circle eight parts of the locomotor system and classify them. Then, add two more examples of each.

bones

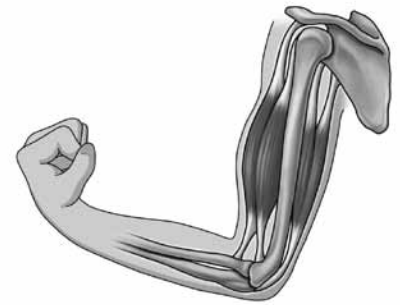
t	a	b	d	m	o	t	n
p	b	o	r	d	w	r	l
a	d	e	l	t	o	i	d
r	o	l	e	t	o	c	d
i	m	p	f	s	e	e	o
b	i	c	e	p	s	p	o
s	n	t	m	s	p	s	n
t	a	d	u	l	n	a	t
e	l	w	r	m	e	s	i
p	s	p	i	n	e	d	g

muscles

4 Look at the picture and answer the questions.

- a. What kind of movement is this? _____
- b. Which muscle pulls a bone? Which bone? _____

- c. What are muscles that work in pairs called? _____
- d. What joints can you identify? _____



5 Complete the table about injuries to the locomotor system. Then, answer the questions.

most common injuries	type of damage	cause

- Which type of injury requires a plaster cast? _____
- Which injury is most common in joints? _____
- Which type may result from lifting heavy objects? _____

6 Tick (✓) the activities that help to keep the locomotor system healthy, and cross (✗) the ones that do not.



Name _____ Date _____

Bones at work

A bone can break in one place like in a simple fracture, or it can break in many places and go through the skin, like in a compound fracture. This type of fracture is harder to heal and may require more than just a plaster cast. Greenstick fractures, where bones crack but don't break, are very common and are usually the fastest to heal.

Bones are amazing at self-repairing. When a bone breaks, many things immediately happen. Broken blood vessels inside the bone cause swelling and send signals to other parts of the body to start the repairing process. First, a special team of cells removes damaged bone tissue. Then, another team of cells builds new bone to close the gap between the broken bone fragments.

In fact, this process happens even if you don't break a bone. Your body is constantly removing old bone and making new bone!



1 Read the text and answer the questions.

- Which types of bone fractures can you name? _____
- Which type of bone fracture is hardest to heal? _____
- What happens right after a bone breaks? _____

- What does the first team of cells do? _____
- What does the second team of cells do? _____
- Why do we say that bones are always at work? _____

2 Do a survey to find out how many people in your class have had a bone fracture. Ask them about the location of the fracture, type of fracture and treatment. Make a table with the results in your notebook.

Name _____ Date _____

Sports for everyone

Exercise is healthy at any age, and everyone can find a sport that matches their needs and physical ability. Whether you're very young, very old or somewhere in between, there's a sport for you!

When we don't exercise, lots of different health problems can arise. A sedentary lifestyle can lead to obesity, joint problems, back pain and other problems.

The duration of a sport and the amount of effort required can vary quite a lot. Some sports are played at high intensity for a short period of time, while others require variable effort for a longer period of time.

In general, intense sports are best suited for fit young people and adults. More moderate activities are available for the elderly and people who are less fit.

sport	duration	effort
basketball	40 minutes	variable
football	90 minutes	variable
gymnastics	2 minutes	intense
sprinting (100 m)	10-15 seconds	very intense
skiing (slalom)	2 minutes	intense
swimming (1500 m)	15-25 minutes	intense
tennis	1-3 hours	variable

1 Read the text and the table, and complete the sentences.

- People should do sports that match their _____ and _____ ability.
- Lack of physical activity can cause _____, joint problems and _____.
- Sports such as gymnastics, _____ and skiing require _____ effort.
- Sports such as basketball, football and _____ require _____ effort.
- Sprinting is very _____ and lasts a very _____ period of time.

2 What types of sports do the people in your family do? Complete the table in your notebook. Then, answer the question.

family member	sport	duration	effort

- What type of sport or physical activity would you recommend to your grandparents?

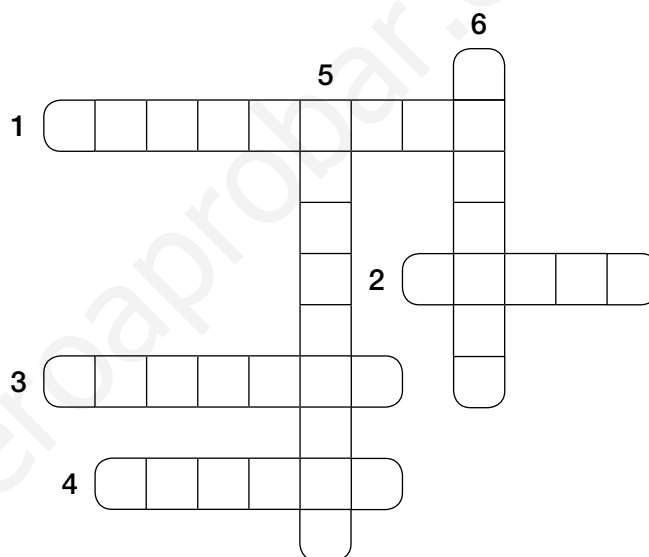
Name _____ Date _____

1 Match. Then, tick (✓) the bones that protect organs.

- | | | |
|--------------------------------------|----------------------|-------|
| <input type="checkbox"/> short bones | bones in the cranium | torso |
| <input type="checkbox"/> long bones | humerus and fibula | limbs |
| <input type="checkbox"/> flat bones | vertebrae | head |

2 Complete the crossword about the locomotor system.

- This is soft, elastic tissue that covers the ends of bones.
- You have over 200 of them in your skeletal system.
- You have over 600 of them in your body.
- Bones meet here.
- These hold bones together.
- These attach muscles to bones.



3 Complete the table with two examples of each. Then, answer the question.

	head	torso	limbs
bones	_____ _____	_____ _____	_____ _____
muscles	_____ _____	_____ _____	_____ _____

- What do skeletal muscles do?

4 Complete the texts. Label them *F* (flexing movement) and *E* (extending movement).

The _____ relaxes and the triceps _____.
The triceps pulls the _____,
so the arm _____.

The biceps _____ and the _____ relaxes.
The biceps pulls the _____,
so the arm _____ at the elbow.



5 Choose the correct words to write a sentence under each photo.

muscle strain - breaks - bone fracture - effort - sprain - contraction - twisting - bone - ligaments



6 Read and write *T* (true) or *F* (false). Then, correct the false sentences.

- a. Healthy habits are important for our locomotor system.
- b. Good posture helps to develop elasticity.
- c. Bad posture can deform your spinal column.
- d. Vitamin C helps the body to absorb calcium.
- e. The right amount of sleep can improve our memory.

Name _____ Date _____

- 1** Bones contain mineral substances, such as...
 - a. vitamin E.
 - b. calcium.
 - c. iron.
- 2** Bones are held together by...
 - a. ligaments.
 - b. tendons.
 - c. cartilage.
- 3** The ribs protect the...
 - a. heart, lungs, stomach and pancreas.
 - b. heart, larynx, stomach and liver.
 - c. heart, lungs, stomach and liver.
- 4** Pectorals and abdominals are muscles in the...
 - a. torso.
 - b. head.
 - c. limbs.
- 5** When a muscle receives an order, it...
 - a. relaxes and pulls the bones attached to it.
 - b. contracts and pulls the bones attached to it.
 - c. contracts and separates from the bone.
- 6** A sprain is an injury that involves damage to...
 - a. the bones.
 - b. the tendons.
 - c. the ligaments.
- 7** Bone growth mainly requires...
 - a. calcium and vitamin C.
 - b. calcium and protein.
 - c. calcium and vitamin D.
- 8** In order to keep our locomotor system healthy, we need to...
 - a. do regular physical activity.
 - b. relax our muscles during sport.
 - c. sleep 6 hours per day.
- 9** Physical activity helps us to...
 - a. develop our memory skills.
 - b. develop elasticity and strengthen our muscles and bones.
 - c. grow our bones.
- 10** Bad posture can cause...
 - a. chest pain.
 - b. abdominal pain.
 - c. back pain.

Name _____ Date _____

How fit are you?

Instructions

1. Work in groups of four. You need a timer and a chair.
2. You are going to perform two tests: *chair push-ups* and *one kilometre endurance*.
3. *Chair push-ups* test for upper body strength and endurance. To perform the test, each group member needs to place their hands on the edge of a chair and do push-ups for a minute. One group member keeps time while another one counts the push-ups. The last team member records the data.
4. The *one kilometre endurance* tests for overall body endurance. Each group member needs to complete one kilometre as fast as possible. Perform the test twice: first walking and then running.
5. Record your results in the table.



	chair push-ups	one kilometre endurance: walking	one kilometre endurance: running
student 1			
student 2			
student 3			
student 4			

6. Analyse your results and answer the questions.
 - a. Which student did the most push-ups in one minute? _____
 - b. Which student walked one kilometre the fastest? _____
 - c. Which student ran one kilometre the fastest? _____
 - d. Which student is the most fit? _____

7. Now write a conclusion.

Name _____ Date _____

1 Complete the diagram with the three types of health. Then, use the words to write a definition of health.



2 Match the infectious agents to the infectious diseases. Then, tick (✓) the disease/s that can be cured with antibiotics.

- | | | |
|--------------|-------------------|--------------------------|
| a. bacteria | athlete's foot | <input type="checkbox"/> |
| b. viruses | sleeping sickness | <input type="checkbox"/> |
| c. fungi | tuberculosis | <input type="checkbox"/> |
| d. parasites | flu | <input type="checkbox"/> |

3 Read and tick (✓) the example of prevention. Explain your answer.

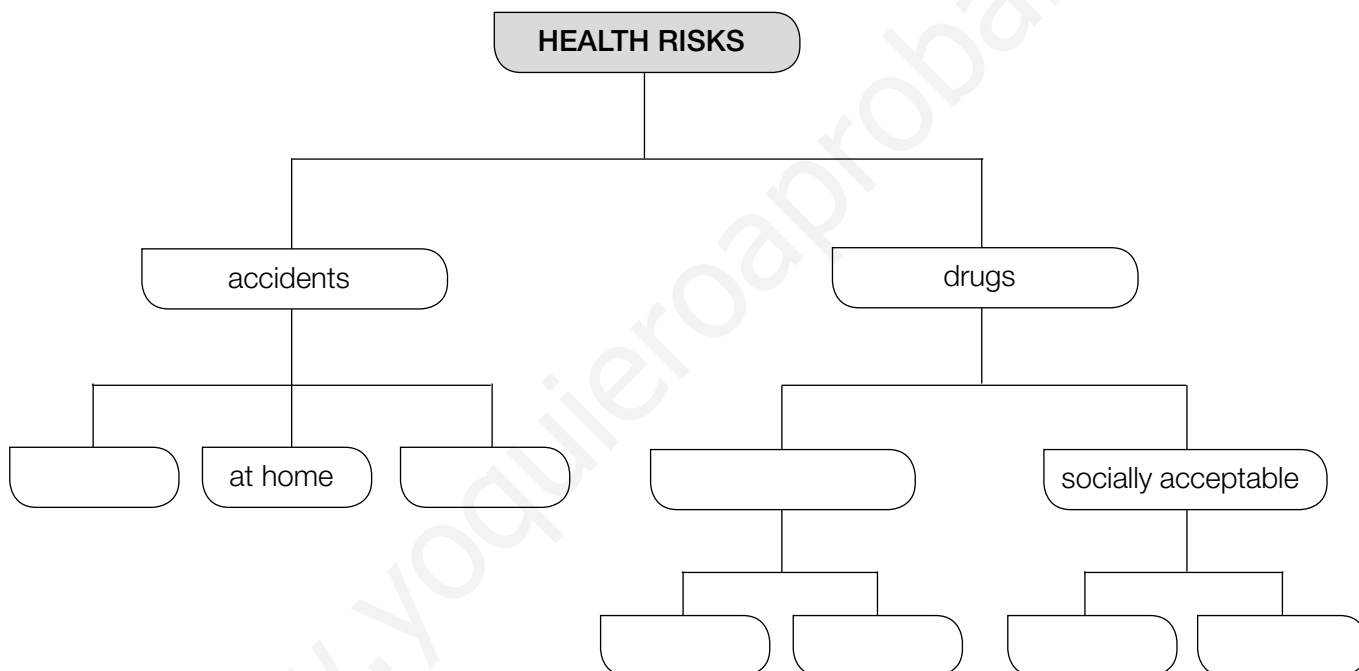
- Peter always washes his hands before eating.
- Lola goes to the doctor because she has a cough and a sore throat.

4 Use the words to complete the text about vaccines.

infected - defences - prevent - infectious - pathogens

Vaccines can _____ some infectious diseases. They contain weakened or dead _____ . When vaccines are administered, our body creates _____ to fight the _____ agents. Then, if our body is _____ by the same type of pathogen, it is ready to defend itself.

5 Complete the chart.



6 Read and write *T* (true) or *F* (false). Then, correct the false sentences.

- a. Accidents are unexpected and voluntary events.
- b. Drugs are mind-altering substances.
- c. Minors can legally consume alcohol and tobacco.
- d. Alcoholism is an acute disease.
- e. Drugs can cause dependency.

Name _____ Date _____

Bacteria and viruses

Both bacteria and viruses cause illnesses. Bacteria cause tuberculosis and cholera. AIDS, measles and the common cold are caused by viruses.

However, there are important differences between bacteria and viruses. Bacteria are the most abundant living things, and they can live in many different environments. Most bacteria are not harmful to people. Viruses are even smaller than bacteria, but they can only reproduce inside living things. For example, they live inside people, animals or plants.

Probably the most important difference between bacteria and viruses is that antibiotics usually kill bacteria, but they cannot kill viruses. Because people have not used antibiotic drugs correctly, some types of bacteria have become more difficult to treat. They have become resistant to antibiotics, which means that antibiotic drugs may not be effective in the future. This is creating a very serious problem for world health.



1 Read the text and complete the sentences.

- a. Both bacteria and viruses cause _____.
- b. Bacteria cause _____.
- c. Viruses cause _____.
- d. The most abundant living things are _____.
- e. Viruses can only reproduce _____.
- f. Antibiotics can usually kill _____.
- g. When a bacteria has become difficult to treat, we say it is _____.

2 Search the Internet for information about how we can prevent bacteria becoming resistant. Write three examples.

Name _____ Date _____

A flu outbreak

Maria did not go to school today. She woke up in a sweat, and her throat was sore. She also had a headache. Her father took her temperature and she had a fever of 38.9 °C. It was time for a visit to the paediatrician.

At the health centre, they learned there was a new flu outbreak. ‘You must have caught the flu’, said Maria’s father.

The doctor listened to Maria’s heart and lungs, and examined her ears and throat. She recommended that Maria rest, drink lots of liquids and keep warm. In order to control the fever, she prescribed paracetamol.



1 Read the text and answer the questions.

- a. What symptoms did Maria have? _____
- b. Why did her father decide to take her to the doctor? _____
- c. Is Maria contagious? Why? _____
- d. What were the doctor’s recommendations? _____
- e. What drug did the doctor prescribe? For which symptom? _____
- f. Why didn’t the doctor prescribe antibiotics? _____

2 Complete the index card about an illness you have had.

Illness: _____

Symptoms: _____

Test by the doctor: _____

Recommendations: _____

Prescriptions: _____

Name _____ Date _____

1 Match. Then, write an example of each.

Chronic diseases	appear rapidly and last a short time.	_____
Congenital diseases	last a long time.	_____
Acute diseases	are present from birth.	_____

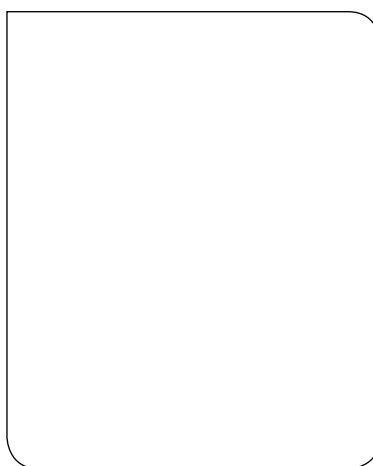
2 Write the infectious agent that causes each type of infectious disease. Then, answer the questions.

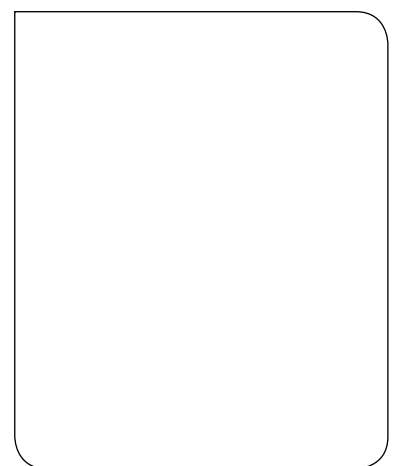
measles and AIDS	_____
athlete's foot	_____
malaria	_____
tetanus and salmonella	_____

- Which of these infectious diseases are contagious? _____
- Which can be contracted through a cut in the skin? _____
- Which can be contracted through contaminated food? _____
- Which is transmitted by vectors? _____

3 Leisure time, physical activity and a healthy diet can all help to prevent illness. Draw and label an example of each.







4 Read and write *medicines, vaccines or surgery*.

- a. They can prevent, alleviate or cure diseases.
- b. It is sometimes performed through small incisions.
- c. They are only used for prevention of some diseases.
- d. They include antibiotics.
- e. It is used to treat some diseases such as appendicitis.
- f. They make the body create defences.

5 Write two measures for preventing accidents in each place.

- in the street:

- at home:

- in swimming pools:



6 Read the sentences and underline the mistakes. Then, write the sentences correctly.

- a. Drugs are substances that can be beneficial to our health.
- b. Marijuana, cocaine, heroin, amphetamines and ecstasy are legal drugs.
- c. Drugs can cause dependency, so it is very easy to stop taking them.
- d. Alcohol particularly affects the brain and the lungs.
- e. Alcohol can improve our relationships with family and friends.

Name _____ Date _____

1 Disease symptoms may include...

- a. fever, pain or vomiting.
- b. swelling, itching or hunger.
- c. fever, thirst or dizziness.

2 Diabetes is a non-infectious, ...

- a. acute disease.
- b. congenital disease.
- c. chronic disease.

3 Non-infectious diseases can be caused by organ malfunction or...

- a. poor nutrition.
- b. microorganisms.
- c. worms.

4 Infectious diseases can be caused by...

- a. bacteria, viruses, insects or parasites.
- b. bacteria, viruses, fungi or parasites.
- c. bacteria, protozoa, fungi or parasites.

5 Disease can be avoided by...

- a. going to the doctor.
- b. taking medicines.
- c. having healthy habits.

6 Antibiotics can be used to treat...

- a. viral infections.
- b. bacterial infections.
- c. parasitic infections.

7 Vaccines can be used to prevent some...

- a. chronic diseases.
- b. congenital diseases.
- c. infectious diseases.

8 Surgery can be used to...

- a. treat injuries and non-infectious diseases.
- b. treat pain and bacterial diseases.
- c. treat fractures and fungal diseases.

9 Respecting traffic lights can prevent...

- a. disease.
- b. infections.
- c. accidents.

10 Alcohol affects...

- a. the brain and the liver.
- b. the brain and the lungs.
- c. the liver and the lungs.

Name _____ Date _____

How do you take vital signs?

Instructions

1. Work in pairs. You need a timer, a digital thermometer, rubbing alcohol and cotton balls.
2. The pulse and body temperature are vital signs. The pulse tells us how fast the heart is pumping. If the pulse rate is faster or slower than normal, this can be a symptom of disease. Normal body temperature is between 36.5 °C and 37 °C. When it is higher, we have a fever. This is a symptom and may indicate an infectious disease.

Taking someone's pulse

- Touch an artery in the person's wrist or neck with two fingers.
- Count the pulse for 10 seconds.
- Multiply the result by six. This will give you the number of pulsations per minute.



Taking someone's temperature

- Clean the tip of the thermometer with rubbing alcohol.
- Start the thermometer and place it under the person's arm.
- Wait until the thermometer beeps. Remove it and read the temperature.



3. Take your partner's pulse and temperature. Record the results. Compare your results with your partner's.
4. At home, take your pulse and temperature at different times of the day. Record the results in the table.

	when you wake up	before lunch	after lunch	before bed
pulse				
temperature				

5. Analyse your results and answer the questions.
 - a. Are the results the same throughout the day? _____
 - b. If not, how do they change? _____

 - c. What do you think makes them change? _____

Name _____ Date _____

1 Circle eight substances and classify them.

pure substances

p	f	h	g	t	e	g	r
t	a	o	d	o	m	b	j
p	b	n	r	s	w	d	w
s	i	e	l	t	o	p	a
o	x	y	g	e	n	f	t
i	m	p	f	e	r	t	e
l	c	s	i	l	v	e	r
s	s	a	n	d	p	a	h

heterogeneous mixtures

homogeneous mixtures

2 What is the best method to separate each mixture? Explain your answers.

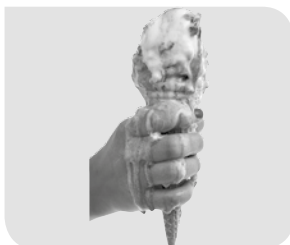
a. water and sand _____

b. water and oil _____

c. water and alcohol _____

d. water and salt _____

3 Label the changes of state.



4 Read and complete the text.

The _____ is a fixed temperature at which a substance changes from liquid to gas. For water, this temperature is _____. The _____ is a fixed temperature at which a substance changes from solid to liquid. For water, this temperature is _____.

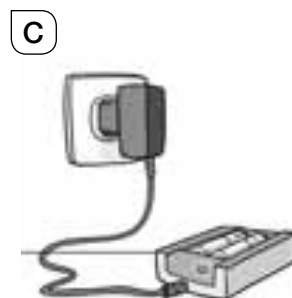
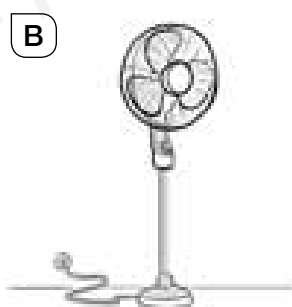
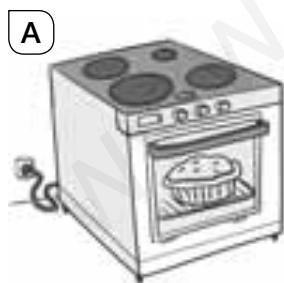


5 Read and write the type of chemical reaction.

- a. Grape juice transforms into wine.
- b. Wood transforms into ash and carbon dioxide.
- c. Milk transforms into yoghurt.
- d. A smooth iron surface becomes brown and rough.
- e. Petrol transforms into carbon dioxide and other gases.

- Now, explain why these are chemical changes and not physical changes.

6 Electrical energy is easily transformed into other forms of energy. Label the form of energy produced by electricity in each picture.



7 A large radiator and a small radiator are both set to 25 °C. Does one have more thermal energy than the other? Which one? Explain.

Name _____ Date _____

Earth, water and fire

Pottery is one of the oldest trades in the world. To shape their ceramic creations, potters only need three elements: earth, water and fire.

They use a special type of earth called clay. When mixed with water, clay becomes easy to mould into different shapes.

Potters shape the clay on a potter's wheel with their hands. A potter's wheel consists of a round table connected to a foot pedal. Stepping on the pedal makes the table spin.

The next step is to bake the pieces at very high temperatures. The clay becomes very hard and impermeable to liquids. It also becomes fire-resistant, which is why we can cook in clay pots without damaging them.

Before baking, potters often paint their pieces, or draw lines and patterns in them while the clay is still soft.

Pottery was invented thousands of years ago, but even today, potters use the same simple techniques.



1 Read the text and answer the questions.

- What do potters need to make ceramics? _____
- Why do they mix clay with water? _____
- How does a potter's wheel work? _____

- How does the clay change when it is baked? _____

2 Choose the correct words. Then, answer the question.

Potters change the *substance* / *shape* of clay on a potter's wheel. In the oven, the water in the clay *evaporates* / *condensates*. The changes to the clay *can* / *cannot* be reversed.

- Does pottery involve physical changes, chemical changes, or both? Explain.

3 Look for ceramic objects at home. Make a list, and draw and describe your favourite piece.

Name _____ Date _____

A tasty mixture

Ana is very excited about tomorrow. It is the local festival in her town, St. Matthew's! Every year, families and friends get together for a picnic to celebrate this holiday. They eat many different foods, including little rolls stuffed with sausage.

It's the job of Ana's father to make the sausage rolls for the picnic. It's no easy task!

First, he makes the dough by mixing wheat flour, salt, water and yeast. He kneads the dough until it forms a homogeneous mixture. Then, he leaves the dough for several hours so fermentation takes place. He again kneads the dough and moulds it into small rolls with a piece of sausage inside. Finally, he bakes them at a high temperature until they are golden-brown.



1 Read the text and answer the questions.

- Which local holiday is celebrated in Ana's town? _____
- How do people celebrate it? _____
- Which food does Ana's father make every year? _____
- What are its main ingredients? _____
- Why is the dough a homogeneous mixture? _____
- Which ingredient allows fermentation to take place? _____

2 Complete the table about the ingredients used for the dough.

	pure substance	mixture	living thing
flour			
water			
salt			
yeast			

3 Write the changes that happen as the rolls are made.

- physical changes: _____
- chemical changes: _____

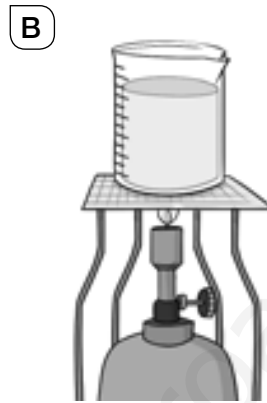
Name _____ Date _____

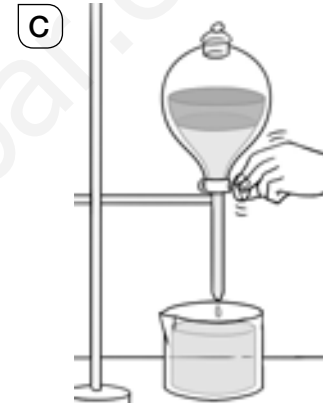
1 Read and write the type of substance. Then, write an example of each.

- a. Two or more indistinguishable components. _____
- b. Two or more distinguishable components. _____
- c. Cannot be separated into other substances. _____

2 Look at the pictures. Write each method of separation, and a mixture it can be used to separate.

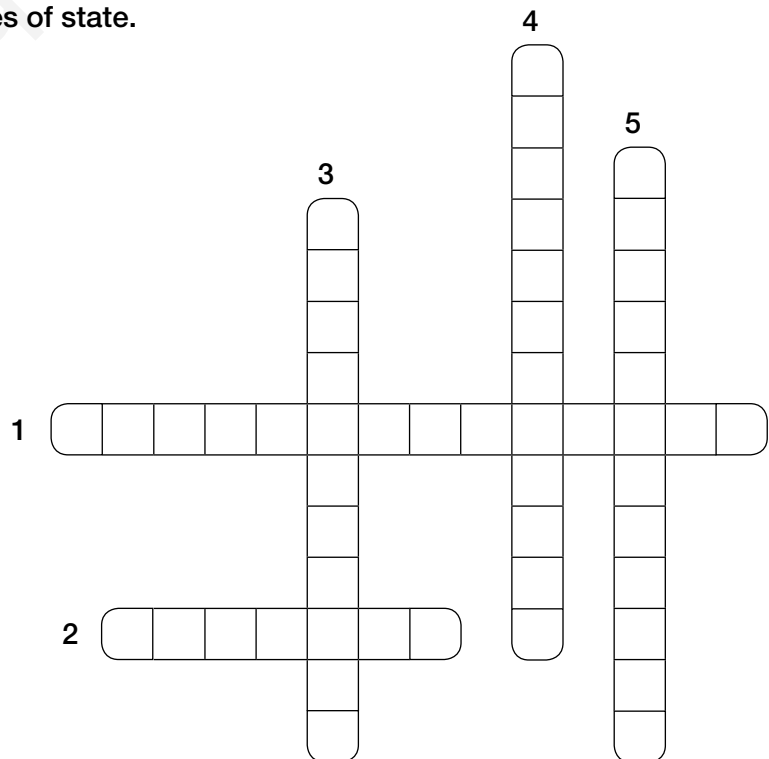






3 Complete the crossword about changes of state. Then, answer the questions.

1. A liquid turns into a solid.
2. A solid turns into a liquid.
3. A solid turns into a gas.
4. A gas turns into a liquid.
5. A liquid turns into a gas.



- What change of state is missing?

- Does it require heating or cooling?

4 Complete the table with the correct temperatures. Then, answer the questions.

0 °C

357 °C

100 °C

-39 °C

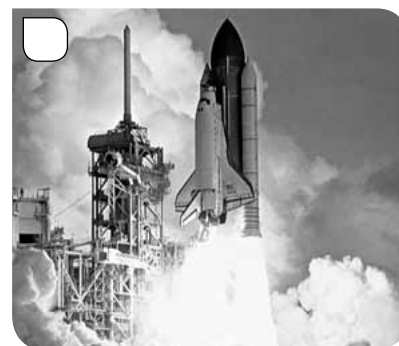
	water	mercury
melting point		
boiling point		

- Which substance requires more heat to change from liquid to gas?

- What state are water and mercury in at -20 °C?

- What state are water and mercury in at 260 °C?

5 Label the photos *C* (combustion), *F* (fermentation) or *O* (oxidation).



6 Read and write *T* (true) or *F* (false). Then, correct the false sentences.

- a. Physical changes produce new substances.
- b. Movement or pressure can cause physical changes in matter.
- c. Substances contract when heated and expand when cooled.
- d. Oxidation and combustion require oxygen to happen.
- e. Fermentation is used to produce some foods.

Name _____ Date _____

1 Water is a pure substance made up of...

- a. hydrogen and oxygen.
- b. hydrogen and helium.
- c. oxygen and helium.

2 Solutions are...

- a. pure substances.
- b. heterogeneous mixtures.
- c. homogeneous mixtures.

3 Solids can be separated from liquids by...

- a. filtration and distillation.
- b. filtration and evaporation.
- c. filtration and decantation.

4 Distillation and decantation can be used to separate mixtures of...

- a. solids and liquids.
- b. solids.
- c. liquids.

5 Physical changes include changes to the...

- a. size, shape, colour or atoms of matter.
- b. size, shape, colour or state of matter.
- c. size, shape, colour or composition of matter.

6 Cooling can cause the following changes of state:

- a. condensation, solidification and reverse sublimation.
- b. condensation, solidification and sublimation.
- c. condensation, vaporization and reverse sublimation.

7 Dew forms as a result of...

- a. evaporation.
- b. condensation.
- c. sublimation.

8 The melting point is the temperature at which...

- a. a liquid changes into a solid.
- b. a liquid changes into a gas.
- c. a solid changes into a liquid.

9 Chemical reactions always produce...

- a. gas.
- b. heat.
- c. new substances.

10 Rust is a result of...

- a. oxidation.
- b. combustion.
- c. fermentation.

Name _____ Date _____

How do you separate a mixture of sand, sawdust and iron filings?

Instructions

1. Work in groups. You need sand, iron filings, sawdust, a watch glass, a beaker, a flask, a funnel, a magnet, a spatula, 2 pieces of filter paper and water.
2. Mix the sand, iron filings and sawdust on a watch glass.
3. Pass the magnet over the mixture to remove the iron filings.
4. Pour the rest of the mixture into a beaker and add some water. Stir and let it rest for a few minutes.
5. Using the spatula, remove the sawdust floating on the surface and place it on a piece of filter paper to dry.
6. Fold the other piece of filter paper into a cone and place it within the funnel. Make sure it is tightly closed at the bottom.
7. Using the funnel, pour the remaining mixture from the beaker into the flask.
8. Reflect on your experiment and answer the questions:



a. What kind of mixture did you make? How do you know?

b. Which methods of separation did you use?

c. Which property allowed you to separate the iron filings? And the sawdust?

d. Look at the picture. Which step of the instructions does it show?

e. Which component of the mixture were you able to separate in step 7?

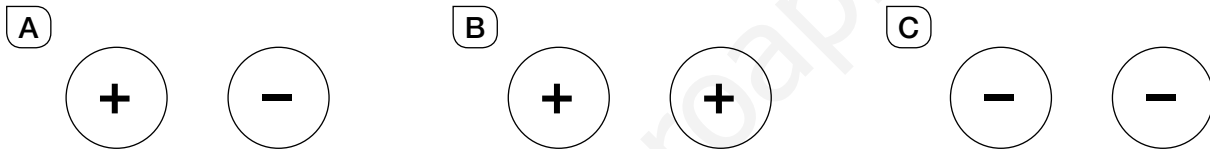
Name _____ Date _____

1 Explain why the pen attracts the pieces of paper.





2 Draw arrows between the electrical charges to show the interaction between them. Then, write a sentence to explain each diagram.

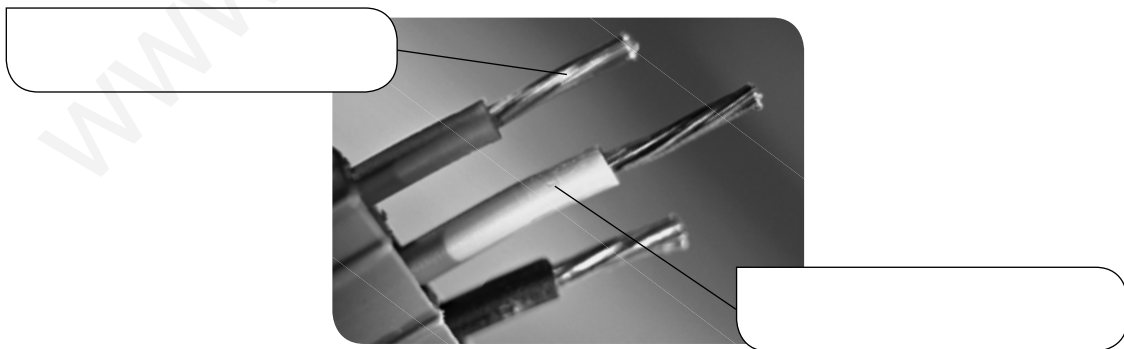


a. _____

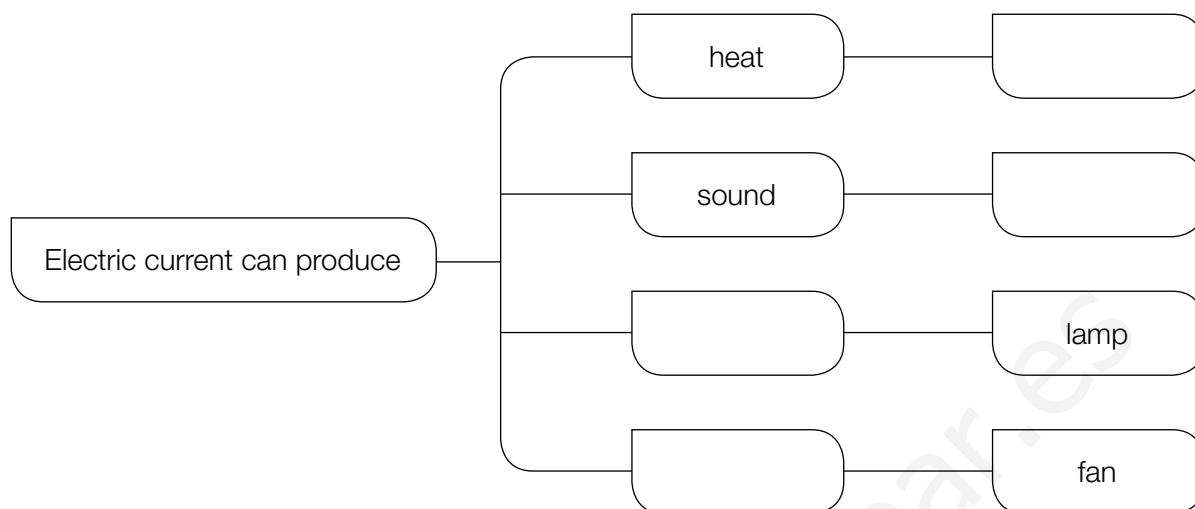
b. _____

c. _____

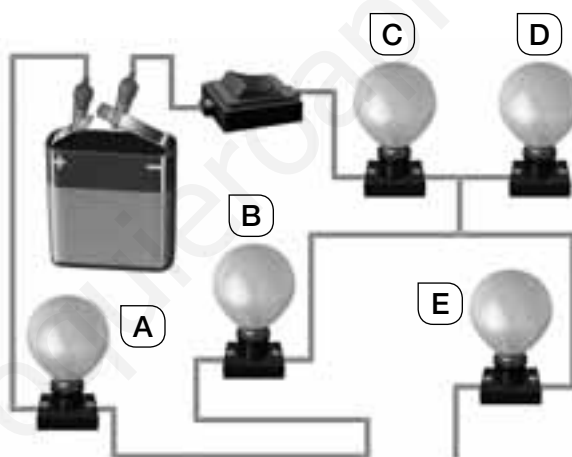
3 Label the materials of the electrical cable. Why are these materials used?



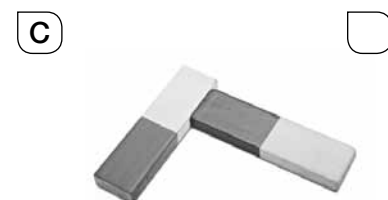
4 Complete the diagram with effects of electric current and an example of each.



5 Look at the diagram. Which bulbs will light up when the switch is on? Explain.



6 Look at the photos and write *repel*, *attract* or *no effect*. Tick (✓) the electromagnet.



Name _____ Date _____

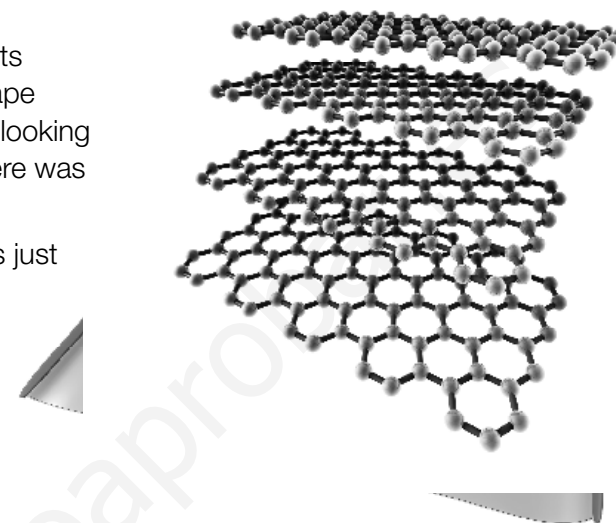
Graphene

Because of its unique properties, graphene is considered the material of the future. It is transparent and thinner than a sheet of paper, but it is much stronger than steel! In addition, graphene is a better conductor of electricity than copper.

Graphene was discovered accidentally by two scientists at the University of Manchester. They pressed some tape over a thin layer of graphite and peeled it away. When looking at the tape under the microscope, they discovered there was a single atomic layer of graphite.

Graphene basically consists of a layer of carbon that is just one atom thick. The atoms are arranged in a regular hexagonal pattern, like a honeycomb. This extremely light, two-dimensional structure allows electrons to pass through easily, which makes graphene a very efficient conductor of electricity.

Graphene has many technological applications. It can be used to make more efficient solar cells, optical devices, and advanced batteries with greater storage capacity. However, it may be particularly useful in the field of flexible electronics, to build faster, lighter and stronger personal communication devices.



1 Read the text and complete the index card.

GRAPHENE	
Description:	_____
Properties:	_____
Uses:	_____

2 Search the Internet for more information about graphene. What else is it used for?

Name _____ Date _____

Blackout!

Last Wednesday there was a big storm where Laura lives. Lightning lit up the sky, and thunder roared above the city. Finally, the storm caused a blackout, making the city go dark. Laura felt scared. Her mum lit some candles and gave her a torch. Then, her dad rang her mum's mobile phone to ask if they were OK.

Feeling better, Laura tried to turn on the television, but it didn't work. She soon realized that many other things don't work without electricity. Her computer wouldn't start. Her tablet's battery had run out and there was no way to charge it. Life without electricity was definitely different...

Since there was nothing they could do about it, Laura and her mum sat down to read a book by the light of the torch. In the end, Laura began to enjoy the blackout!



1 Read the text and answer the questions.

- What is a blackout? _____
- What caused the blackout in Laura's city? _____
- How did it affect Laura? _____
- What two electrical devices worked during the blackout? How? _____

- How did she feel in the end? _____

2 Draw a circuit diagram of the electric circuit inside Laura's torch.

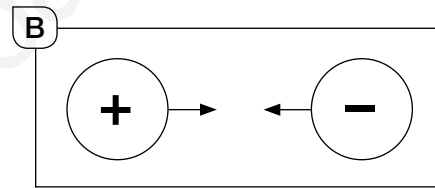
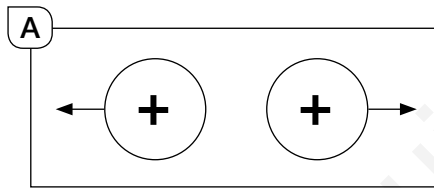
Name _____ Date _____

1 Look at the picture and answer the questions.



- How are the objects in A electrically charged? _____
- How are the objects in C electrically charged? _____
- What is happening in B? _____

2 Look at the diagrams. Explain the interaction between electrical charges in each.



3 Use the words to write sentences about conductors and insulators.

plastic - water - flows easily - electric current - air -
does not flow - glass - wood - metals

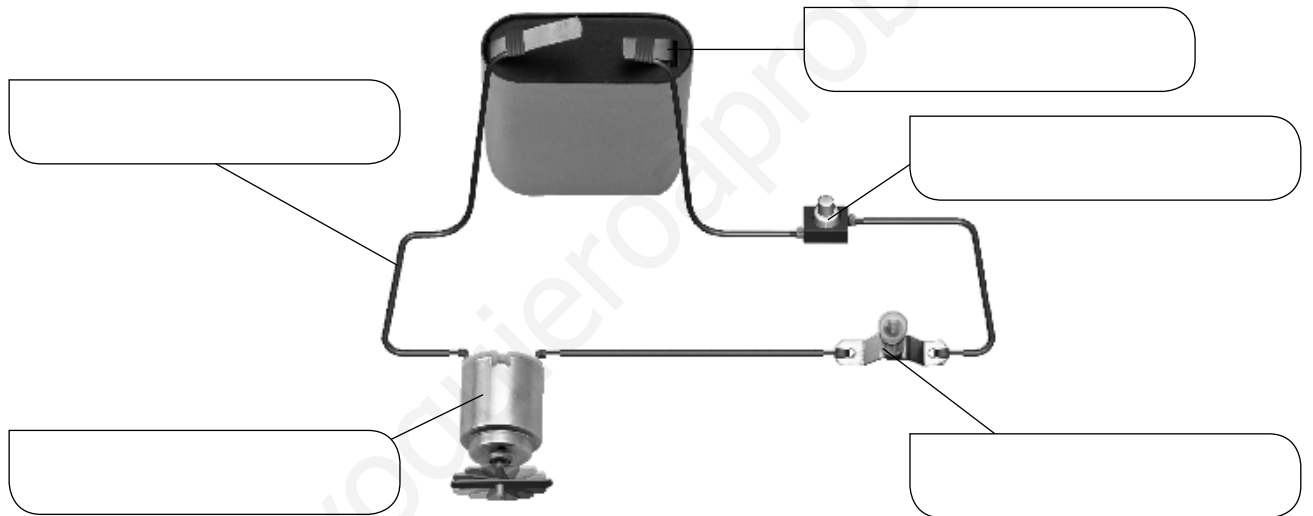
conductors

insulators

4 Look at the photographs and write the effect of electric current.



5 Label the electric circuit. Then, choose three components and write a sentence about each one.



- _____
- _____
- _____

6 Complete the sentences about magnetism.

- a. A magnet attracts objects made of _____ and other magnetic _____.
- b. There are natural magnets, like _____, and _____ magnets.
- c. _____ poles of magnets attract and same poles of magnets _____.
- d. The Earth is a giant _____ with two _____.
- e. The red end of the _____ on a compass always points _____.
- f. An _____ is a magnet that only works with _____.

Name _____ Date _____

- 1** There are electrical charges in...
 - a. all objects.
 - b. some objects.
 - c. objects in movement.
- 2** Objects are...
 - a. usually electrically positive.
 - b. usually electrically neutral.
 - c. electrically negative until we rub them against something.
- 3** Objects with opposite charges...
 - a. attract.
 - b. repel.
 - c. do not affect each other.
- 4** An electric current...
 - a. can only flow through insulators.
 - b. cannot be transformed into other forms of energy.
 - c. is the flow of electrical charges through materials.
- 5** Electric current does not flow through insulators because they...
 - a. do not allow electrical charges to move.
 - b. are extremely hard materials.
 - c. are not connected to an electric circuit.
- 6** In an electric circuit, the switch...
 - a. transports electricity.
 - b. transforms electricity into light energy.
 - c. controls the flow of electricity.
- 7** When we plug in a drill, the electric current produces...
 - a. magnetism.
 - b. movement.
 - c. light.
- 8** The two poles of a magnet are known as...
 - a. the north magnetic pole and the south magnetic pole.
 - b. the opposite pole and the same pole.
 - c. the positive pole and the negative pole.
- 9** The red end of a compass needle always points north because of the Earth's...
 - a. gravity.
 - b. magnetism.
 - c. shape.
- 10** An iron core surrounded by a coil of wire is called...
 - a. a generator.
 - b. a battery.
 - c. an electromagnet.

Name _____ Date _____

Make a timeline of the major advances in the field of electricity

The 19th century was a time of major advances in many fields of human knowledge. Electricity was one of these, and many devices we still use today were invented in this period. You are going to research some of the devices.

Instructions

1. Work in groups of four. You need: a long strip of white card, felt-tip pens, scissors and glue.
2. Search the Internet for information about these advances in the field of electricity:
 - the telegraph
 - the radio
 - the electromagnet
 - the voltaic battery
 - the incandescent light bulb
 - the electric generator
3. Find out who invented these devices and when.
4. Draw a timeline on a strip of card.
5. Put the information you found out in the correct place on the timeline.
6. Find pictures of the inventors to illustrate your timeline.
7. Glue the pictures in the corresponding places on your timeline.



the telegraph



the radio



the incandescent light bulb

8. Display your timeline and present it to the class.

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