PRIMARY 5

Natural Science

TEACHER'S RESOURCE BOOK

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Natural Science 5 is a collective work, conceived, designed and created by the Primary Education department at Santillana, under the supervision of **Antonio Brandi Fernández**.

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Contents

Introduction

Natural Science 5 Teacher's Resource Book provides a wide variety of photocopiable worksheets designed to complement **Natural Science 5 Student's Book** and **Natural Science 5 Teacher's Book**. It is divided into 12 topics in order to cover the main concepts of both the National Curriculum and the curriculum established by the Community of Madrid.

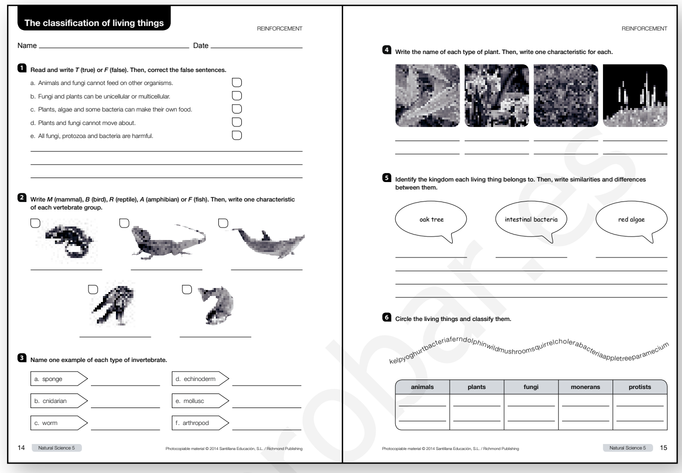
These worksheets facilitate a flexible approach in the classroom. Students in the same class can be given different worksheets. Stronger students can expand on the material learnt in class. Weaker students can use the worksheets to revise. Alternatively, students can work together with stronger peers to complete the tasks. 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 at the back of this book.

Worksheets

Reinforcement worksheets

There are twelve double-page **Reinforcement worksheets**. 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. Depending on the students, they can complete the worksheets with or without consulting their Student's Books, in the classroom or at home, individually or in pairs.


The classification of living things — REINFORCEMENT

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 — b. cnidarian — c. worm — d. echinoderm — e. mollusc — f. arthropod

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

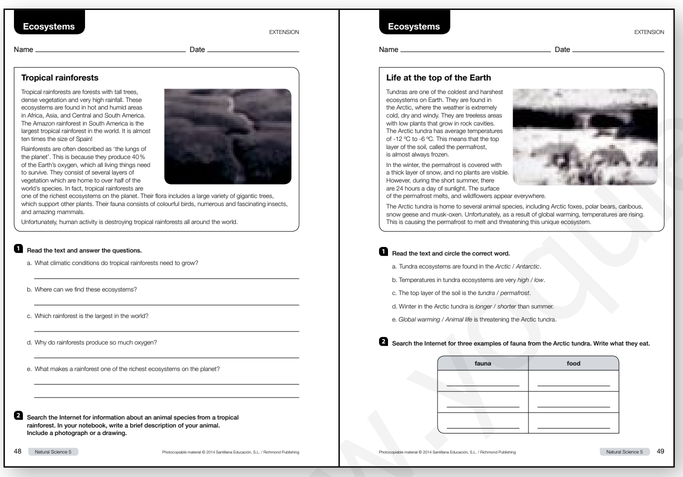
5 Identify the kingdom each living thing belongs to. Then, write similarities and differences between them.

oak tree — intestinal bacteria — red algae

6 Circle the living things and classify them.

animals	plants	fungi	monerans	protists

Extension worksheets


Ecosystems — EXTENSION

Name ____ Date ____

Tropical rainforests

1 Read the text and answer the questions.

a. What climatic conditions do tropical rainforests need to grow?
b. Where can we find these ecosystems?
c. Which rainforest is the largest in the world?
d. Why do rainforests produce so much oxygen?
e. What makes a rainforest one of the richest ecosystems on the planet?

2 Search the Internet for information about an animal species from a tropical rainforest. In your notebook, write a brief description of your animal. Include a photograph or a drawing.

Ecosystems — EXTENSION

Life at the top of the Earth

1 Read the text and circle the correct word.

a. Tundra ecosystems are found in the *Arctic / Antarctic*.
b. Temperatures in tundra ecosystems are very *high / low*.
c. The top layer of the soil is the *tundra / permafrost*.
d. Winter in the Arctic tundra is *longer / shorter* than summer.
e. *Global warming / Animal life* is threatening the Arctic tundra.

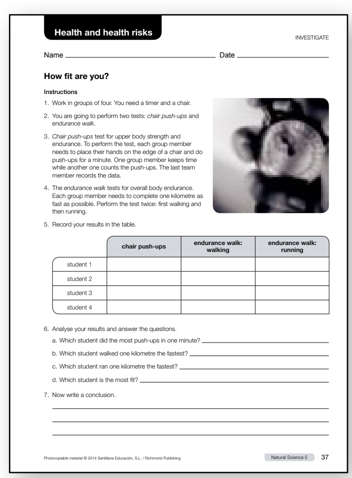
2 Search the Internet for three examples of fauna from the Arctic tundra. Write what they eat.

fauna	food

There are twenty-four **Extension worksheets**. These worksheets can be used for fast finishers or to expand on the material covered in class.

Investigate worksheets

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


Health and health risks — INVESTIGATE

Name ____ Date ____

How fit are you?

Instructions

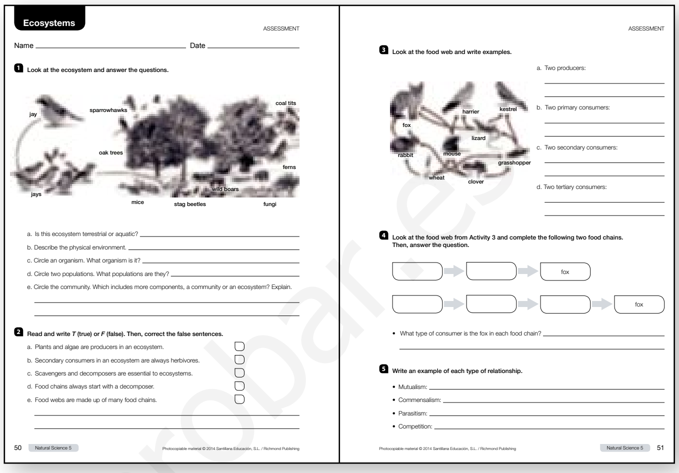
1. Work in groups of four. You need a timer and a chair.
2. You are going to perform two tests: *chair push-ups* and *endurance walk*.
5. Record your results in the table.

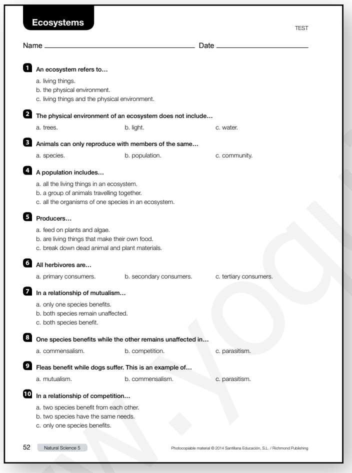
	chair push-ups	endurance walk: walking	endurance walk: running
student 1			
student 2			
student 3			
student 4			

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.

Assessment worksheets

There are twelve double-page **Assessment worksheets**, one for each topic. These worksheets can be given to students once the topic has been completed, as a revision test, or to check progress at any point during the year.



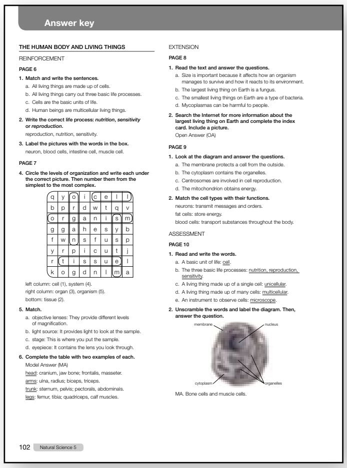


Tests

There are twelve **multiple-choice tests**, one for each topic. These tests are to be completed once the topic has been studied. The tests provide students the opportunity to revise the main concepts of each topic and to assess the knowledge they have acquired.

Answer key

An **Answer key** for all the worksheets is provided at the back of this **Teacher's Resource Book**.



Name _____ Date _____

1 **Match and write the sentences.**

a. All living things are

b. All living things carry out

c. Cells are

d. Human beings are

the basic units of life.

made up of cells.

three basic life processes.

multicellular living things.

_____

_____

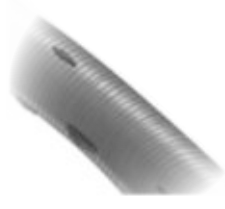
_____

_____

2 **Write the correct life process: *nutrition, sensitivity* or *reproduction*.**

3 **Label the pictures with the words in the box.**

blood cells - muscle cell - intestine cell - neuron



_____ _____ _____ _____

4 **Circle the levels of organization and write each under the correct picture. 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 **Match.**

a. objective lenses	It contains the lens you look through.
b. light source	This is where you put the sample.
c. stage	They provide different levels of magnification.
d. eyepiece	It provides light to look at the sample.

6 **Complete the table with two examples of each.**

	head	arms	trunk	legs
bones				
muscles				

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.**

a. Why is size important for living things? _____

b. Which living thing is the largest on Earth? _____

c. What type of organism are the smallest living things on Earth? _____

d. 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: _____

Area it covers: _____

Age: _____

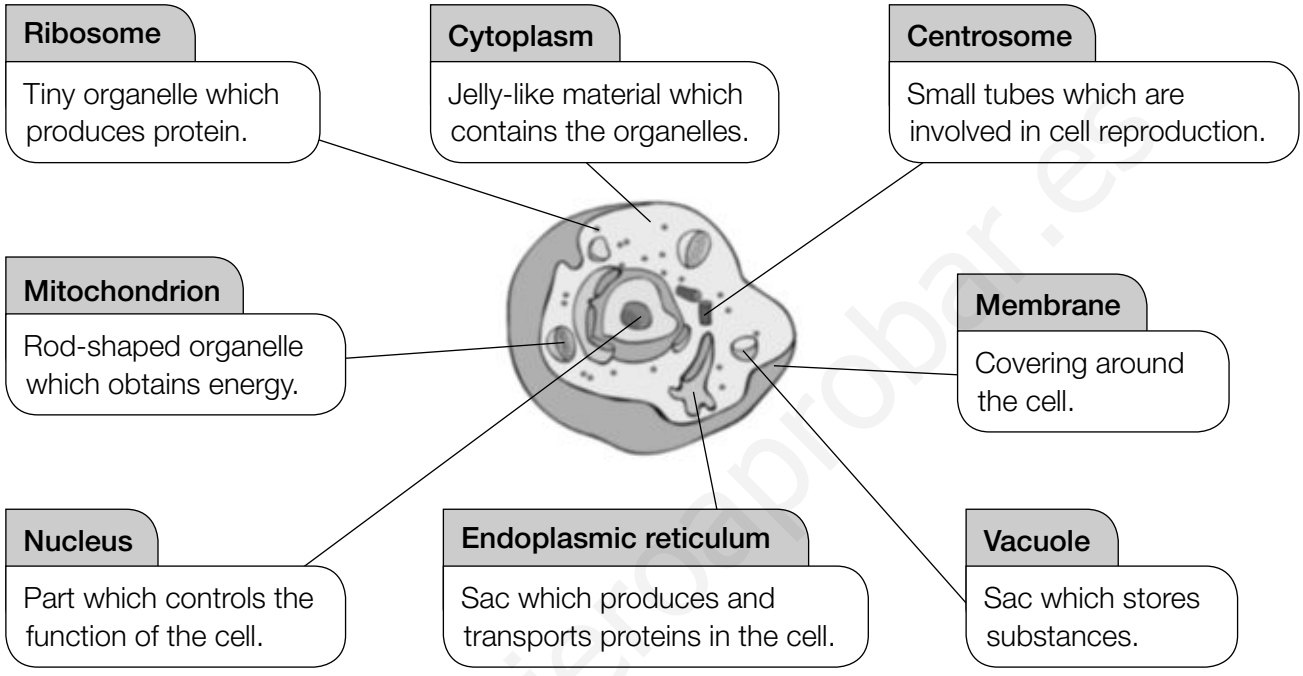
Other characteristics: _____

_____

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.**

a. Which part of the cell protects it from the outside? _____

b. Which part of the cell contains the organelles? _____

c. Which parts of the cell are involved in cell reproduction? _____

d. Which part of the cell obtains energy? _____

2 **Match the cell types with their functions.**

neurons 	store energy
fat cells 	transport substances throughout the body
blood cells 	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 **Unscramble the words and label the diagram. Then, answer the question.**

ramenbem	cusenlu	latcopsym	saglerenlo

- Can you name two types of cells in the human body? _____

_____

3 **Write the next four levels of organization of the human body.**

Cells ► _____ ► _____ ► _____ ► _____

- Then, write a sentence with these words.

human body	work together	organism functions correctly

_____

_____

_____

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

a. Multicellular living things are made up of the same type of cells. ☐

b. All cells in a tissue perform the same function. ☐

c. The stomach and the heart are tissues in the human body. ☐

d. Systems are made up of organs with a common function. ☐

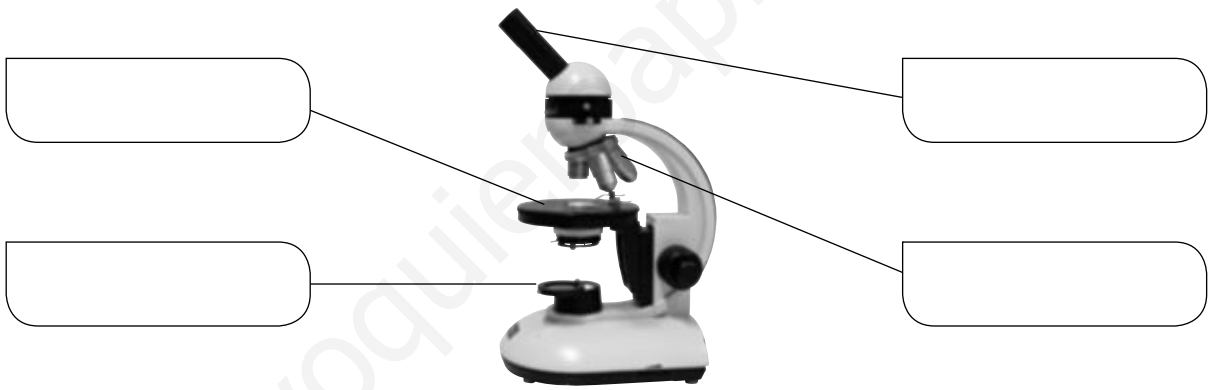
e. Organisms are made up of different systems. ☐

_____

_____

5 **Label the parts of the microscope. Then, answer the question.**

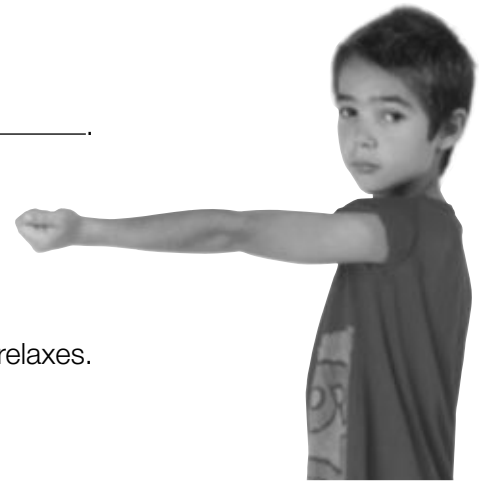
eyepiece | objective lens | stage | light source



- Which parts of the microscope are responsible for the different levels of magnification?

_____

6 **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.

The human body and living things

TEST

Name _____ Date _____

1 **All living things carry out three life processes: nutrition, sensitivity and...**

a. organization. b. reproduction. c. changing.

2 **Human beings are multicellular because...**

a. they are made up of millions of cells.
b. they are made up of cells with a multicellular structure.
c. they are made up of hundreds of cells.

3 **The stage is the part of the microscope...**

a. which magnifies the sample.
b. where you put the sample.
c. which provides light.

4 **Neurons are...**

a. elongated. b. round. c. star-shaped.

5 **In multicellular livings things, cells of the same type join together to form...**

a. organs. b. tissues. c. systems.

6 **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.

7 **Our body takes its shape from the...**

a. skeletal system.
b. muscular system.
c. skeletal system and the muscular system.

8 **Bones meet at...**

a. tendons. b. ligaments. c. joints.

9 **Our muscles are long and thin when...**

a. they are relaxed.
b. we are playing sports.
c. we lift heavy objects.

10 **Most muscles in the locomotor system work...**

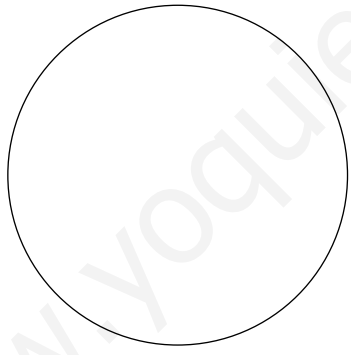
a. in groups. b. in pairs. c. individually.

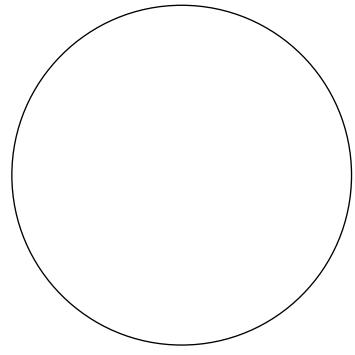
Name _____ Date _____

What are the cells of a human cheek like?

Instructions

1. Work with a partner. You need 2 toothpicks, a microscope, 2 microscope slides, 2 cover slips, an eye dropper and some iodine solution.
2. Using the dropper, put a drop of iodine solution on the centre of the microscope slide.
3. Gently scrape the inside lining of your cheek with the end of the toothpick.
4. Put the scrapings in the drop of iodine solution on the microscope slide.
5. Cover the sample with the cover slip. Make sure there are no bubbles.
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: *membrane*, *nucleus* and *cytoplasm*.

The classification of living things

REINFORCEMENT

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 _____

b. cnidarian _____

c. worm _____

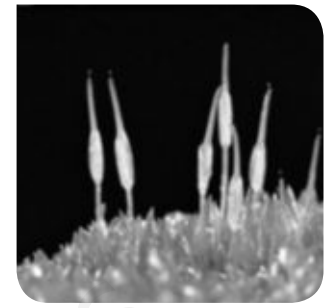
d. echinoderm _____

e. mollusc _____

f. arthropod _____

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

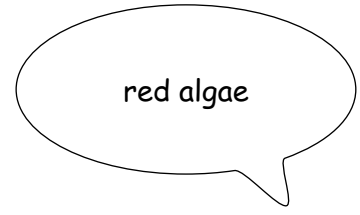


_____ _____ _____ _____

_____ _____ _____ _____

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



_____ _____ _____

_____

_____

_____

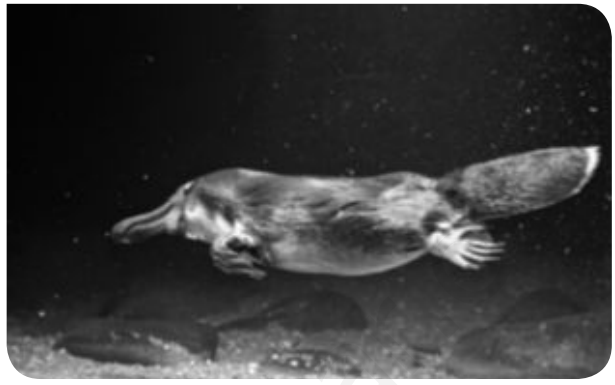
6 **Circle the living things and classify them.**

kelpyoghurtbacteriaferndolphinwildmushroomsquirrelcholerabacteriaappletreeparamecium

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.**

a. The platypus is a *freshwater* / *saltwater* mammal.

b. It lays eggs in *the water* / *burrows*.

c. Its body is covered with *fur* / *feathers*.

d. It has *teeth* / *a bill*.

e. 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 accidently 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.**

a. Who was Alexander Fleming? _____

b. What did he accidently discover? _____

c. Which living thing produced this substance? _____

d. What did he observe? _____

e. Why was his discovery so important? _____

f. What was the nickname for penicillin? _____

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

antibiotic	description	use

The classification of living things

ASSESSMENT

Name _____ Date _____

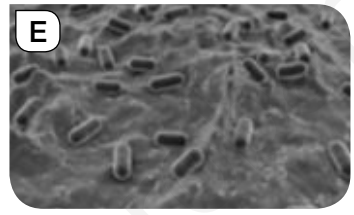
1 **Identify and label the five kingdoms of living things.**

_____

_____

_____

_____



_____

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. _____

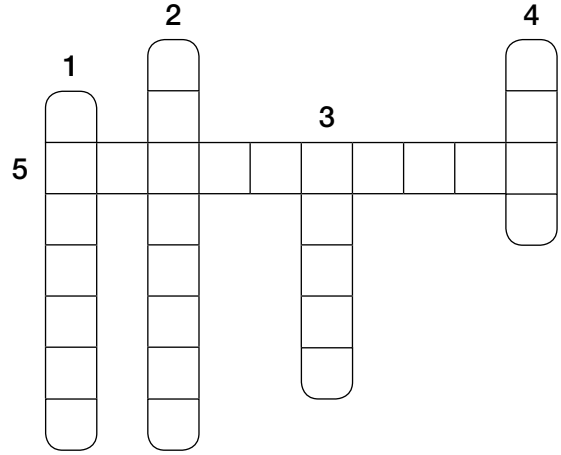
c. They can make their own food. They cannot move about. _____

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: _____

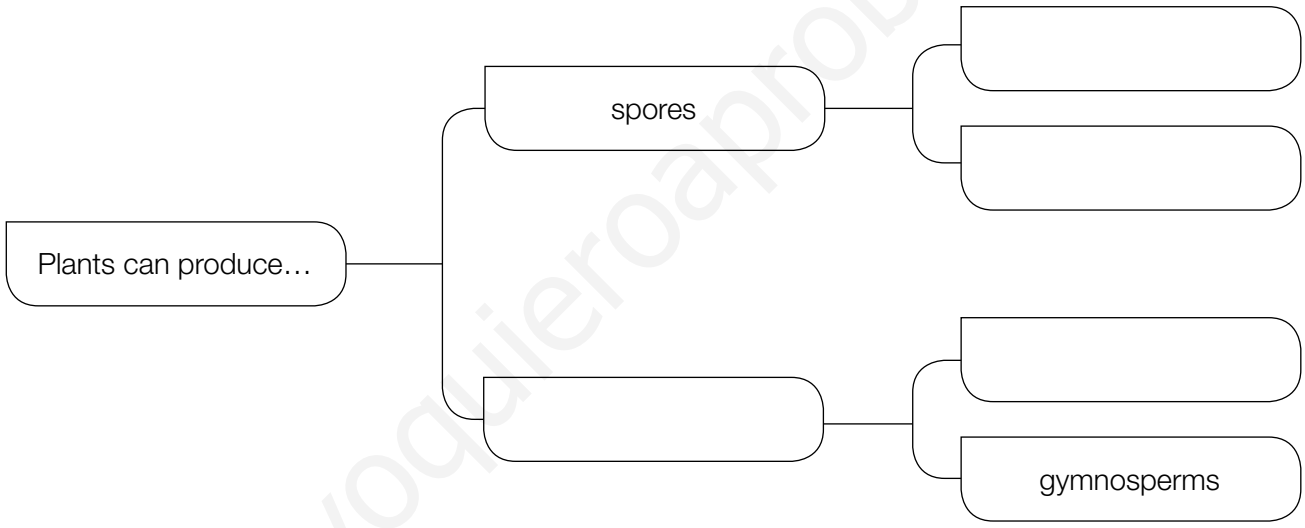
_____

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.**

_____

_____

The classification of living things

TEST

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...**

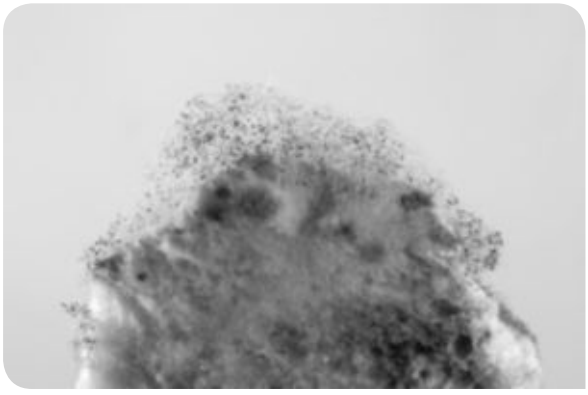
a. algae and protozoa. b. algae and bacteria. c. algae and viruses.

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.

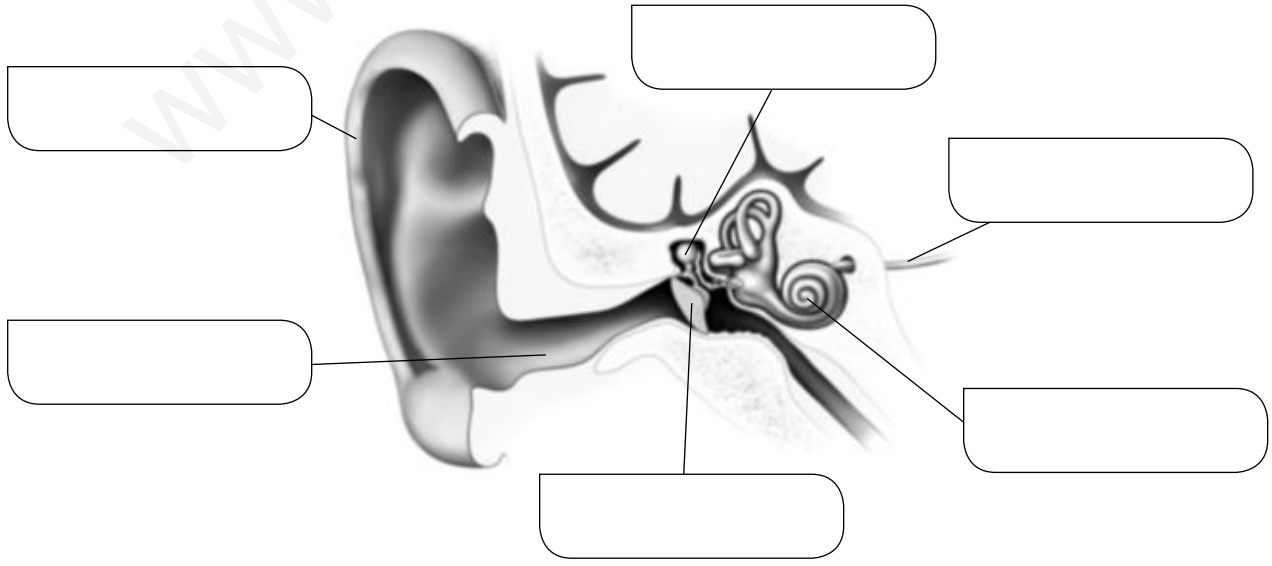
☐ Our heart is beating at all times.

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

a. The nervous system is made up of the central and peripheral nervous systems. ☐

b. Nervous tissue is made up of neurons. ☐

c. The central nervous system is made up of the brain and nerves. ☐

d. The spinal cord produces the response when we touch something hot. ☐

e. The central nervous system extends throughout the body. ☐

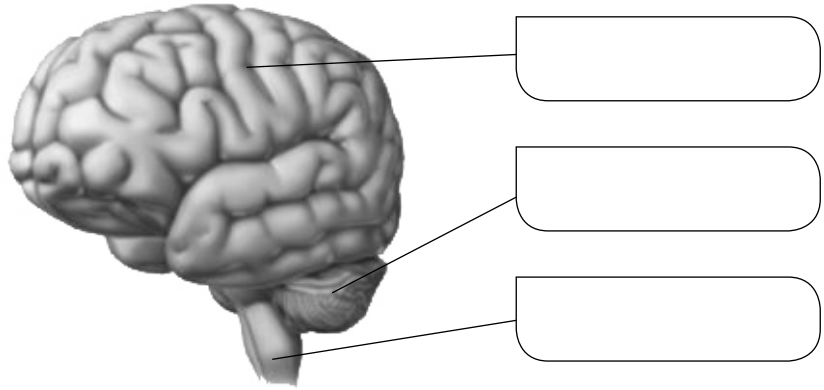
f. Sensory nerves connect the receptors in the sense organs to motor nerves. ☐

_____

_____

_____

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



_____

_____

_____

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.**

Sensitivity and the senses

Name _____ Date _____

1 **Read the definitions and write the words.**

a. Changes in the external environment: _____

b. Organs that capture information from the environment: _____

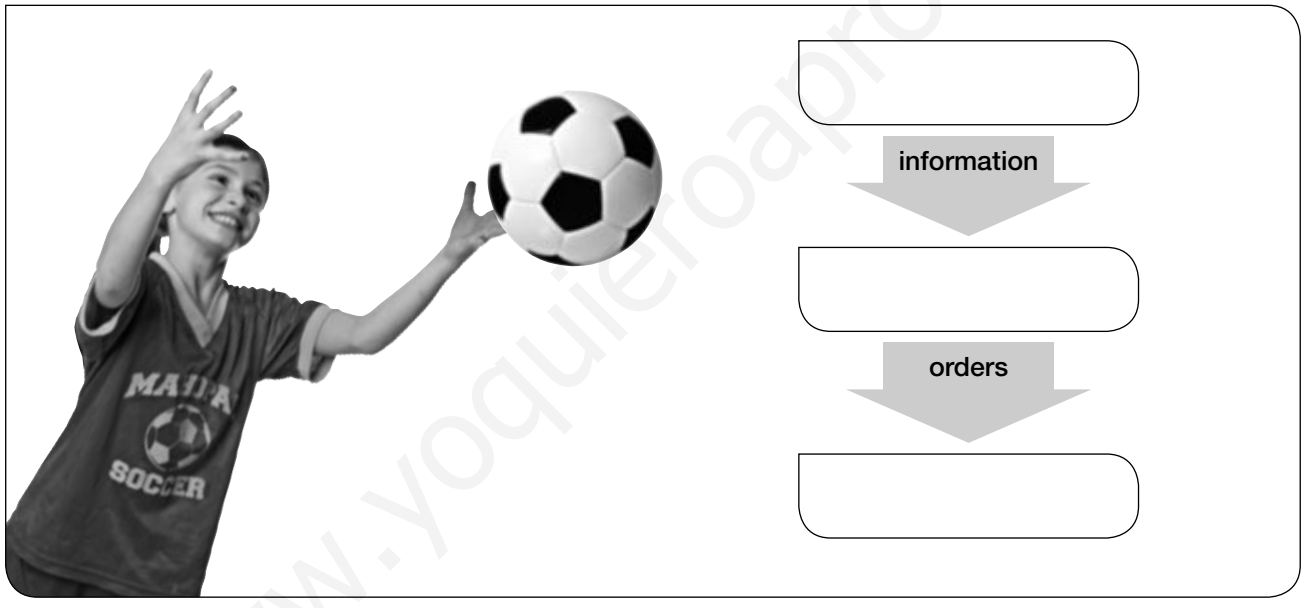
c. Groups of specialized cells that are sensitive to stimuli: _____

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 (✗) 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 diagram of the sense organ for each sense. Then, label the part of each sense organ where the receptors are located.**

sight

touch

taste

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

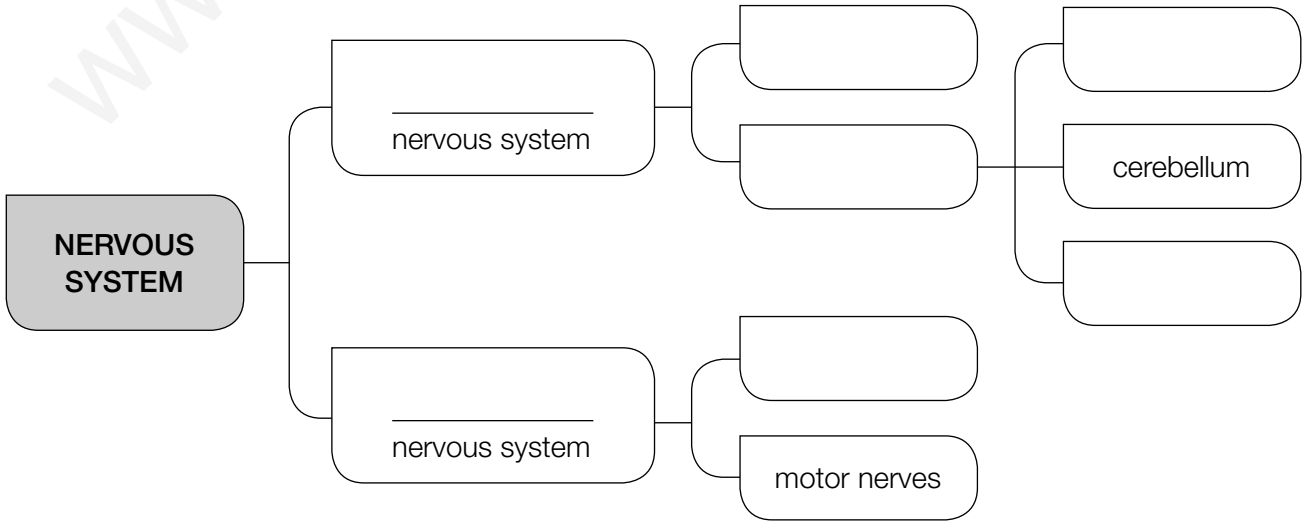
dendrites

axon

body

- _____
- _____
- _____

6 **Complete the chart about the nervous system.**



Sensitivity and the senses

TEST

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 **Neurons are divided into...**

a. three parts: the body, the dendrites and the axon.
b. three parts: the body, the dendrites and the nervous tissue.
c. two parts: the body and the dendrites.

8 **The brain and the spinal cord are parts of...**

a. the cerebrum.
b. the central nervous system.
c. the peripheral nervous system.

9 **The brain is divided into...**

a. the cerebrum and the cerebellum.
b. the cerebellum and the spinal cord.
c. the cerebrum, the cerebellum and the brainstem.

10 **The peripheral nervous system consists of...**

a. sensory and motor nerves.
b. nervous cells.
c. the sense organs and the motor nerves.

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.

   _____

   _____

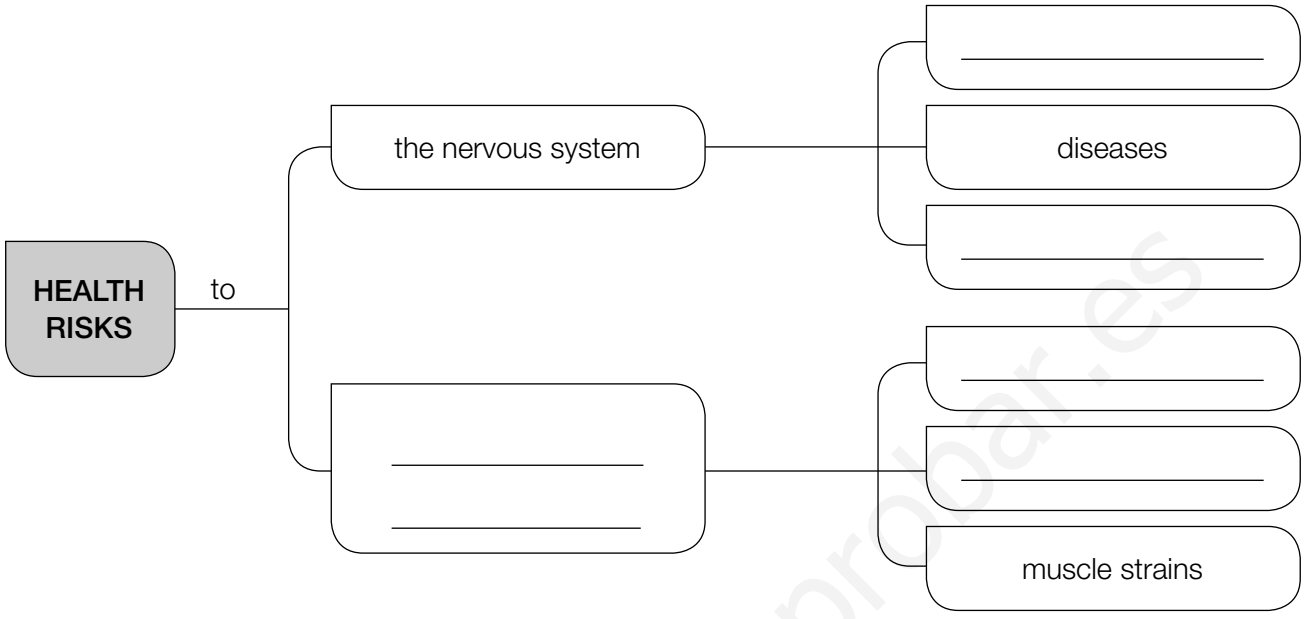
   _____

Health and health risks

REINFORCEMENT

Name _____ Date _____

1 **Complete the chart.**



2 **Use the words in the box to write sentences about damage to the nervous system.**

tremors - injuries - memory - vision - brain - reflexes - spinal cord

accidents _____

diseases _____

alcohol _____

3 **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 type of injury is most common in joints? _____
- Which type of injury may result from bad posture? _____

4 **Tick (✓) the activities that help to keep the locomotor system in shape, and cross (✘) the ones that do not.**




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

a. Healthy habits are important for our nervous and locomotor systems. ☐

b. Physical activity always refers to sports. ☐

c. Good posture is only important when you sit. ☐

d. Bone growth requires mainly vitamin C. ☐

e. When we sleep, our locomotor system rests and our brain sorts and stores information. ☐

_____

_____

_____

6 **Match. Then, write some examples of your own healthy habits.**

- swimming
- eating oily fish
- walking to school
- reading
- drinking milk
- playing cards

leisure

physical activity

healthy diet

- _____
- _____
- _____
- _____
- _____

Name _____ Date _____

Bones at work

A bone can break in two 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.**

a. Which types of bone fractures can you name? _____

b. Which type of bone fracture is hardest to heal? _____

c. What happens right after a bone breaks? _____

_____

d. What does the first team of cells do? _____

e. What does the second team of cells do? _____

f. 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 _____

Food allergies

A food allergy is a reaction of the body's immune system to a particular substance in food. In other words, the body identifies a specific substance, called a food allergen, as harmful.

Allergic reactions vary from person to person. Some people experience irritation of the eyes or skin. Food allergens can also cause disorders of the digestive system, such as nausea and vomiting, or disorders of the respiratory system, such as difficulty breathing. They can cause disorders of the circulatory system, too. When allergies affect the respiratory or circulatory systems, the reaction can be fatal, so emergency care may be needed.

The most common allergies in children are allergies to peanuts and other nuts, milk, wheat, eggs and shellfish. Peanut allergy can have very serious consequences. However, as children get older, they often outgrow allergies, especially allergies to milk and eggs.

It is extremely important to diagnose food allergies correctly. People with these allergies have to follow a strict diet and avoid eating certain foods.

1 **Read the text and answer the questions.**

a. What is a food allergy? _____

b. What type of body reactions can food allergens cause? _____

c. What are the most common food allergies in children? _____

d. Which other products, besides milk, should a person with a milk allergy avoid? _____

_____

e. Which typical food allergies can children outgrow? _____

f. What is the best way to control food allergies? _____

2 **Do a survey to find out how many people in your class have food allergies. Which allergies are the most common? Write the results in your notebook.**

allergy to peanuts and other nuts	allergy to shellfish	allergy to milk	allergy to wheat	allergy to eggs	allergy to other foods

Health and health risks

ASSESSMENT

Name _____ Date _____

1 **Read the sentences and write the words.**

a. These cause injuries to the brain and spinal cords: _____

b. This disease usually affects the elderly: _____

c. This substance can affect the brain: _____

d. This happens when a bone breaks or cracks: _____

e. This involves damage to a ligament: _____

f. This is caused by excessive effort or bad posture: _____

2 **Cross out (✗) the odd one out. Then, write the corresponding damage to the nervous system.**

a. diving	paralysis	brain	spinal cord	_____
b. disease	memory	tremors	muscle control	_____
c. brain	reflexes	vision	spinal cord	_____

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

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

_____ _____

_____ _____

_____ _____

_____ _____

4 **Complete the sentences with the correct words.**

stretching - helmet - prevent - muscles - protective clothing - elasticity

a. When we do physical activity, we develop _____ and strengthen our _____ and bones.

b. We can _____ injuries by warming up and _____ before and after exercising.

c. We can avoid sport accidents by wearing a _____ and _____ _____.

5 **Tick (✓) the photos that show good posture. Then, write a sentence about each one.**

a. _____

b. _____

c. _____

6 **Write a sentence with each group of words.**

calcium	vitamin D	bones
sleep	rest	brain
leisure	relax	health

_____

_____

_____

Health and health risks

TEST

Name _____ Date _____

1 **The nervous system can be damaged due to...**

a. accidents and viruses.
b. illnesses and alcohol.
c. accidents, diseases and alcohol.

2 **Alzheimer's disease...**

a. involves a loss of memory.
b. can cause lack of muscle control.
c. can lead to involuntary tremors.

3 **The term *alcoholism*...**

a. means the sale of alcohol.
b. refers to a chronic disease.
c. is another word for a drink.

4 **A sprain is an injury that involves damage to...**

a. the bones. b. the tendons. c. the ligaments.

5 **A muscle strain is usually caused by...**

a. twisting. b. excessive effort. c. a broken bone.

6 **In order to keep our nervous and locomotor systems healthy, we need to...**

a. do some physical activity.
b. play videogames several times a week.
c. sleep 6 hours per day.

7 **To prevent sports injuries, ...**

a. we must run for an hour.
b. we have to drink water.
c. we should always warm up and stretch.

8 **It is important to keep good posture to...**

a. be healthy. b. cause back pain. c. play sports.

9 **Bone growth requires...**

a. calcium and vitamin D. b. sugar. c. water and sugar.

10 **Children should sleep...**

a. 6 hours per day. b. 8 hours per day. c. 10 hours per day.

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 *endurance walk*.
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 *endurance walk* 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	endurance walk: walking	endurance walk: 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.

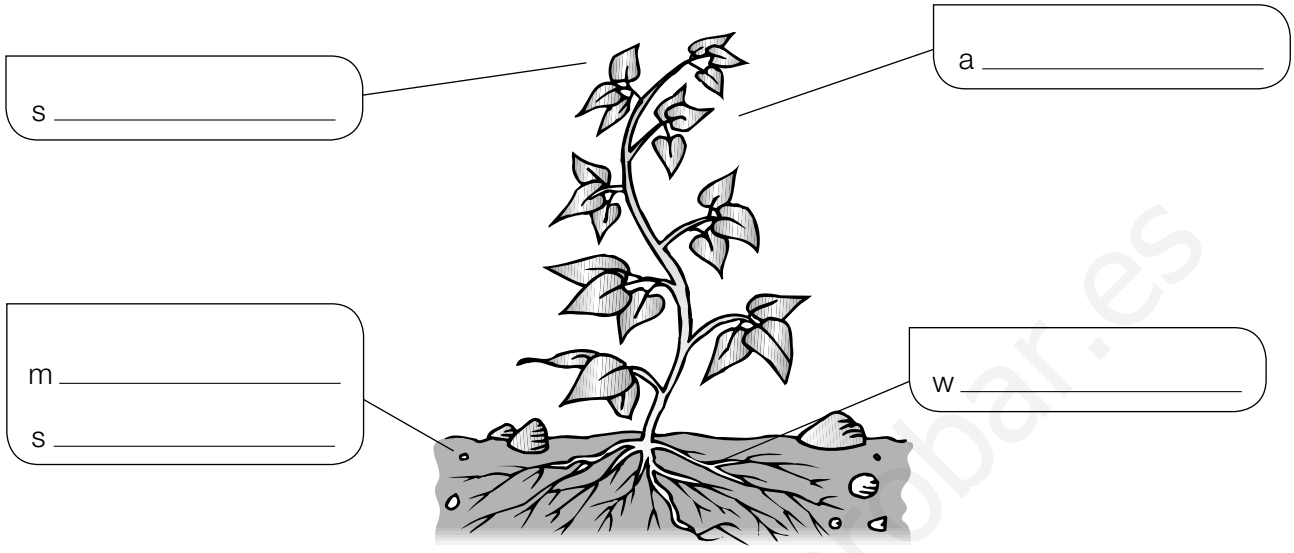
_____

_____

_____

Name _____ Date _____

1 **What do plants need? Label the drawing.**



2 **Where can these plants grow? Write *a bright area*, *a humid area* or *a hot area*.**

_____

_____

_____

3 **Complete the sentences.**

- Plants take in _____ _____ from the air to make their _____.
- _____ soil is rich in water and _____ _____.

4 **Match the columns using three different colours.**

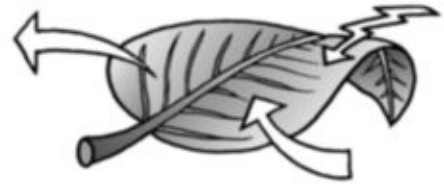
Fir trees		mild temperatures.
Beech trees	grow well in	high temperatures.
Palm trees		low temperatures.

5 **Match the sentences about plant nutrition. Then, number them in order.**

☐ a. Raw sap and carbon dioxide transform into	through xylem vessels.
☐ b. Plants take in carbon dioxide	through stomata in the leaves.
☐ c. Raw sap travels up from the roots	elaborated sap through photosynthesis.
☐ d. Sunlight is trapped by	through phloem vessels.
☐ e. Plants absorb water and mineral salts	through their roots.
☐ f. Elaborated sap is distributed	chlorophyll found in the leaves and stem.

6 **Colour the arrows green for oxygen and red for carbon dioxide.**

photosynthesis



respiration

7 **Complete the text about gas exchange in plants.**

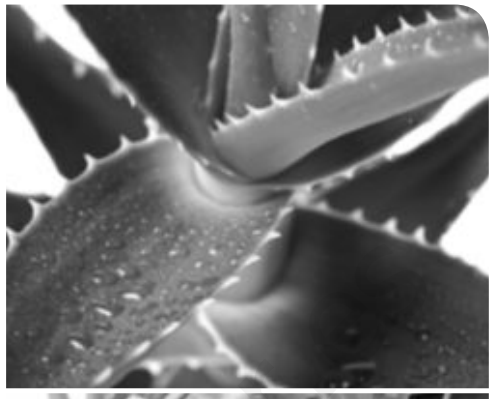
Through photosynthesis, plants take in _____ and release _____ during the day. Through respiration, plants take in _____ and release _____ during the day and at night. Plants produce more _____ than they take in.

Name _____ Date _____

How plants adapt

In order to survive, plants have developed specific adaptations to the conditions in different areas. Some examples are:

- In areas where water is scarce, plants grow further apart. They may have waxy leaves, or some have no leaves at all. This helps to reduce loss of water through evaporation.
- In areas with less light and cool temperatures, trees have broad leaves to absorb lots of sunlight. They have thick bark to protect themselves against cold winters.
- In areas with cold temperatures, trees have needle-like leaves to help to reduce loss of water and to allow snow to fall off more easily. Their leaves are dark in colour to absorb sunlight and heat.
- In areas with very cold temperatures, plants are small. By growing close to the ground, they keep warm. Their leaves are dark in colour to absorb sunlight and heat. Plants in cold areas grow in groups to keep out the wind and cold air.



1 **Read the text. Choose one adaptation per area and complete the table.**

type of area	plant adaptation	reason for adaptation

2 **Research how cactuses adapt to desert conditions and write a brief description.**

_____

_____

Name _____ Date _____

A forest of giants

Giant sequoias are the largest trees on Earth. They can reach up to 90 metres in height and up to 12 metres in diameter. They can live up to 3,000 years, making them some of the oldest living things on Earth. In fact, these trees grow so old because they survive many of the threats that could kill them. Sequoia trunks have thick, fibrous bark with no resin, which makes them resistant to fire. In addition, their bark contains chemicals that protect them from disease.

Sequoias depend on forest fires to reproduce: heat from fires makes their seed cones open and release their seeds. Fires also help to clear the ground to facilitate germination.

Although giant sequoias are native plants of California in the United States, they can be found in other areas of the world. They usually grow at elevations from 900 to 2,700 metres in mixed mountain forests.

1 **Read the text and complete the sentences.**

a. Sequoias are the largest and oldest _____ on Earth.

b. They have thick, fibrous _____ which is resistant to _____.

c. Chemicals in their bark protect them against _____.

d. They actually need fire to _____.

e. Giant sequoias are native plants of _____.

f. They grow at elevations of up to _____.

2 **Search the Internet for information about the three largest sequoias in the world and complete the table.**

sequoia	name	location	height
1			
2			
3			

Name _____ Date _____

1 **Complete the chart. Then, answer the question.**

Plants need

to grow.

- Which gas do plants take in from the air in order to make their own food?

_____

2 **Use the words in the box to complete the sentences.**

water buttercups - a lot of - less - constant - elm trees - water - reeds - far - close

a. _____ and bulrushes grow very _____ to water because they need _____ water to grow.

b. _____ can grow _____ from water because they need _____ water to grow.

c. _____ grow in _____ because they need a _____ supply of water to grow.

3 **Read the sentences and underline the mistakes. Then, write the sentences correctly.**

a. Plants take in oxygen to make their food.

_____

b. Plants absorb mineral salts through their leaves.

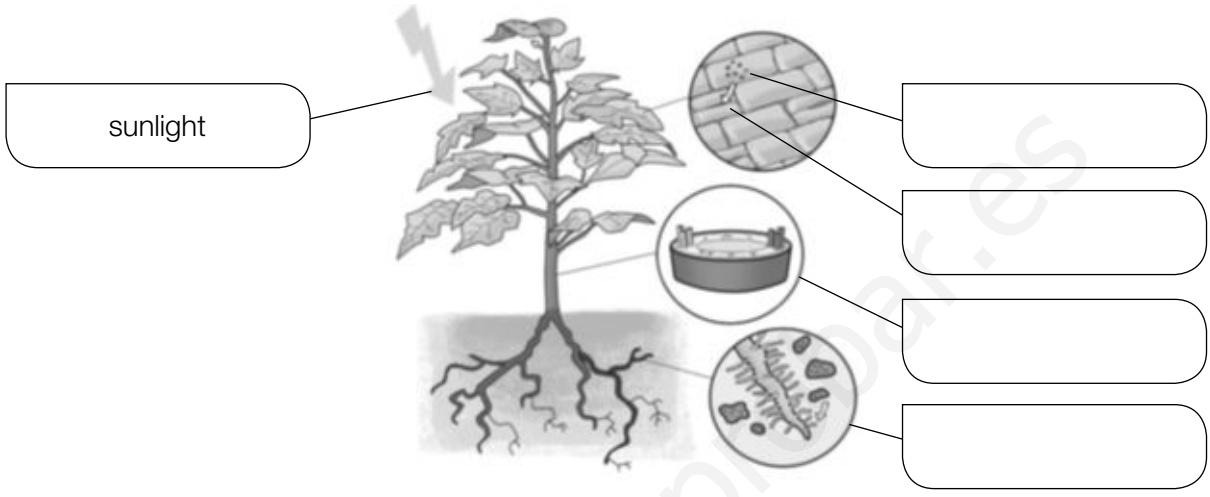
_____

c. Most plants grow in poor soil which is rich in water and mineral salts.

_____

4 **Label the parts of the plant. Then, answer the question.**

stomata - root hairs - carbon dioxide - xylem vessels



- What time of day does photosynthesis take place? _____

5 **Circle the words related to plant nutrition. Then, choose three to complete the sentences.**

stomata - seeds - raw sap - chlorophyll - temperature - phloem vessels

- _____ is a green substance which traps sunlight.
- _____ are openings in the leaves for gas exchange.
- _____ are tubes that distribute elaborated sap throughout the plant.

6 **Match. Then, answer the question.**

elaborated sap	xylem vessels
raw sap	phloem vessels

- Which vessels reach all parts of the plant? Why? _____

_____

Plant growth and nutrition

TEST

Name _____ Date _____

1 **Plants use carbon dioxide...**

a. to absorb light from the Sun.
b. to make their own food.
c. to take in mineral salts from the soil.

2 **The amount of water plants need to survive...**

a. varies from plant to plant.
b. is the same for all plants.
c. depends on the number of leaves they have.

3 **Plants take in mineral salts through their...**

a. stomata. b. roots. c. chlorophyll.

4 **When soil is humid and rich in mineral salts, we say it is...**

a. abundant. b. poor. c. fertile.

5 **Raw sap is...**

a. produced during photosynthesis.
b. a mixture of water and mineral salts.
c. absorbed through the stomata.

6 **Raw sap travels up to the leaves through the...**

a. xylem vessels. b. roots. c. phloem vessels.

7 **Chlorophyll is...**

a. produced during photosynthesis.
b. found mainly in the roots.
c. a green substance that traps sunlight.

8 **Plants release oxygen...**

a. during respiration. b. during photosynthesis. c. through the roots.

9 **The non-green parts of the plant...**

a. get their nutrients from raw sap.
b. get their nutrients from elaborated sap.
c. need water to carry out photosynthesis.

10 **Plants carry out respiration...**

a. during the day. b. at night. c. day and night.

Name _____ Date _____

What do plants need to grow?

Instructions

1. Work in groups of four. You need 4 small plants, a paper bag, a transparent plastic bag and water.
2. Label the plants: 1. no water; 2. no light; 3. no air; 4. control plant.
3. Place the paper bag over plant number 2, so it does not receive any light.
4. Place the plastic bag over plant number 3, so it does not get any air.
5. Put the plants on a windowsill and water them regularly, except for plant number 1. Make sure the control plant has air, light and water.
6. Observe the growth of the plants over the next four weeks and record your observations. Complete the table.

week	plant 1	plant 2	plant 3	plant 4
1				
2				
3				
4				

7. Compare your results and answer the questions.
   a. Did all the plants grow the same? Explain. _____
   _____
   b. Which plant was the healthiest? _____
   c. Which plant was the least healthy? _____
8. Now write a conclusion.

_____

_____

Name _____ Date _____

1 **Look at the picture and answer the questions about this ecosystem.**

- Is this physical environment terrestrial or aquatic? _____
- What components make up the physical environment? _____
- What living things are present in this ecosystem? _____
- How do living things modify this environment? _____

2 **Match each word with its definition. Then, look at the picture above and label a species, a population and the community.**

• community	group of living things that can successfully reproduce
• species	all the organisms of one species in an ecosystem
• population	all the populations in an ecosystem

3 **Write an example of each.**

a. Producer: _____

b. Primary consumer: _____

c. Secondary consumer: _____

d. Tertiary consumer: _____

e. Scavenger: _____

f. Decomposer: _____

4 **Number the living things in this food chain in order. Then, write *producer*, *primary consumer*, *secondary consumer* and *tertiary consumer*.**

5 **Match the columns using four different colours.**

a. Competition	is the relationship between	two species when one benefits and the other remains unaffected.
b. Parasitism		two species when both benefit.
c. Mutualism		two species when one benefits while the other suffers.
d. Commensalism		different species that have the same needs.

6 **Look at the pictures. Name each type of relationship.**

Name _____ Date _____

Tropical rainforests

Tropical rainforests are forests with tall trees, dense vegetation and very high rainfall. These ecosystems are found in hot and humid areas in Africa, Asia, and Central and South America. The Amazon rainforest in South America is the largest tropical rainforest in the world. It is almost ten times the size of Spain!

Rainforests are often described as 'the lungs of the planet'. This is because they produce 40 % of the Earth's oxygen, which all living things need to survive. They consist of several layers of vegetation which are home to over half of the world's species. In fact, tropical rainforests are one of the richest ecosystems on the planet. Their flora includes a large variety of gigantic trees, which support other plants. Their fauna consists of colourful birds, numerous and fascinating insects, and amazing mammals.

Unfortunately, human activity is destroying tropical rainforests all around the world.

1 **Read the text and answer the questions.**

a. What climatic conditions do tropical rainforests need to grow?

_____

b. Where can we find these ecosystems?

_____

c. Which rainforest is the largest in the world?

_____

d. Why do rainforests produce so much oxygen?

_____

e. What makes a rainforest one of the richest ecosystems on the planet?

_____

_____

2 **Search the Internet for information about an animal species from a tropical rainforest. In your notebook, write a brief description of your animal. Include a photograph or a drawing.**

Name _____ Date _____

Life at the top of the Earth

Tundras are one of the coldest and harshest ecosystems on Earth. They are found in the Arctic, where the weather is extremely cold, dry and windy. They are treeless areas with low plants that grow in rock cavities. The Arctic tundra has average temperatures of -12 ºC to -6 ºC. This means that the top layer of the soil, called the permafrost, is almost always frozen.

In the winter, the permafrost is covered with a thick layer of snow, and no plants are visible. However, during the short summer, there are 24 hours a day of sunlight. The surface of the permafrost melts, and wildflowers appear everywhere.

The Arctic tundra is home to several animal species, including Arctic foxes, polar bears, caribous, snow geese and musk-oxen. Unfortunately, as a result of global warming, temperatures are rising. This is causing the permafrost to melt and threatening this unique ecosystem.

1 **Read the text and circle the correct word.**

a. Tundra ecosystems are found in the *Arctic* / *Antarctic*.

b. Temperatures in tundra ecosystems are very *high* / *low*.

c. The top layer of the soil is the *tundra* / *permafrost*.

d. Winter in the Arctic tundra is *longer* / *shorter* than summer.

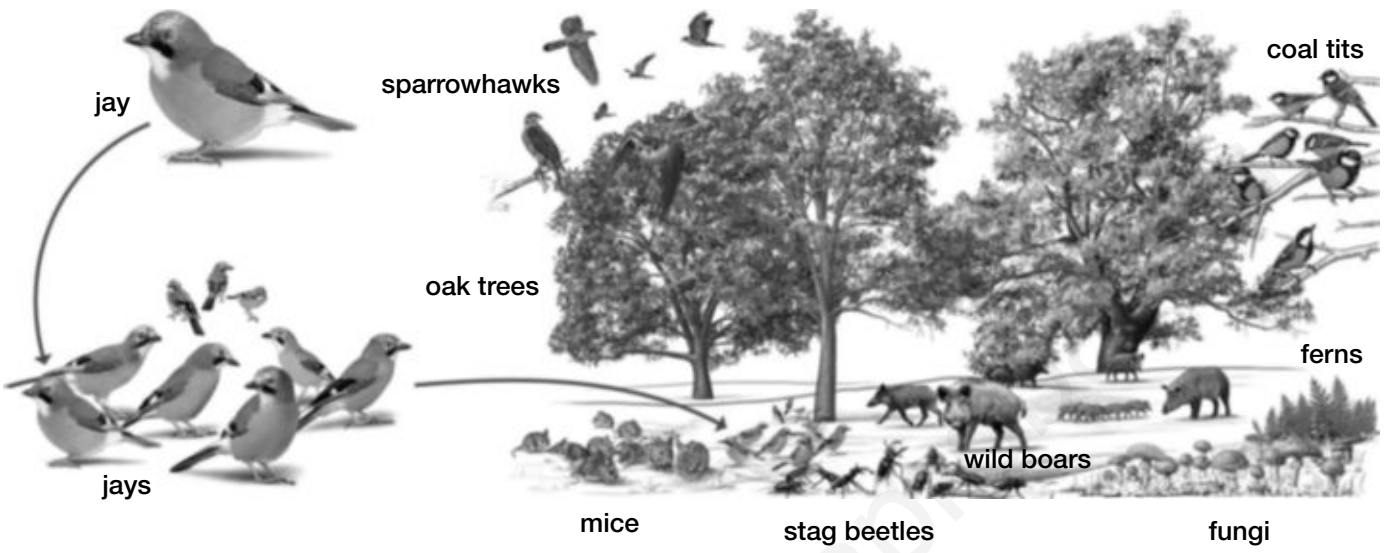
e. *Global warming* / *Animal life* is threatening the Arctic tundra.

2 **Search the Internet for three examples of fauna from the Arctic tundra. Write what they eat.**

fauna	food
_____	_____
_____	_____
_____	_____

Name _____ Date _____

1 **Look at the ecosystem and answer the questions.**



a. Is this ecosystem terrestrial or aquatic? _____

b. Describe the physical environment. _____

c. Circle an organism. What organism is it? _____

d. Circle two populations. What populations are they? _____

e. Circle the community. Which includes more components, a community or an ecosystem? Explain.

_____

_____

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

a. Plants and algae are producers in an ecosystem. ☐

b. Secondary consumers in an ecosystem are always herbivores. ☐

c. Scavengers and decomposers are essential to ecosystems. ☐

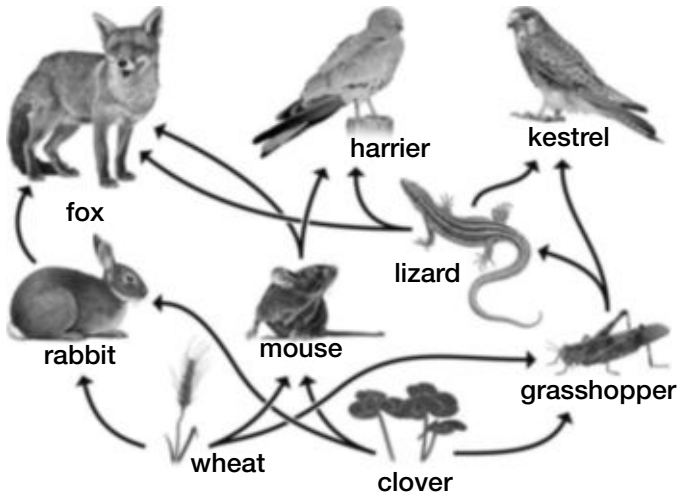
d. Food chains always start with a decomposer. ☐

e. Food webs are made up of many food chains. ☐

_____

_____

3 **Look at the food web and write examples.**



a. Two producers:

_____

_____

b. Two primary consumers:

_____

_____

c. Two secondary consumers:

_____

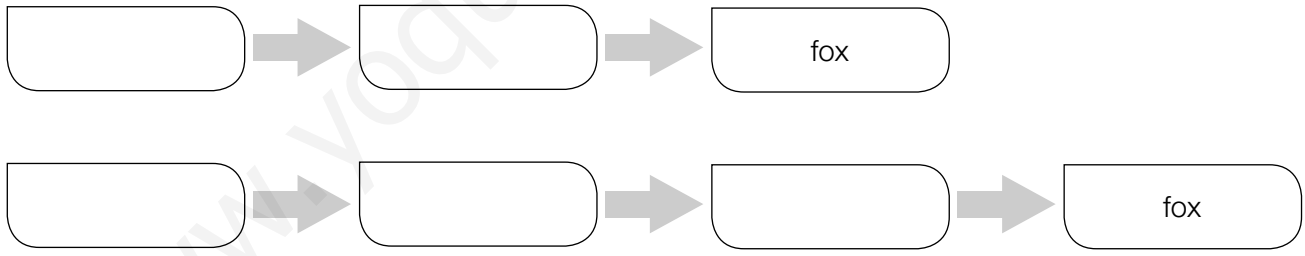
_____

d. Two tertiary consumers:

_____

_____

4 **Look at the food web from Activity 3 and complete the following two food chains. Then, answer the question.**



- What type of consumer is the fox in each food chain? _____

_____

5 **Write an example of each type of relationship.**

- Mutualism: _____
- Commensalism: _____
- Parasitism: _____
- Competition: _____

Ecosystems

TEST

Name _____ Date _____

1 **An ecosystem refers to…**

a. living things.
b. the physical environment.
c. living things and the physical environment.

2 **The physical environment of an ecosystem does not include…**

a. trees. b. light. c. water.

3 **Animals can only reproduce with members of the same…**

a. species. b. population. c. community.

4 **A population includes…**

a. all the living things in an ecosystem.
b. a group of animals travelling together.
c. all the organisms of one species in an ecosystem.

5 **Producers…**

a. feed on plants and algae.
b. are living things that make their own food.
c. break down dead animal and plant materials.

6 **All herbivores are…**

a. primary consumers. b. secondary consumers. c. tertiary consumers.

7 **In a relationship of mutualism…**

a. only one species benefits.
b. both species remain unaffected.
c. both species benefit.

8 **One species benefits while the other remains unaffected in…**

a. commensalism. b. competition. c. parasitism.

9 **Fleas benefit while dogs suffer. This is an example of…**

a. mutualism. b. commensalism. c. parasitism.

10 **In a relationship of competition…**

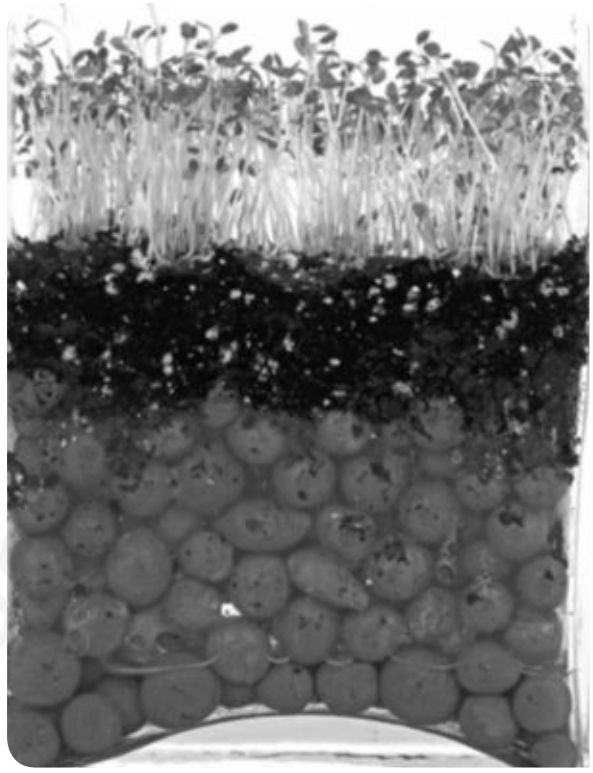
a. two species benefit from each other.
b. two species have the same needs.
c. only one species benefits.

Name _____ Date _____

Can you build an ecosystem? Make a terrarium.

Instructions

1. Work in groups of four. Cover the bottom of a clear glass or plastic container with small pebbles.
2. Add some soil. Make small holes in the soil and plant seeds and small plants.
3. Add water and place the container in a sunny place.
4. Cover the top of the container with clear plastic film.
5. Allow the seeds to germinate and the plants to take root. Water your terrarium regularly, but moderately.
6. Collect some insects in a jar, for example, ants, ladybirds and centipedes. Add them to your terrarium.
7. Observe your terrarium every week. Record and draw your observations in the table, including interactions among the living things.



week 1	week 2	week 3	week 4

Name _____ Date _____

1 **Circle six ecosystems. Classify them. Then, tick (✓) the saltwater ecosystem.**

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

terrestrial ecosystems

_____

_____

_____

aquatic ecosystems

_____

_____

_____

2 **Write six factors that make up the environment of human beings.**

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____

3 **Look at the picture. Write the human activities that modify the environment.**

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

4 **Read the descriptions and name the negative effects of human activity.**

a. Slow transformation of fertile land into desert: _____

b. Disappearance of forests: _____

c. Living things at risk of becoming extinct: _____

d. Accumulation of rubbish and harmful substances in air, water and soil: _____

5 **Name the two negative effects of human activity. Then, answer the question.**

_____ _____

- How do they happen?

a. _____

_____

_____

b. _____

_____

_____

6 **Write two ways of protecting the environment for each case.**

- government measures: _____

_____

_____

- citizen actions: _____

_____

_____

Name _____ Date _____

Pollution at sea

Due to human activity, many pollutants end up in our oceans. These pollutants include liquid waste, such as oil, and solid waste, such as plastics. Some of these pollutants accumulate on the seabed. Tiny marine organisms eat them and this can poison marine food webs.

Oil spills float on water and block out sunlight. Algae need sunlight to produce their own food. Algae are the main producers in marine ecosystems. Therefore, when algae are destroyed, marine food webs are harmed. Oil causes other problems. It sticks to birds' feathers and animal fur, causing them harm and eventually killing them.

Solid waste is another threat to marine life. Many marine animals mistake plastics for food. Solid waste is carried by ocean currents and wind to different places on Earth, creating huge heaps of debris, called garbage patches. These garbage patches consist mainly of tiny plastic fragments which block sunlight and are very hard to clean up. The Great Pacific Garbage Patch, located in the northern Pacific Ocean, is sometimes called the Plastic Continent.

1 **Read the text and answer the questions.**

a. What type of waste substances are polluting the oceans?

_____

b. How is marine pollution affecting the marine food web?

_____

_____

c. How do oil spills harm marine algae?

_____

_____

d. How can plastics harm marine animals?

_____

e. What are garbage patches?

_____

Name _____ Date _____

Doñana National Park

Doñana is considered one of the most important wetland reserves in the world and is a haven for birds. It is located in the delta of the Guadalquivir River, and extends over an area of more than 500 km^2 in the provinces of Huelva, Seville and Cadiz.

Doñana has many different ecosystems, such as marshes, lagoons and sand dunes. These ecosystems are home to an enormous variety of wildlife. The biodiversity of Doñana National Park is unique in Europe. The fauna includes over 300 species of vertebrates. About six million migratory birds stop off in Doñana in late spring on their way from Africa to northern and central Europe, and do just the opposite in late autumn. Doñana is also home to endangered species, such as the Iberian Lynx and the Spanish Imperial Eagle. Due to its great ecological value, Doñana is a UNESCO Biosphere Reserve and a World Heritage Site.

1 **Read the text and answer the questions.**

a. What type of protected natural area is Doñana National Park? _____

b. Which river runs through Doñana? _____

c. What type of ecosystems can you find in the park? _____

d. When do birds fly from northern Europe to Doñana? _____

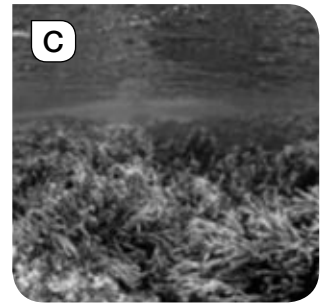
e. Which endangered species can you find in Doñana? _____

2 **Search the Internet for information about two migratory birds you can find in Doñana National Park. Then, complete the table.**

migratory bird	description	migratory flights

Name _____ Date _____

1 **Identify each ecosystem and a living thing it is home to.**



_____ _____ _____ _____

_____ _____ _____ _____

2 **Draw other components of the environment of a squirrel, including one component that is the result of human activity. Then, write sentences about the squirrel's environment.**

_____

_____

_____

3 **Look at the photograph of Antarctica and answer the question.**

- How can this continent be affected by air pollution?

4 **Complete the table about negative effects of human activity.**

negative effect	causes	consequences

5 **Complete four ways of protecting the environment. Then, match them to the photos.**

a. _____ waste.

b. _____ energy.

c. Saving _____.

d. Respecting _____.

People and the environment

TEST

Name _____ Date _____

1 **Atlantic forests are…**

a. humid regions with hot summers.
b. dry regions with cool summers.
c. humid regions with cool summers.

2 **Plants in mountain grasslands are…**

a. humid. b. herbaceous. c. very rare.

3 **Salinity refers to…**

a. the hardness of rocks on the coast.
b. the amount of salt in water.
c. the amount of vegetation in lagoons.

4 **Water does not move much in…**

a. oceans. b. rivers. c. lagoons.

5 **Everything that affects a living thing makes up its…**

a. environment. b. climate. c. habitat.

6 **Human activity…**

a. never affects the environment.
b. sometimes affects the environment.
c. always affects the environment.

7 **Desertification is often caused by…**

a. deforestation. b. endangered species. c. fertile soil.

8 **An example of overexploitation is…**

a. polluting forest environments.
b. catching too many fish.
c. allowing soil to be eroded.

9 **The job of protecting the environment is for…**

a. governments. b. citizens. c. governments and citizens.

10 **Biosphere Reserves…**

a. achieve a balance between human activity and nature.
b. are declared by national or local governments.
c. include all the living things on Earth.

Name _____ Date _____

How clean is the air?

Instructions

1. Work in groups of four. You need white card, string, a cotton swab, Vaseline, a hole punch, a permanent black marker and a magnifying glass.
2. Cut the card into 8 small squares.
3. Punch a hole in the top of each piece of card and draw a circle on each piece.
4. Decide on 4 locations where you want to test the air, for example, inside the school, the school playground, the school parking lot and the school street. Label each piece of card with a location.
5. Spread a thin layer of Vaseline with a cotton swab inside the circle you drew on each piece of card.
6. Using the string, hang each piece of card in its location.
7. Collect your pieces of card in a week. Observe them with a magnifying glass. Count the number of particles that are stuck to the Vaseline on each card and record your data. Draw a picture of what you see.

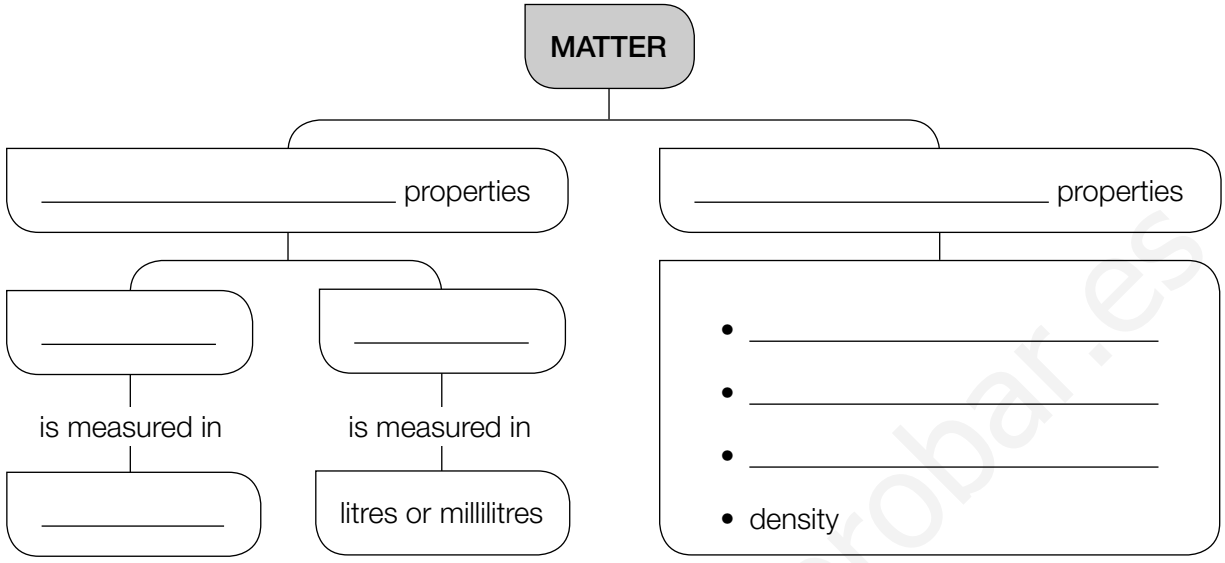
location	number of particles	drawing
inside the school		
school playground		
school parking lot		
school street		

8. Compare your results and answer the questions.
   a. Which piece of card had the highest number of particles? _____
   b. Which piece of card had the lowest number of particles? _____
9. Now write a conclusion.

_____

Name _____ Date _____

1 **Complete the mind map.**



2 **Look at the photographs. Write how to measure volume in each case.**

A

B

C

_____ _____ _____

_____ _____ _____

3 **Write *mass*, *volume* or *density*.**

- _____ refers to the concentration of matter in a particular volume.
- _____ is the amount of matter in an object.
- _____ is the amount of space an object occupies.
- _____ and _____ are general properties of matter.
- _____ is a specific property of matter.

4 **Find eight objects and classify them. Then, answer the questions.**

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

objects that float

_____

_____

_____

_____

_____

objects that sink

_____

_____

_____

- Which objects have a lower density than water? _____

_____

- Which objects have a higher density than water? _____

_____

5 **Complete the table about the physical states of matter. Write *fixed* or *not fixed*. Then, answer the question.**

	solids	**liquids**	**gases**
volume			
shape			

- Which physical state of matter can be compressed? Explain. _____

_____

6 **Match. Then, write an example of each.**

sublimation	A gas turns into a solid.	_____
reverse sublimation	A solid turns into a gas.	_____

Name _____ Date _____

Plasma

After solids, liquids and gases, plasma is the fourth state of matter. Plasmas are gases with electrically charged particles. This means plasmas can conduct electricity. Since they are gases, they do not have a fixed shape or volume.

Plasma is the most common state of matter in the Universe. The Sun and other stars are huge balls of plasma. In fact, stars are made up of gases at very high temperatures that charge up atoms. Other examples of natural plasmas are lightning and the Northern Lights.

But plasma is not only up in the sky. We use man-made plasma in neon signs, plasma screens, plasma lamps and fluorescent light bulbs. For example, fluorescent light bulbs are filled with gas; the gas gets charged with electricity and creates glowing plasma inside the bulb.

There are many types of plasmas. They each have different characteristics and behaviour, which makes them very useful in the world around us.

1 **Read the text and complete the table about plasma.**

description	examples of natural plasma	examples of man-made plasma

2 **Search the Internet for more information about other uses of man-made plasmas.**

_____

_____

_____

Name _____ Date _____

Shrilk

Shrilk is a new biologically engineered material inspired by nature – in particular, by the rigid exoskeleton of insects. Shrilk is thin, clear, flexible and as strong as aluminium, although much lighter. It is also biodegradable, and can be used as fertilizer.

Shrilk is made of chitin, a large molecule found in shrimp shells, and fibroin, a protein from silk. The secret of shrilk is not only in its components, but also in how these components are arranged in layers. This layering results in a material that is both strong and light. Depending on its water content, shrilk can be rigid or elastic, so it can also be easily moulded into different shapes. In addition, shrilk can be produced at a very low cost, since shrimp shells are basically a waste product.

Due to its unique properties, shrilk can be an environmentally friendly substitute for plastic. So far, shrilk has been used as a bioplastic to make film, rubbish bags, nappies, packaging materials and medical supplies.

1 **Read the text and make an index card.**

SHRILK

Description: _____

Components and structure: _____

Advantages: _____

Uses: _____

2 **Search the Internet for general information about other bioplastics. Write their names and some of their advantages.**

_____

_____

_____

_____

Name _____ Date _____

1 **Complete the table.**

	general or specific property	definition	measurement unit
mass			
volume			
density			

2 **Look at the photos and answer the question.**

A

B

- Which ball has the higher density? Explain.

_____

_____

_____

_____

3 **Look at the photo of oil and water. Which substance is denser? Explain.**

_____

_____

_____

_____

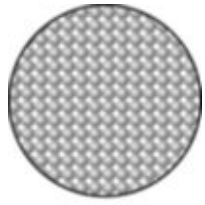
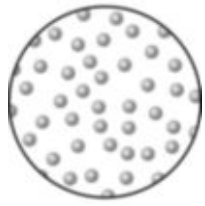
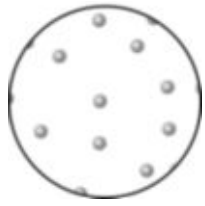
_____

_____

_____

_____

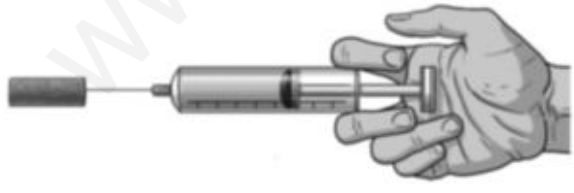
4 **Complete the table about the states of matter.**

	state of matter	description
		
		
		

5 **Write an example of each.**

- a flexible solid: _____
- a fragile solid: _____
- a viscous liquid: _____
- a volatile liquid: _____

6 **Which property of gases do these pictures illustrate? Explain.**



_____

_____

_____

_____

Matter

TEST

Name _____ Date _____

1 **Density is…**

a. a general property of matter.
b. a specific property of matter.
c. not a property of matter.

2 **The amount of matter in objects is called…**

a. mass. b. volume. c. density.

3 **Volume is directly related to…**

a. weight. b. colour. c. size.

4 **The volume of regular-shaped solids is…**

a. measured in measuring cylinders.
b. calculated with mathematical formulas.
c. calculated by the water displacement method.

5 **To calculate the density of an object, we…**

a. divide its mass by its volume.
b. add its mass and its volume.
c. divide its mass by its weight.

6 **If the density of an object is higher than the density of water, it…**

a. floats in water. b. repels water. c. sinks in water.

7 **Solids…**

a. can flow and be compressed.
b. can flow, but cannot be compressed.
c. cannot flow or be compressed.

8 **If a liquid does not flow easily, it is…**

a. viscous. b. volatile. c. strong.

9 **When we compress a gas, its volume…**

a. increases. b. decreases. c. stays the same.

10 **Sublimation happens when…**

a. a gas turns directly into a solid.
b. a liquid suddenly freezes.
c. a solid turns directly into a gas.

Name _____ Date _____

Does it float or sink?

Instructions

1. Work in pairs.
2. You need a clear plastic container, a marble, a cork, a paper clip, a pencil, a rubber, an elastic band, a coin, a plastic spoon and water.
3. You are going to test whether these objects float or sink.
4. First, complete the table with your predictions: Write *F* (floats) or *S* (sinks).

	marble	cork	paper clip	pencil	rubber	elastic band	coin	plastic spoon
prediction								
result								

5. Take it in turns to place the objects in the water. Add the results to the table above.
6. Compare your predictions and results.
7. Make two lists:
   - objects with higher density than water:

     _____

   - objects with lower density than water:

     _____
8. Now write a conclusion.

_____

_____

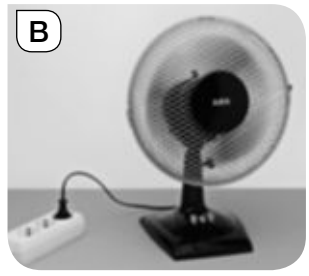
_____

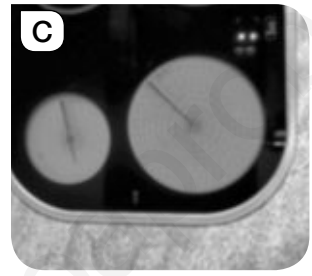
Name _____ Date _____

1 **1. Cross out (✗) the odd one out. Then, write the corresponding form of energy.**

a. kite	bike	computer	skateboard	_____
b. radiator	the Sun	blender	fire	_____
c. water	batteries	food	fuel	_____
d. star	candle	snow	torch	_____

2 **Match each picture to its corresponding energy transformation. Then, complete the table with examples from your home.**





- ☐ chemical energy → mechanical energy
- ☐ chemical energy → thermal energy
- ☐ electrical energy → mechanical energy
- ☐ electrical energy → thermal energy

electrical → mechanical	electrical → thermal	electrical → light

3 **Write one energy source for each type of energy.**

a. mechanical energy: _____

b. nuclear energy: _____

c. chemical energy: _____

d. thermal energy: _____

e. light energy: _____

4 **Write the energy source used in each type of power plant. Then, answer the question.**

a. thermal power plant: _____

b. hydroelectric power plant: _____

c. nuclear power plant: _____

• Which of these energy sources will never run out? _____

5 **Match and write sentences about environmental problems.**

a. Fossil fuels are	acid rain.
b. Burning fossil fuels causes	radioactive waste.
c. Toxic substances in the air produce	limited resources.
d. Nuclear power plants produce	global warming.

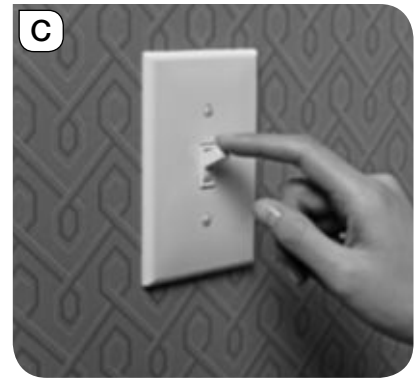
_____

_____

_____

_____

6 **Describe the ways of saving energy shown in the pictures. Then, add another example.**



_____

_____

_____

_____

_____

Name _____ Date _____

Geothermal energy

Geothermal energy, also known as the Earth's internal heat, is thermal energy generated inside the Earth. It is a clean, renewable source of energy that, unlike solar and wind energy, is always available. Geothermal energy can be found in deep wells or shallow ground.

Geothermal energy can be used directly to heat buildings, including houses, spas or greenhouses. It can also be used to generate electricity by capturing steam from inside the Earth, which is then used to drive electric generators.

Geothermal energy is produced in over 20 countries worldwide. The United States, the Philippines and Indonesia are the main producers of geothermal energy in the world. The largest geothermal power plant, The Geysers, is in California. This plant produces enough electricity for a city the size of Madrid.

However, Iceland is the leading country in the world in the use of geothermal energy. With at least twenty-five active volcanoes and many hot springs and geysers, Iceland can heat almost every building in the country with natural hot water. A favourite pastime in Iceland is swimming in hot water pools while the outside temperatures are below freezing!

1 **Read the text and answer the questions.**

a. What is geothermal energy? _____

b. What advantage does it have compared to solar and wind energy? _____

c. How can geothermal energy be used? _____

d. Which countries are the leading producers of geothermal energy? _____

_____

e. What are The Geysers? _____

f. Which country is the leading user of geothermal energy? _____

2 **Search the Internet for information about geothermal energy in Spain and write a brief description.**

_____

_____

_____

Name _____ Date _____

Bioclimatic architecture

Bioclimatic architecture is architecture that takes into consideration the climate and other environmental factors of a building's natural surroundings. Its purpose is to save energy and achieve optimal thermal and lighting conditions inside buildings. Bioclimatic architecture includes the use of natural resources, such as the Sun, wind, and vegetation.

In the past, traditional architectural styles used materials, such as adobe, or features, such as thick walls, to create stable indoor temperatures. Andalusian courtyards are an example of traditional bioclimatic architecture. The courtyards capture cool air at night and release heat during the day. Fountains in these courtyards help to keep the air temperature cool.

The Sun is the biggest source of energy in bioclimatic architecture, so the orientation of a building, and in particular the windows, is important. Windows facing south receive the maximum amount of light and solar heat. In addition, the use of thermal insulating materials, such as stone, wood and adobe, prevents buildings from losing heat in winter, and keeps them cool in summer. Finally, insulating windows or using double windows is very important to prevent heat from escaping.

1 **Read the text and answer the questions.**

a. What are the advantages of bioclimatic architecture? _____

_____

b. Name an example of traditional bioclimatic architecture. _____

c. Why is the orientation of a building an important factor in bioclimatic architecture? _____

_____

d. Which architectural elements help buildings maintain the indoor temperature? _____

_____

2 **Look around your home. Make a list of architectural elements that can be considered bioclimatic.**

_____

_____

_____

Name _____ Date _____

1 **Write the form of energy for each situation.**

a. Energy in a flying kite: _____

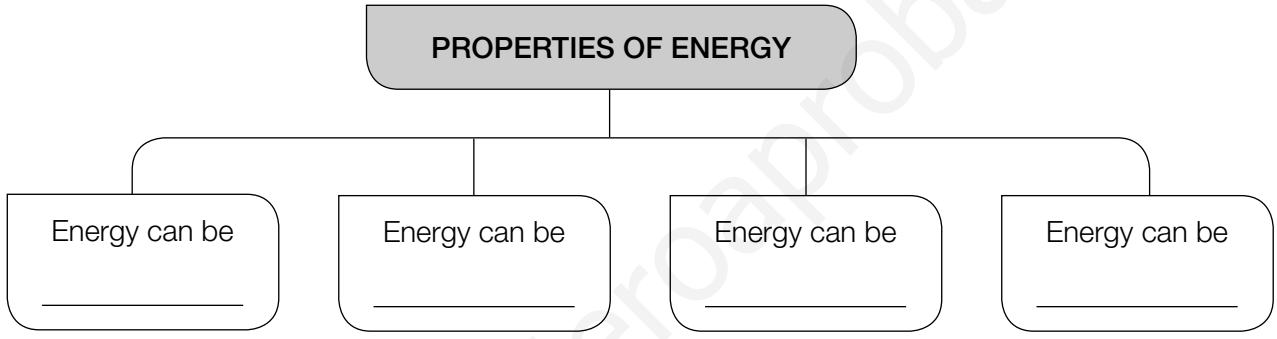
b. Energy emitted by a star: _____

c. Energy produced by the movement of charged particles: _____

d. Energy released when uranium atoms are split apart: _____

e. Energy in a slice of pizza: _____

2 **Complete the mind map.**



3 **Find eight energy sources and classify them. Then, answer the questions.**

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

renewable sources

_____

_____

_____

_____

non-renewable sources

_____

_____

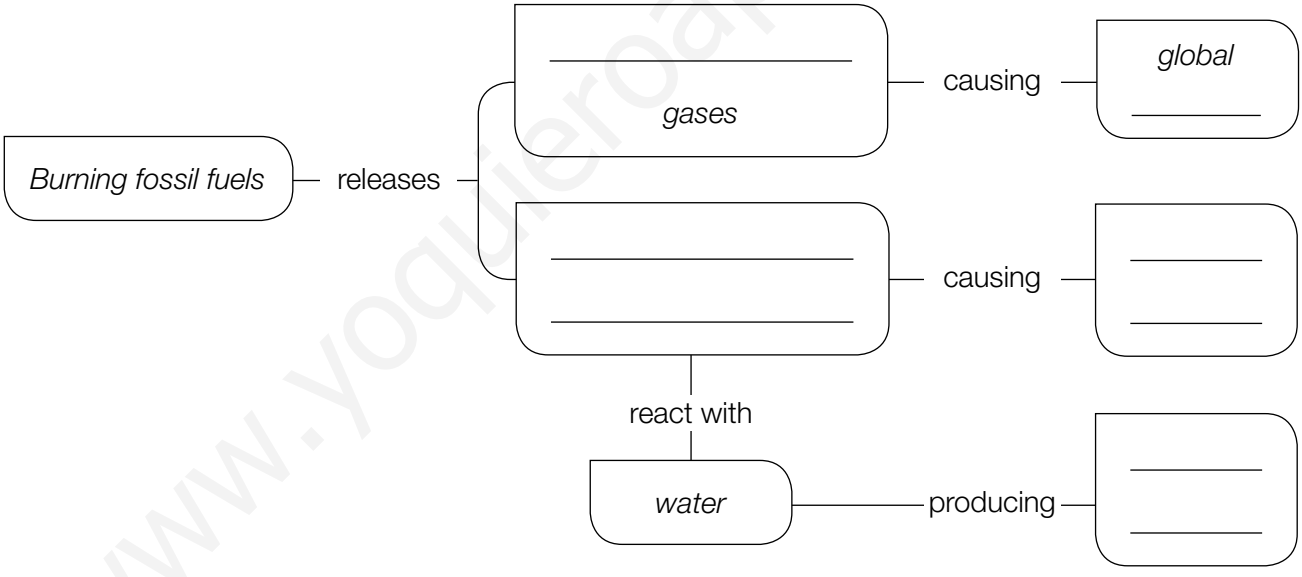
_____

_____

- Which energy sources are found in minerals? _____
- Which renewable energy source is organic matter? _____

4 **Name the energy source in each photograph. Then, write the name of the power plant where each energy source is used.**

5 **Complete the mind map about fossil fuels.**



6 **Use the words to write about ways of saving energy.**

public transport - thermostat - three Rs - shower

Energy

TEST

Name _____ Date _____

1 **Energy is the ability…**

a. to obtain and store food.
b. to be present everywhere and in everything.
c. to do work or cause changes.

2 **The form of energy related to temperature is…**

a. chemical energy. b. thermal energy. c. light energy.

3 **Energy can be transformed. For example, …**

a. batteries store chemical energy.
b. electrical energy becomes light energy in a lamp.
c. electrical energy moves through electric cables.

4 **Non-renewable energy sources will…**

a. run out one day. b. never run out. c. become renewable.

5 **The energy in biomass is…**

a. chemical energy. b. geothermal energy. c. mechanical energy.

6 **Burning fossil fuels…**

a. produces radioactive waste.
b. can produce acid rain.
c. uses up the Sun's energy.

7 **The gases in the atmosphere that absorb heat are known as…**

a. air pollution. b. toxic substances. c. greenhouse gases.

8 **The Earth's temperature is increasing. This is called…**

a. the greenhouse effect. b. global warming. c. solar energy.

9 **The greenhouse effect is…**

a. decreasing because of human activity.
b. increasing because of human activity.
c. not affected by human activity.

10 **We can save energy in many ways. For example, we can…**

a. take showers instead of baths.
b. turn off the light when we enter a room.
c. dry our clothes in a dryer.

Name _____ Date _____

Make a solar oven

Instructions

1. Work in groups of four. You need a cardboard pizza box, a craft knife, a marker, a thermometer, aluminium foil, cling film and black card.
2. Draw a square on the lid of the box about 3 cm from the edge. Cut a flap in the box with the craft knife by cutting along 3 sides of the square. Fold the flap back so it stays open.
3. Cover the inside of the box with aluminium foil. Make sure the shiny side is facing down. Then, cover the inside of the flap with aluminium foil. Make sure the shiny side is facing up.
4. Glue black card to the inside bottom of the box.
5. Cover the opening cut in the lid with cling film.
6. Take your solar oven outside on a sunny day.
7. Test your oven by measuring the temperature inside the oven over time. Adjust the lid so it receives as much sunlight as possible at all times.

	10 am	11 am	12 pm	1 pm	2 pm	3 pm
temperature						

8. Analyse your results and answer the questions.

   a. What was the highest temperature reached in your solar oven? _____

   b. What time did your oven reach the highest temperature? _____

9. Now write a conclusion about the best time(s) of day to use your solar oven.

_____

_____

Name _____ Date _____

1 **Use the clues to write the properties of light.**

a. Light is faster than anything else we can observe in the Universe: _____

_____

b. Light cannot move around objects: _____

c. Lamp light travels to every part of a room: _____

2 **Unscramble the words and label the pictures.**

ueqapo - pratentsnar - nustlancret

_____ _____ _____

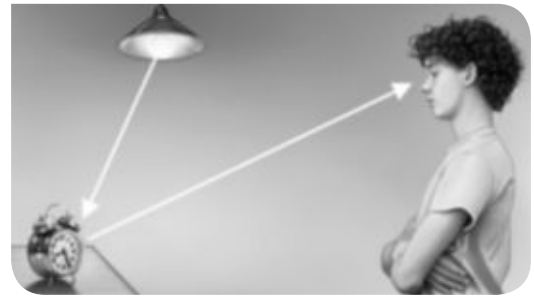
3 **Complete the text about the reflection of light.**

eyes - sources of light - reflection - reflect - surface - light - bounces off - reflected - see - smooth and shiny

Most objects are not _____. We can only see them because they _____ part of the light that hits their _____.

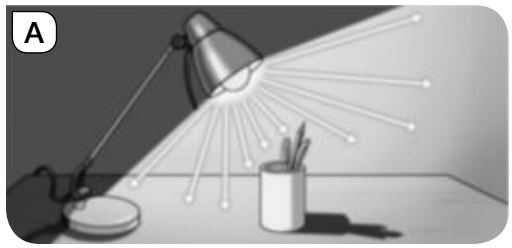
When _____ hits an object, it _____ the object.

This is called _____.



The _____ light enters our _____. This is how we _____ objects. _____ surfaces reflect most of the light.

4 **Describe two properties of light shown in picture A. Then, use picture B to explain how we see objects.**



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

a. Heat is the thermal energy in objects. ☐

b. Heat does not cause changes. ☐

c. Temperature refers to how hot or cold an object is. ☐

d. Thermometers are used to measure temperature. ☐

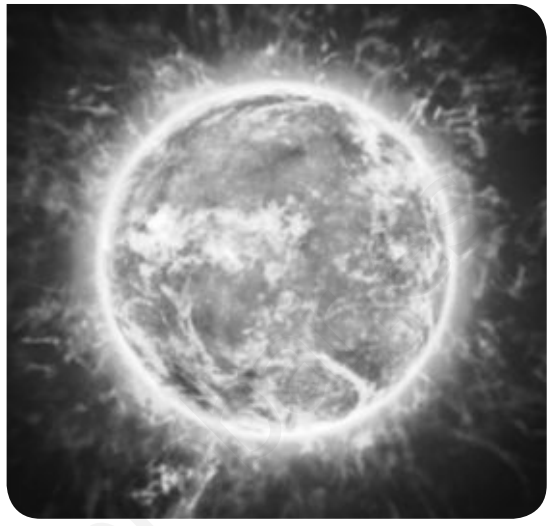
e. Temperature is measured in degrees Celsius. ☐

6 **Write *conductor* or *insulator*. Then, answer the question.**

• Which object is made of two different materials. Why? _____

Name _____ Date _____

Our Sun: a natural source of light and heat



Like other stars, our Sun shines so brightly because it is extremely hot. The centre of the Sun, known as the core, can reach up to 15 million degrees Celsius. The core produces all the Sun's energy in the form of light and heat. The light takes between 10,000 and 150,000 years to reach the surface of the Sun, where the temperature is much lower – only 5,500 degrees Celsius!

This enormous star is mainly made up of hydrogen and helium. About three quarters of it is hydrogen and the rest is mostly helium. The Sun makes energy by nuclear fusion. This reaction, which involves combining hydrogen atoms together to make helium, releases huge amounts of light and heat. As a result, the Sun's mass is being consumed. In fact, the Sun has used up half of its stored hydrogen. In about 5 billion years, the hydrogen fusion at its core will stop. When this happens, the Sun will stop producing light and heat.

1 **Read the text and complete the index card.**

THE SUN

Composition: _____

Heat and light produced by: _____

Temperature in the core: _____

Temperature at the surface: _____

Lifetime remaining: _____

2 **Search the Internet for more information about the Sun. Write a few sentences.**

_____

_____

_____

_____

Name _____ Date _____

Shadows

People have always been fascinated by shadows because, although they are always with us, we can never catch them or touch them.

But what is a shadow? It is the dark area caused when an object blocks light. Objects need to be opaque or translucent to make a shadow. Transparent objects do not make shadows because they allow light to pass through. Shadows from opaque objects are darker than shadows from translucent ones.

Shadows form because light travels in a straight line and cannot go around obstacles. Shadows always appear on the side of objects away from the light source, and they always have the same outline as the objects.

Shadows can change size and shape. Indoors, they get bigger as you move closer to a light source, and smaller when you move away from the light source. Outdoors, shadows change as the position of the Sun changes.

1 **Read the text and answer the questions.**

a. What is a shadow? _____

b. Do all objects produce shadows? Why? _____

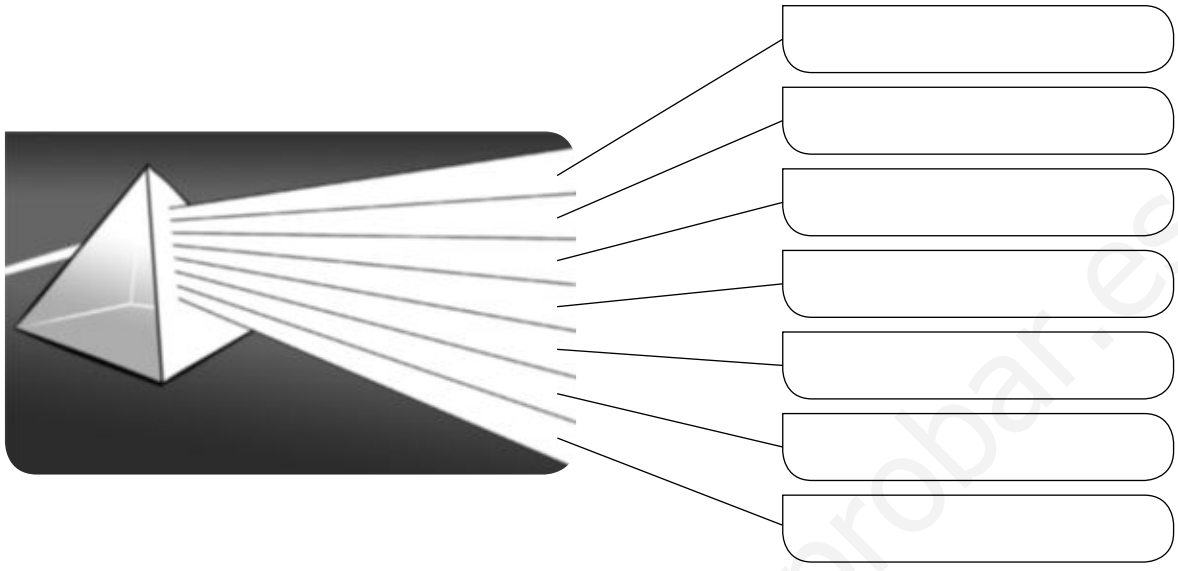
c. What makes shadows change indoors? _____

d. What makes shadows change outdoors? _____

2 **Turn off all the lights and close the curtains in a room. Turn on a lamp and put your hand close to the light source. Explore ways of making the size of the shadow of your hand change. Draw and write your observations.**

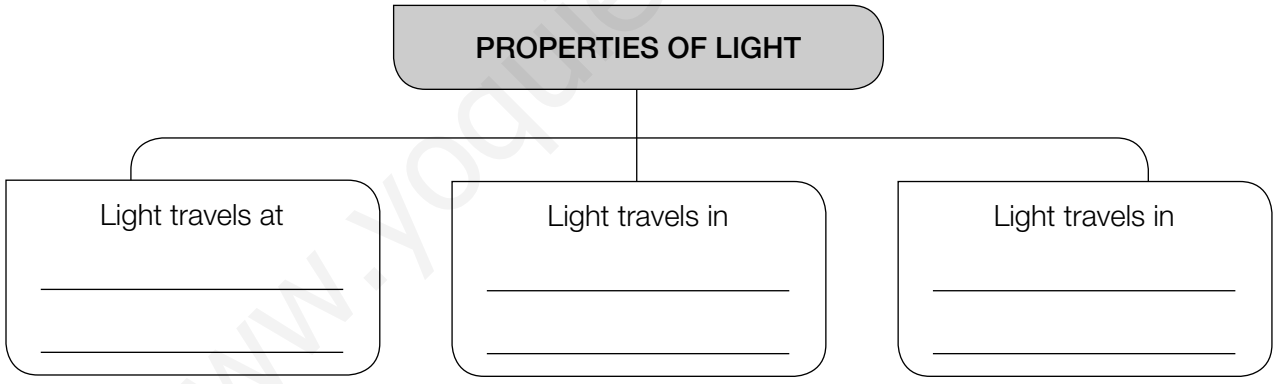
Name _____ Date _____

1 **Colour the diagram and label the colours of light. Then, write a sentence about the composition of light.**



- _____

2 **Complete the word map.**



3 **Explain how the black bowl and the white bowl interact with light. Then, explain how a red bowl interacts with light.**

_____

_____

4 **Label the photographs *reflection* or *refraction*. Complete the sentences.**

_____ _____

- When light _____ an object, it _____ off and changes _____.
- When light _____ from one material to another material with a different _____, it _____.

5 **Look at the photographs and draw an arrow to show the transfer of thermal energy. Then, answer the question.**

- When will the transfer of thermal energy stop in both cases? _____

_____

6 **Match and write examples of materials for each.**

conductors	materials that transmit heat quickly	_____
insulators	materials that transmit heat slowly	_____

Light and heat

TEST

Name _____ Date _____

1 **We see rainbows because…**

a. clouds reflect these seven colours.
b. raindrops separate white light into seven colours.
c. they are created by the wet ground after it rains.

2 **Light travels at 300,000 kilometres per…**

a. second. b. minute. c. hour.

3 **Light cannot pass through…**

a. transparent objects. b. translucent objects. c. opaque objects.

4 **We can only see objects when…**

a. they reflect light.
b. they absorb light.
c. a source of light reaches our eyes.

5 **The colour of an object is the colour of the light…**

a. it absorbs. b. it reflects. c. that reaches it.

6 **Refraction…**

a. only happens under water.
b. causes objects to change their shape.
c. causes light to bend.

7 **Heat…**

a. is the transfer of thermal energy.
b. is another word for temperature.
c. describes temperatures above 30 ºC.

8 **A hot bowl of soup on the table will…**

a. slowly increase in temperature.
b. cool down until it reaches the temperature of the room.
c. become colder than the air in the room.

9 **Conductors transmit heat…**

a. slowly. b. with difficulty. c. quickly.

10 **Glass, plastic and wood are examples of good…**

a. conductors. b. insulators. c. reflectors.

Name _____ Date _____

Which surfaces reflect light best?

Instructions

1. Work with a partner. You need a torch, a mirror and some aluminium foil.
2. Cut out two pieces of the foil.
3. Crumple one of the pieces of foil, then flatten it out.
4. Stand next to a wall. Hold the mirror in one hand and direct the light from the torch towards the mirror so the reflection shines on the wall.
5. Now, repeat the experiment with the smooth and crumpled pieces of the aluminium foil.
6. Complete the table.

	reflects light well or poorly?
mirror	
smooth foil	
crumpled foil	

7. Analyse your results and answer the questions.

   a. Which surface reflects light best? _____

   b. Which surface reflects the least light? _____

   c. Can you name other surfaces that reflect light well? _____

8. Now write a conclusion.

_____

_____

_____

Name _____ Date _____

1 **Explain why the pen attracts the pieces of paper.**

A

B

_____

_____

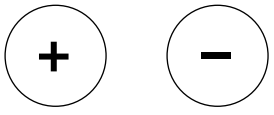
_____

_____

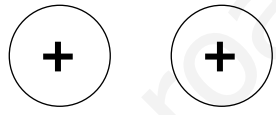
_____

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

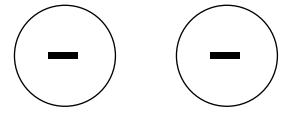
A



B



C

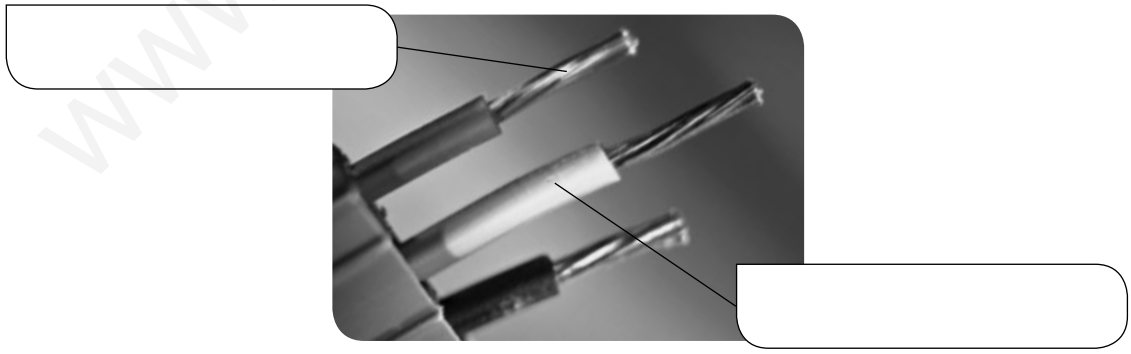


a. _____

b. _____

c. _____

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

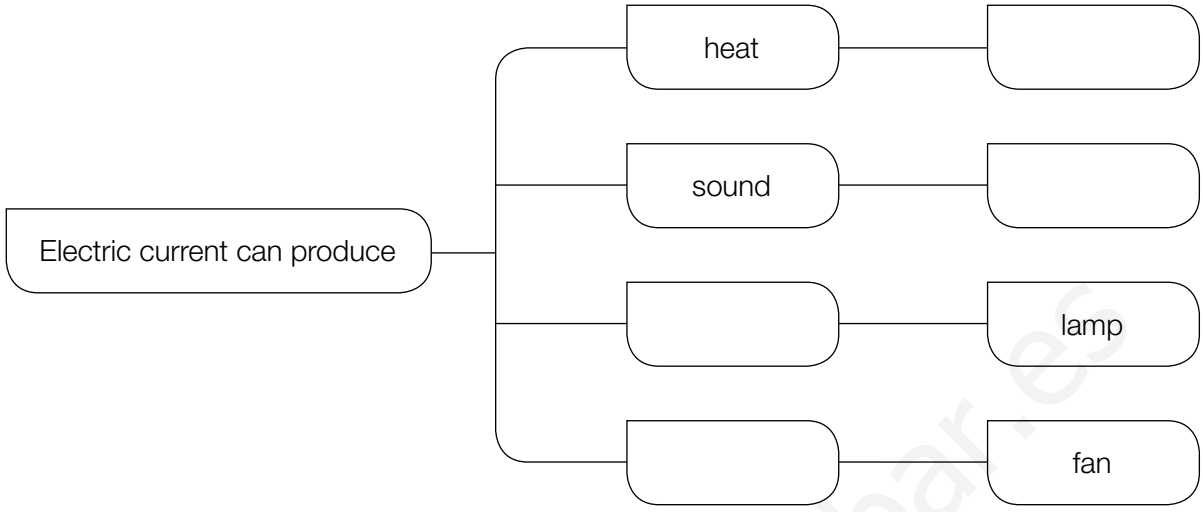


_____

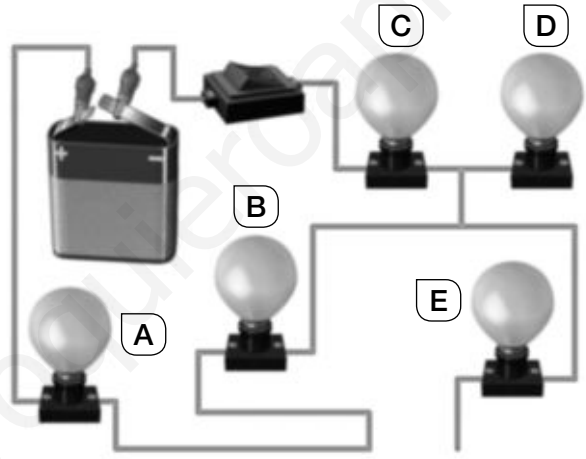
_____

_____

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.**



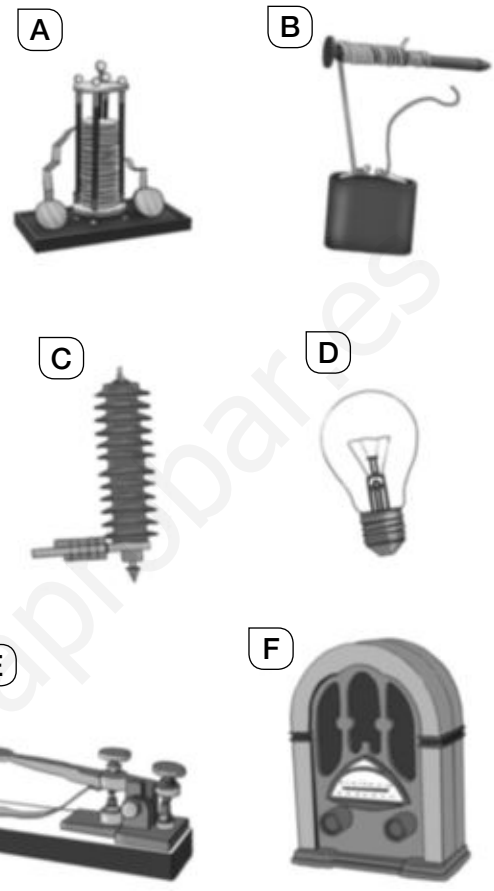
6 **Write a sentence with each group of words.**

socket - cables - national grid

wind - turbine - generator

Name _____ Date _____

Sparks of invention



Since the first electric phenomena were described over two centuries ago, advances in the field of electricity have been slow, but constant.

In the 18th century, Benjamin Franklin (1706-1790) flew a kite to 'capture electricity' from thunderclouds.

Alessandro Volta (1745-1827) developed an instrument capable of producing electric charges. Around 1800, he invented the first electric battery. Fig. A.

In 1820, Hans Christian Oersted (1777-1851) confirmed there was a very close relationship between electricity and magnetism. He invented the electromagnet. Fig. B.

In the early 19th century, Michael Faraday (1791-1867) made important discoveries that led to the development of electric generators and motors. Fig. C.

In 1870, Thomas Alva Edison (1847-1931) invented the incandescent light bulb and many other useful devices. Fig. D.

Another important invention was the electric telegraph. It was perfected by Samuel Morse (1791-1872) in 1837. Fig. E.

In 1880, Heinrich Hertz (1857-1894) proved the existence of electromagnetic waves that could be detected from a distance. He built a device that could generate radio waves. This was the first radio transmitter. Fig. F.

In the 1960s, techniques were developed for building integrated circuits. The electronic age had begun.

1 **Read the text. Then, match the columns.**

a. Michael Faraday	first electric battery
b. Thomas Alva Edison	electromagnet
c. Hans Christian Oersted	electric generator
d. Samuel Morse	incandescent light bulb
e. Heinrich Hertz	electric telegraph
f. Alessandro Volta	radio transmitter

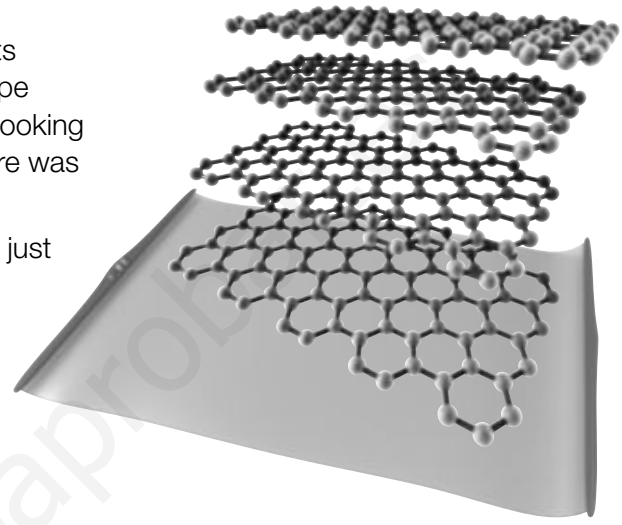
2 **Search the Internet for more information about one of the inventions from the text.**

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 _____

1 **Look at the picture and answer the questions.**

a. How are the objects in A electrically charged? _____

b. How are the objects in C electrically charged? _____

c. What is happening in B? _____

2 **Look at the diagrams. Explain what interaction between electrical charges each shows.**

_____

_____

_____

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 _____

_____

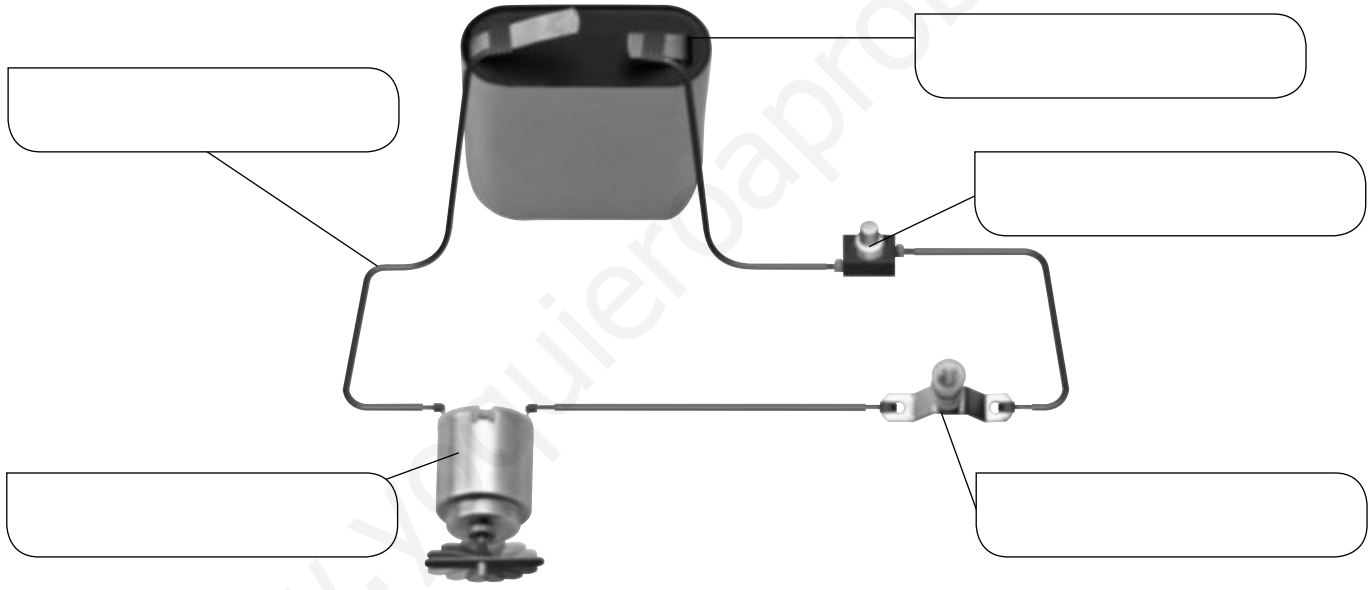
insulators _____

_____

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 **Read the energy transformations. Write the type of power plant.**

a. mechanical energy from water → electricity _____ power plants

b. chemical energy from fossil fuels → electricity _____ power plants

c. mechanical energy from wind → electricity _____ power plants

d. thermal energy from the Sun → electricity _____ power plants

Electricity

TEST

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. always electrically negative.

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 **When electric current flows through batteries, it produces…**

a. heat. b. a chemical effect. c. sound.

7 **In an electric circuit, the switch…**

a. transports electricity.
b. transforms electricity into light energy.
c. controls the flow of electricity.

8 **The component that provides the electricity in a circuit is the…**

a. device. b. cable. c. generator.

9 **We connect appliances to the electrical grid through…**

a. power plants. b. turbines. c. sockets.

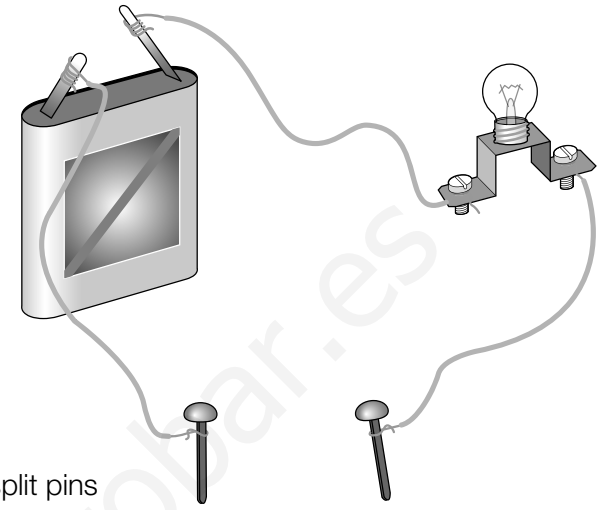
10 **In thermal power plants, …**

a. wind moves a turbine.
b. fossil fuels are used to heat up water.
c. there are no turbines or generators.

Name _____ Date _____

Make a conductivity tester

Instructions



1. Work in groups of four. You need a 4.5 V battery, a light bulb holder, a light bulb, a wire about 50 cm long, two split pins, some insulating tape to build a simple electric circuit and the following objects: a paper clip, an elastic band, a pencil, a pencil lead, a key, a plastic spoon.
2. Cut the wire into three pieces. Ask your teacher to help you strip the plastic covering from the ends of the wire.
3. Build the electric circuit as in the picture.
4. Put the light bulb in the light bulb holder. Make the two split pins touch. If the light bulb lights up, your conductivity tester is ready!
5. Before testing the conductivity of the objects, write down your predictions: *conductor* or *insulator*.
6. Test the objects, one by one. Add your results to the table.

object	prediction	result
paper clip		
elastic band		
pencil		
pencil lead		
key		
plastic spoon		

7. Compare your predictions and the results. Then, write a conclusion.

_____

_____

_____

Name _____ Date _____

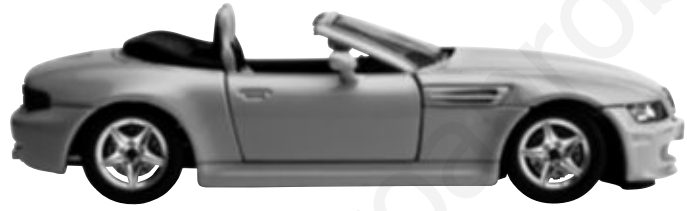
1 **Look at the swing. Why is it moving?**

_____

_____

_____

2 **Draw arrows to show movement and the force of friction.**



3 **Look at the photograph and answer the questions.**

a. The man wants to continue at the same speed. Which two forces must be the same?

_____

b. What will happen if he stops pedalling? Why?

_____

_____

_____

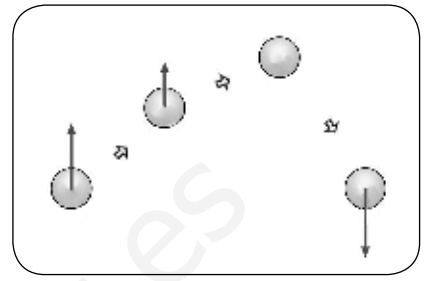
_____

4 **Solve the problem.**

A motorist drives 100 kilometres in one hour. How many kilometres will he drive in three hours if he maintains the same speed?

5 **You throw a ball in the air. Use the words to explain what happens to the ball.**

gravity - speed - upwards - downwards



6 **Read these definitions of machine components and write the names.**

cover - mechanism - sensors - engine - gears - springs

a. These allow a machine to detect information: _____

b. This produces movement by transforming chemical energy into mechanical energy: _____

c. This outer part protects the machine: _____

d. Several operating parts that work together: _____

e. These are wheels with teeth: _____

f. These are coils that store and release energy: _____

7 **Label four operating parts on the bicycle.**

8 **Cross out (✗) the odd one out. Then, write *modern structure, home, free time* or *communication.***

a. animation	exercise machine	refrigerator	motion gaming	_____
b. tower	telephone	the Internet	social networks	_____
c. pillar	beam	foundation	animation	_____
d. dishwasher	bridge	thermostat	refrigerator	_____

Name _____ Date _____

Friction in sports

Friction is a force that slows down the movement of an object (or a person) in contact with a surface or another object.

Surface friction affects sports in which an object, such as a ball, wheel or sled, rolls or slides. For example, if you kick a football on grass, friction between the ball and the grass causes the ball to slow down. Friction differs depending on the surface: the smoother the surface, the less friction there is.

Air resistance plays a big role in ball sports or in sports in which a person moves through the air, such as running or cycling, and water resistance affects aquatic sports such as swimming.

In some sports, it is advantageous to decrease friction, for example, in skiing or ice skating. Skis are treated with wax so that they slide faster, and skate blades are sharpened to reduce friction. In other sports, it is better to increase friction. For example, in football, players wear shoes with studs, and goalkeepers wear special gloves.

1 **Read the text and answer the questions.**

a. When does friction slow down the movement of an object?

_____

b. Is friction greater on ice or on sand? Why?

_____

c. Why do skiers wax their skis?

_____

d. Why do you think goalkeepers wear special gloves?

_____

2 **Search the Internet to find out how friction affects another sport. Write a paragraph describing how friction is increased or decreased to gain advantage.**

_____

_____

_____

Name _____ Date _____

Watches over time

In the past, all watches were mechanical. Mechanical watches do not have batteries. The source of energy in these watches is the mainspring. The spring can be wound into a tight coil mechanically or automatically. The energy from the spring is transformed into movement and transferred to a series of small gears.

Nowadays, most watches have a battery. The mineral quartz is the energy source for about 95 % of these batteries. Quartz crystals can accumulate electrical charges which are then released as signals with very precise frequency.

Smartwatches are the most recent development in this field. They are computerized wristwatches that do a lot more than just tell time. A smartwatch may include a touch screen, camera, thermometer, compass, calculator, mobile phone and GPS. It can provide access to news, weather, music, sports and social networks. Smartwatches run on rechargeable batteries similar to the ones in smartphones.

Eco-Drive technology is new in watch making. An Eco-Drive watch is powered by light energy. It recharges continuously using any natural or artificial light source. An Eco-Drive watch runs forever!

1 **Read the text and complete the table.**

type of watch	description	energy source

2 **Search the Internet for photographs of the wristwatches described above. Print, cut and paste them onto a sheet of paper and write a short description.**

Name _____ Date _____

1 **Use the words to complete the text about forces.**

temporarily - move - changes - break - direction - shape - permanently

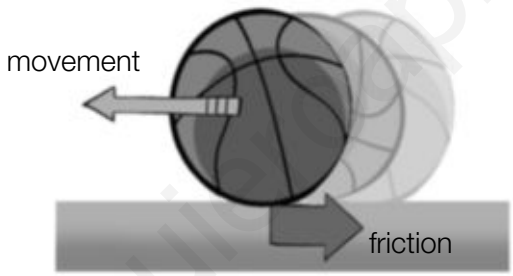
Forces cause _____. They can make objects change _____ or break.

Some objects change their shape _____ and do not return to their initial shape.

Other objects change their shape _____ and return to their initial shape. Rigid objects _____ when sufficient force is applied.

Forces can also make objects start to _____, change _____ or stop.

2 **Describe what is happening in the picture.**



_____

_____

_____

3 **Calculate the speeds. Then, answer the questions.**

a. Andrea drives 400 km to the seaside. It takes her five hours.

What is her average speed? _____.

b. David takes two hours to drive to his dad's house. The distance is 180 km.

What is his average speed? _____.

- How can they know their speed at a particular moment?

_____

- What two forces slow down moving cars?

f_ _ _ _ _ _ _ _ a _ _ r_ _ _ _ _ _ _ _ _ _

4 **What is gravity? Define in your own words. Then, answer the question.**

- How does gravity affect an object moving upwards? And downwards?

5 **Look at the picture. What force makes the ball fall? Explain.**

6 **Unscramble the words and write the names of eight machine components. Then, tick (✓) the ones that may work together in a mechanism.**

a. ehwle: _____ ☐
b. torom: _____ ☐
c. xela: _____ ☐
d. neesrc: _____ ☐
e. cetsururt: _____ ☐
f. nicah: _____ ☐
g. tidarcino: _____ ☐
h. revle: _____ ☐

7 **Circle the advances in modern life and classify them. Then, add one more example of each.**

bridgeradioexercisemachinedishwasherelectronicmailanimationtowerdualflushtoilet

modern structure	home	free time	communication

Forces and machines

TEST

Name _____ Date _____

1 **If you apply sufficient force to a rigid object, it will…**

a. break.
b. change shape temporarily.
c. change shape permanently.

2 **If a ball is rolling on the grass, it will slow down and stop because of…**

a. water resistance. b. speed. c. friction.

3 **A car travels 300 km in 6 hours. Its speed is…**

a. 20 km/h. b. 50 km/h. c. 180 km/h.

4 **You throw a ball up in the air. As it travels upwards, gravity…**

a. causes the ball to speed up.
b. causes the ball to slow down.
c. does not affect the ball.

5 **The component of a machine that produces movement is the…**

a. operating part. b. structure. c. motor.

6 **Indicators and screens…**

a. give information about what the machine is doing.
b. receive information from outside the machine.
c. distribute electricity throughout the machine.

7 **Gears are…**

a. levers that turn in circles.
b. wheels with teeth.
c. rods that support rotating wheels.

8 **Pedals on a bicycle are an example of…**

a. axles. b. belts. c. levers.

9 **The foundation of a structure…**

a. transmits weight to the columns.
b. is built in the ground.
c. connects the cables to the beams.

10 **To regulate the temperature in our homes, we use…**

a. water flow regulators. b. appliances. c. thermostats.

Name _____ Date _____

Which technological advance has changed the world the most?

Instructions

1. Work in groups of four. Look at the following technological advances.

the telephone

radio and television

the automobile

the personal computer

the Internet

motion gaming

2. Do a survey at school. Ask which of these technological advances has changed the world the most. Ask students, teachers, administrators and other school workers.
3. How many people chose each technological advance? Write the number in each column.

the telephone	radio and television	the automobile	the computer	Internet	motion gaming

4. Make a bar graph with the data from the table.
5. Answer these questions about your findings:
   - Which advance is considered to have changed the world the most? _____
   - Did most people agree? _____

THE HUMAN BODY AND LIVING THINGS

REINFORCEMENT

PAGE 6

1. Match and write the sentences.

a. All living things are made up of cells.

b. All living things carry out three basic life processes.

c. Cells are the basic units of life.

d. Human beings are multicellular living things.

2. Write the correct life process: *nutrition*, *sensitivity* or *reproduction*.

reproduction, nutrition, sensitivity.

3. Label the pictures with the words in the box.

neuron, blood cells, intestine cell, muscle cell.

PAGE 7

4. Circle the levels of organization and write each under the correct picture. 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

left column: cell (1), system (4).

right column: organ (3), organism (5).

bottom: tissue (2).

5. Match.

a. objective lenses: They provide different levels of magnification.

b. light source: It provides light to look at the sample.

c. stage: This is where you put the sample.

d. eyepiece: It contains the lens you look through.

6. Complete the table with two examples of each.

Model Answer (MA)

head: cranium, jaw bone; frontalis, masseter.

arms: ulna, radius; biceps, triceps.

trunk: sternum, pelvis; pectorals, abdominals.

legs: femur, tibia; quadriceps, calf muscles.

EXTENSION

PAGE 8

1. Read the text and answer the questions.

a. Size is important because it affects how an organism manages to survive and how it reacts to its environment.

b. The largest living thing on Earth is a fungus.

c. The smallest living things on Earth are a type of bacteria.

d. Mycoplasmas 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.

Open Answer (OA)

PAGE 9

1. Look at the diagram and answer the questions.

a. The membrane protects a cell from the outside.

b. The cytoplasm contains the organelles.

c. Centrosomes are involved in cell reproduction.

d. The mitochondrion obtains energy.

2. Match the cell types with their functions.

neurons: transmit messages and orders.

fat cells: store energy.

blood cells: transport substances throughout the body.

ASSESSMENT

PAGE 10

1. Read and write the words.

a. A basic unit of life: cell.

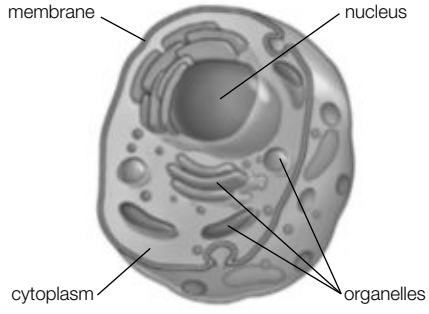
b. The three basic life processes: nutrition, reproduction, sensitivity.

c. A living thing made up of a single cell: unicellular.

d. A living thing made up of many cells: multicellular.

e. An instrument to observe cells: microscope.

2. Unscramble the words and label the diagram. Then, answer the question.



MA. Bone cells and muscle cells.

3. Write the next four levels of organization of the human body.

Cells ► tissues ► organs ► systems ► organism.

MA

In the human body, cells, tissues, organs and systems work together so the organism functions correctly.

PAGE 11

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

a. F; b. T; c. F; d. T; e. T.

Multicellular living things are made up of different types of cells.

The stomach and the heart are organs in the human body.

5. Label the parts of the microscope. Then, answer the question.

left column: stage, light source.

right column: eyepiece, objective lenses.

The objective lenses are responsible for the different levels of magnification.

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

(E) The biceps relaxes and the triceps contracts. The triceps pulls the ulna, so the arm straightens.

(F) The biceps contracts and the triceps relaxes. The biceps pulls the radius, so the arm bends at the elbow.

TEST

PAGE 12

1. b; 2. a; 3. b; 4. c; 5. b; 6. a; 7. a; 8. c; 9. a; 10. b.

INVESTIGATE

PAGE 13

OA

THE CLASSIFICATION OF LIVING THINGS

REINFORCEMENT

PAGE 14

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

a. F; b. F; c. T; d. T; e. F.

Animals and fungi feed on other organisms.

Fungi can be unicellular or multicellular.

Some 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.

top row: A, R, M.

bottom row: B, F.

MA

Amphibians: oviparous; Reptiles: breathe with lungs; Mammals: viviparous; Birds: two wings; Fish: have fins.

3. Name one example of each type of invertebrate.

MA

a. sponge: coral; b. cnidarian: jellyfish; c. worm: earthworm; d. echinoderm: starfish; e. mollusc: mussel; f. arthropod: bee.

PAGE 15

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

fern, angiosperm, gymnosperm, moss.

MA

fern: leaves called fronds; angiosperm: produce flowers; gymnosperm: produce cones; moss: very small.

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

oak tree: Plant kingdom; intestinal bacteria: Monera kingdom; red algae: Protista kingdom.

MA

Oak trees and red algae make their own food.

Oak trees are multicellular, but intestinal bacteria are unicellular.

Red algae are aquatic living things, and bacteria can live in all kinds of environments.

6. Circle the living things and classify them.

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

animals: dolphin, squirrel; plants: fern, apple tree; fungi: wild mushroom; monerans: yoghurt bacteria, cholera bacteria; protists: kelp, paramecium.

EXTENSION

PAGE 16

1. Read the sentences and circle the correct word.

a. The platypus is a freshwater mammal.

b. It lays eggs in burrows.

c. Its body is covered with fur.

d. It has a bill.

e. It is a carnivore.

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

OA

PAGE 17

1. Read the text and answer the questions.

a. He was a Scottish scientist.

b. He accidently discovered penicillin.

c. A fungus produced it.

d. He observed that the substance killed some harmful bacteria.

e. Because it saved many lives.

f. It was called the 'miracle drug'.

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

OA

ASSESSMENT

PAGE 18

1. Identify and label the five kingdoms of living things.

A. Protista; B. Plant; C. Animal; D. Fungi; E. Monera.

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

a. Fungi; b. Animal; c. Plant; d. Protista; e. Monera.

3. Complete the crossword about vertebrate groups.

1. mammals; 2. reptiles; 3. birds; 4. fish; 5. amphibians.

PAGE 19

4. Read the definitions and write the invertebrate group.

a. cnidarians; b. molluscs; c. arthropods; d. worms; e. sponges; f. echinoderms.

5. Complete the chart.

Plants can produce spores: mosses, ferns.

Plants can produce seeds: angiosperms, gymnosperms.

6. Match the columns using five different colours.

MA

yeast – bread – Fungi kingdom.

bacteria – yoghurt – Monera kingdom.

mould – blue cheese – Fungi kingdom.

algae – sushi – Protista kingdom.

mushroom – mushroom – Fungi kingdom.

7. Research examples of harmful bacteria, moulds and mushrooms.

MA

Some bacteria can cause illnesses such as cholera. Some moulds can cause allergic reactions. Some mushrooms are poisonous and can make us sick.

TEST

PAGE 20

1. c; 2. c; 3. a; 4. a; 5. b; 6. c; 7. c; 8. b; 9. a; 10. c.

INVESTIGATE

PAGE 21

OA

SENSITIVITY AND THE SENSES

REINFORCEMENT

PAGE 22

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

a. The brain sends order to the locomotor system.

b. Nerves send information from the sense organs to the brain.

c. Receptors in our sense organs detect stimuli.

d. Muscles and bones carry out the corresponding responses.

e. The brain receives and interprets this information.

order: 4; 2; 1; 5; 3.

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

✓ Saliva is produced when we eat food.

✓ Our heart is beating at all times.

The nervous system is responsible for internal coordination.

3. Label the diagram.

clockwise, starting top center: ossicles, auditory nerve, cochlea, eardrum, ear canal, outer ear.

PAGE 23

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

MA

eyes: Information travels from the retina to the brain through the optic nerve.

nose: Information travels from the olfactory epithelium to the brain through the olfactory nerve.

tongue: Information travels from the taste buds to the brain through the taste nerves.

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

a. T; b. T; c. F; d. T; e. F; f. F.

The central nervous system is made up of the brain and the spinal cord.

The peripheral nervous system extends throughout the body.

Sensory nerves connect the receptors in the sense organs to the central nervous system.

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

cerebrum, cerebellum, brainstem.

MA

The cerebrum controls voluntary actions. It also stores data and controls emotions.

The cerebellum controls movement, coordination and balance.

The brainstem controls internal organ activities.

EXTENSION

PAGE 24

1. Read the text and complete the table.

main cause: inherited trait.

population affected: 250 million people.

most common type: red-green colour blindness.

least common type: total colour blindness.

job limitations: train driver, airline pilot.

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

OA

PAGE 25

1. Read the text and complete the index card.

MA

Definition: a sleep disorder which consists of walking or doing other activities while asleep.

Activities performed: sitting up in bed, walking, climbing, driving.

Causes: fatigue, fever, certain medications, stress.

Risks: falling down, running into things.

Precautions: removing obstacles, closing doors and windows.

2. Do a survey in your class. How many people sleepwalk or know a sleepwalker?

OA

ASSESSMENT

PAGE 26

1. Read the definitions and write the words.

a. Changes in the external environment: stimuli.

b. Organs that capture information from the environment: sense organs.

c. Groups of specialized cells that are sensitive to stimuli: receptors.

d. System that controls the function of sensitivity: nervous system.

e. System that carries out the orders from the brain: locomotor system.

f. Part of the function of sensitivity that controls many body processes: internal coordination.

2. Complete the diagram. Then, answer the questions.

sense organs, information, brain, orders, the locomotor system.

a. The eyes are involved (and perhaps the ears).

b. The eyes see that the ball is coming.

c. The brain interprets the information and decides how to act.

d. The muscles and bones carry out the orders.

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

a. ~~retina~~, ears; b. ~~taste buds~~, nose; c. ~~ear canal~~, eyes.

PAGE 27

4. Draw a diagram of the sense organ for each sense. Then, label the part of each sense organ where the receptors are located.

OA

sight: retina; touch: skin; taste: taste buds.

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

MA

Dendrites receive messages from the sense organs.

The axon transmits messages to other neurons.

The body is the widest part of the neuron.

6. Complete the chart about the nervous system.

central nervous system; spinal cord, brain; cerebrum, cerebellum, brainstem.

peripheral nervous system; sensory nerves, motor nerves.

TEST

PAGE 28

1. a; 2. a; 3. c; 4. b; 5. c; 6. c; 7. a; 8. b; 9. c; 10. a.

INVESTIGATE

PAGE 29

OA

HEALTH AND HEALTH RISKS

REINFORCEMENT

PAGE 30

1. Complete the chart.

Health risks to the nervous system: accidents, diseases, alcohol.

Health risks to the locomotor system: bone fractures, sprains, muscle strains.

2. Use the words in the box to write sentences about damage to the nervous system.

MA

accidents: They cause brain injuries and spinal cord injuries.

diseases: They cause loss of memory and tremors.

alcohol: Alcohol intoxication can cause blurred vision and loss of reflexes.

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

most common injuries: bone fractures; sprains; muscle strains.

type of damage: broken bones; sprained ankles, knees, wrists; muscle contraction.

cause: accidents; twisting; excessive effort, bad posture.

A bone fracture requires a plaster cast.

Sprains are most common in joints.

Muscle strains may result from bad posture.

PAGE 31

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

top row: ✗, ✓; bottom row: ✗, ✓.

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

a. T; b. F; c. F; d. F; e. T.

Physical activity can refer to walking the dog, dancing and other activities.

Good posture is always important.

Bone growth requires calcium and vitamin D.

6. Match. Then, write some examples of your own healthy habits.

swimming – physical activity; eating oily fish – healthy diet; walking to school – physical activity; reading – leisure; drinking milk – healthy diet; playing cards – leisure.

MA

walking my dog, doing stretching exercises, carrying my school bag over both shoulders, eating a lot of green vegetables, listening to music.

EXTENSION

PAGE 32

1. Read the text and answer the questions.

a. Simple fractures, compound fractures and greenstick fractures.

b. Compound fractures are hardest to heal.

c. Right after a bone breaks, broken blood vessels cause swelling and send signals to other parts of the body to start the repairing process.

d. The first team of cells removes damaged bone tissue.

e. The second team of cells builds new bone.

f. Because our body is constantly removing old bone and making new bone.

2. Do a survey to find out how many people in your class have had a bone fracture.

OA

PAGE 33

1. Read the text and answer the questions.

a. A food allergy is a reaction of the body's immune system to a particular substance in food.

b. Food allergens can cause irritation of the skin, nausea, vomiting and respiratory problems or disorders of the circulatory system.

c. The most common food allergies in children are allergies to nuts, milk, wheat, eggs and shellfish.

d. A person with a milk allergy should also avoid cheese and yoghurt.

e. Children can often outgrow allergies to milk and eggs.

f. The best way to control food allergies is to follow a strict diet and avoid eating certain foods.

2. Do a survey to find out how many people in your class have food allergies.

OA

ASSESSMENT

PAGE 34

1. Read the sentences and write the words.

a. These cause injuries to the brain and spinal cord: accidents.

b. This disease usually affects the elderly: Alzheimer's.

c. This substance can affect the brain: alcohol.

d. This happens when a bone breaks or cracks: bone fracture.

e. This involves damage to a ligament: sprain.

f. This is caused by excessive effort or bad posture: muscle strain.

2. Cross out (✗) the odd one out. Then, write the corresponding damage to the nervous system.

a. ~~brain~~, spinal cord injury; b. ~~memory~~, Parkinson's; c. ~~spinal cord~~, alcoholism.

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

MA

A bone fracture is when a bone breaks.

A sprain involves damage to ligaments. It is usually caused by twisting.

PAGE 35

4. Complete the sentences with the correct words.

a. When we do physical activity, we develop elasticity and strengthen our muscles and bones.

b. We can prevent injuries by warming up and stretching before and after exercising.

c. We can avoid sports accidents by wearing a helmet and protective clothing.

5. Tick (✓) the photos that show good posture. Then, write a sentence about each one.

A. ✓; B. ✓.

MA

a. The boy is carrying his schoolbag over both shoulders.

b. The girl is sleeping on her side.

c. The boy has not bent his legs. His back is not straight.

6. Write a sentence with each group of words.

MA

Calcium and vitamin D are needed for healthy bones.

Sleep allows our body to rest and our brain to store information.

Leisure time helps you to relax, and it is important for your health.

TEST

PAGE 36

1. c; 2. a; 3. b; 4. c; 5. b; 6. a; 7. c; 8. a; 9. a; 10. c.

INVESTIGATE

PAGE 37

OA

PLANT GROWTH AND NUTRITION

REINFORCEMENT

PAGE 38

1. What do plants need? Label the drawing.

left column: sunlight, mineral salts.

right column: air, water.

2. Where can these plants grow? Write *a bright area*, *a humid area* or *a hot area*.

cactus: a hot area; lavender: a bright area;
moss: a humid area.

3. Complete the sentences.

Plants take in carbon dioxide from the air to make their food.

Fertile soil is rich in water and mineral salts.

PAGE 39

4. Match the columns using three different colours.

Fir trees grow well in low temperatures.

Beech trees grow well in mild temperatures.

Palm trees grow well in high temperatures.

5. Match the sentences about plant nutrition. Then, number them in order.

a. Raw sap and carbon dioxide transform into elaborated sap through photosynthesis.

b. Plants take in carbon dioxide through stomata in the leaves.

c. Raw sap travels up from the roots through xylem vessels.

d. Sunlight is trapped by chlorophyll found in the leaves and stem.

e. Plants absorb water and mineral salts through their roots.

f. Elaborated sap is distributed through phloem vessels.

order: 5; 3; 2; 4; 1; 6.

6. Colour the arrows green for oxygen and red for carbon dioxide.

photosynthesis: plants take in carbon dioxide (red arrow) and release oxygen (green arrow).

respiration: plants take in oxygen (green arrow) and release carbon dioxide (red arrow).

7. Complete the text about gas exchange in plants.

Through photosynthesis, plants take in carbon dioxide and release oxygen during the day. Through respiration, plants take in oxygen and release carbon dioxide during the day and at night. Plants produce more oxygen than they take in.

EXTENSION

PAGE 40

1. Read the text. Choose one adaptation per area and complete the table.

MA

type of area: water is scarce; less light and cool temperatures; cold temperatures; very cold temperatures.

plant adaptation: waxy leaves or no leaves; broad leaves; needle-like leaves; dark leaves.

reason for adaptation: reduce loss of water; absorb lots of sunlight; allow snow to fall off more easily; absorb sunlight and heat.

2. Research how cactuses adapt to desert conditions and write a brief description.

MA

Cactuses have long roots which cover a large area. They store water inside their stems.

PAGE 41

1. Read the text and complete the sentences.

a. Sequoias are the largest and oldest trees on Earth.

b. They have thick, fibrous bark which is resistant to fire.

c. Chemicals in their bark protect them against disease.

d. They actually need fire to reproduce.

e. Giant sequoias are native plants of California.

f. They grow at elevations of up to 2,700 metres.

2. Search the Internet for information about the three largest sequoias in the world and complete the table.

MA

1 General Sherman	California	84 metres
2 General Grant	California	82 metres
3 President	California	73 metres

ASSESSMENT

PAGE 42

1. Complete the chart. Then, answer the question.

Plants need light, water, air and mineral salts to grow.

They take in carbon dioxide in order to make their food.

2. Use the words in the box to complete the sentences.

a. Reeds and bulrushes grow very close to water because they need a lot of water to grow.

b. Elm trees can grow far from water because they need less water to grow.

c. Water buttercups grow in water because they need a constant supply of water to grow.

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

a. Plants take in carbon dioxide to make their food.

b. Plants absorb mineral salts through their roots.

c. Most plants grow in fertile soil which is rich in water and mineral salts.

PAGE 43

4. Label the parts of the plant. Then, answer the question.

from top to bottom: stomata; carbon dioxide; xylem vessels; root hairs.

Photosynthesis takes place during the day.

5. Circle the words related to plant nutrition. Then, choose three to complete the sentences.

stomata; raw sap; chlorophyll; phloem vessels.

Chlorophyll is a green substance which traps sunlight.

Stomata are openings in the leaves for gas exchange.

Phloem vessels are tubes that distribute elaborated sap throughout the plant.

6. Match, then answer the question.

elaborated sap – phloem vessels.

raw sap – xylem vessels.

MA. Phloem vessels reach all parts of the plant because they carry the nutrients which all parts of the plant need.

TEST

PAGE 44

1. b; 2. a; 3. b; 4. c; 5. b; 6. a; 7. c; 8. b; 9. b; 10. c.

INVESTIGATE

PAGE 45

OA

ECOSYSTEMS

REINFORCEMENT

PAGE 46

1. Look at the picture and answer the questions about this ecosystem.

It is a terrestrial ecosystem.

The physical environment is made up of rocks, water, air, temperature, humidity and light.

People and animals are present in this ecosystem.

MA. Living things modify this environment by making their homes here and fishing here.

2. Match each word with its definition. Then, look at the picture above and label a species, a population and the community.

community: all the populations in an ecosystem.

species: group of living things that can successfully reproduce.

population: all the organisms of one species in an ecosystem.

MA. Labels: all the living things (community); the walruses (species); all the seagulls (population).

3. Write an example of each.

MA

a. Producer: grass.
b. Primary consumer: rabbit.
c. Secondary consumer: fox.
d. Tertiary consumer: eagle.
e. Scavenger: vulture.
f. Decomposer: mushroom.

PAGE 47

4. Number the living things in this food chain in order. Then, write *producer*, *primary consumer*, *secondary consumer* and *tertiary consumer*.

top row: 4, 2.

bottom row: 3, 1.

top row: tertiary consumer; primary consumer.

bottom row: secondary consumer; producer.

5. Match the columns using four different colours.

a. Competition is the relationship between different species that have the same needs.
b. Parasitism is the relationship between two species when one benefits while the other suffers.
c. Mutualism is the relationship between two species when both benefit.
d. Commensalism is the relationship between two species when one benefits and the other remains unaffected.

6. Look at the pictures. Name each type of relationship.

competition; mutualism; parasitism.

EXTENSION

PAGE 48

1. Read the text and answer the questions.

a. Tropical rainforests need hot and humid areas to grow.

b. These ecosystems are in Africa, Asia and Central and South America.

c. The Amazon rainforest is the largest in the world.

d. They produce so much oxygen because there are so many trees.

e. A rainforest is one of the richest ecosystems because there is a large variety of flora and fauna.

2. Search the Internet for information about an animal species from a tropical rainforest. In your notebook, write a brief description of your animal. Include a photograph or a drawing.

OA

PAGE 49

1. Read the text and circle the correct word.

a. Tundra ecosystems are found in the Arctic.

b. Temperatures in tundra ecosystems are very low.

c. The top layer of the soil is the permafrost.

d. Winter in the Arctic tundra is longer than summer.

e. Global warming is threatening the Arctic tundra.

2. Search the Internet for three examples of fauna from the Arctic tundra. Write what they eat.

OA

ASSESSMENT

PAGE 50

1. Look at the ecosystem and answer the questions.

a. This is a terrestrial ecosystem.

b. It is a flat area; there is air; there is fertile soil.

c. MA. A wild boar.

d. MA. Sparrow hawks and stag beetles.

e. All the living things. An ecosystem includes more components than a community because it includes the physical environment too.

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

a. T; b. F; c. T; d. F; e. T.

Secondary consumers in an ecosystem are always carnivores.

Food chains always start with a producer.

PAGE 51

3. Look at the food web and write examples.

MA

a. Two producers: wheat and clover.

b. Two primary consumers: mouse and grasshopper.

c. Two secondary consumers: harrier and lizard.

d. Two tertiary consumers: fox and kestrel.

4. Look at the food web from Activity 3 and complete the following two food chains. Then, answer the question.

wheat ► rabbit ► fox

wheat ► grasshopper ► lizard ► fox

In the first food chain, the fox is a secondary consumer.

In the second food chain, the fox is a tertiary consumer.

5. Write an example of each type of relationship.

MA

Mutualism: bees and flowers.

Commensalism: remoras and sharks.

Parasitism: fleas and dogs.

Competition: squirrels and dormice.

TEST

PAGE 52

1. c; 2. a; 3. a; 4. c; 5. b; 6. a; 7. c; 8. a; 9. c; 10. b.

INVESTIGATE

PAGE 53

OA

PEOPLE AND THE ENVIRONMENT

REINFORCEMENT

PAGE 54

1. Circle six ecosystems. Classify them. Then, tick (✓) the saltwater ecosystem.

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

terrestrial ecosystems: forest, steppe, desert.

aquatic ecosystems: river, lagoon, open sea (✓).

2. Write six factors that make up the environment of human beings.

MA

1. temperature; 2. water; 3. roads; 4. buildings; 5. vehicles; 6. other living things.

3. Look at the picture. Write the human activities that modify the environment.

MA

building houses and shops, livestock farming, growing crops, building bridges, making fences, building roads and installing electric cables.

PAGE 55

4. Read the descriptions and name the negative effects of human activity.

a. desertification; b. deforestation; c. endangered species; d. pollution.

5. Name the two negative effects of human activity. Then, answer the question.

A. desertification; B. deforestation.

MA

a. Desertification is usually the result of deforestation. Without tree roots, the soil is unprotected and rain causes erosion. Slowly, the area becomes a desert.

b. Deforestation happens when forests disappear. This can be caused by forest fires or because people cut down too many trees.

6. Write two ways of protecting the environment for each case.

MA

government measures: disposing of waste appropriately, establishing animal protection laws.

citizen actions: recycling waste, saving energy.

EXTENSION

PAGE 56

1. Read the text and answer the questions.

a. Liquid wastes, such as oil, and solid wastes, such as plastics, are polluting the oceans.

b. Tiny marine organisms eat pollutants and this can poison marine food webs.

c. Oil spills harm marine algae because they block out sunlight, which the algae need to make their food. The oil can also harm or kill marine animals.

d. Plastic objects harm marine animals because the animals think they are food and they eat them.

e. Garbage patches are huge heaps of debris made up of tiny plastic fragments.

PAGE 57

1. Read the text and answer the questions.

a. Doñana National Park is a wetland reserve.

b. The Guadalquivir River runs through Doñana.

c. You can find marshes, lagoons and sand dunes.

d. Birds fly from northern Europe to Doñana in late autumn.

e. You can find the Iberian Lynx and the Spanish Imperial Eagle.

2. Search the Internet for information about two migratory birds you can find in Doñana National Park. Then, complete the table.

OA

ASSESSMENT

PAGE 58

1. Identify each ecosystem and a living thing it is home to.

MA

A. Mediterranean forest: rabbits.

B. mountain grassland: butterflies.

C. rocky shore: sea anemones.

D. river: trout.

2. Draw other components of the environment of a squirrel, including one component that is the result of human activity. Then, write sentences about the squirrel's environment.

MA

Owls live in the same environment as squirrels, and they eat squirrels.

Some people hunt squirrels.

People cut down trees to build houses, and this reduces the squirrel's habitat.

PAGE 59

3. Look at the photograph of Antarctica and answer the question.

MA

Antarctica can be affected by air pollution. Air pollution is causing global warming. Because of global warming, the temperatures in Antarctica are increasing and some of the ice is melting. This affects all the living things that live there.

4. Complete the table about negative effects of human activity.

MA

negative effect: water pollution; desertification.

causes: soaps, detergents, industrial waste and chemicals; deforestation.

consequences: contaminated water; soil erosion and no fertile soil.

5. Complete four ways of protecting the environment. Then, match them to the photos.

a. Recycling waste. b. Saving energy. c. Saving water. d. Respecting nature.

top row: b, c.

bottom row: d, a.

TEST

PAGE 60

1. c; 2. b; 3. b; 4. c; 5. a; 6. c; 7. a; 8. b; 9. c; 10. a.

INVESTIGATE

PAGE 61

OA

MATTER

REINFORCEMENT

PAGE 62

1. Complete the mind map.

Matter has general properties: mass is measured in kilograms or grams; volume is measured in litres or millilitres.

Matter has specific properties: colour, hardness, flexibility and density.

2. Look at the photographs. Write how to measure volume in each case.

A. the water displacement method; B. a mathematical formula; C. measuring cylinders.

3. Write *mass*, *volume* or *density*.

Density refers to the concentration of matter in a particular volume.

Mass is the amount of matter in an object.

Volume is the amount of space an object occupies.

Mass and volume are general properties of matter.

Density is a specific property of matter.

PAGE 63

4. Find eight objects and classify them. Then, answer the questions.

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

objects that float: rubber duck, match, cork, bottle cap, pencil.

objects that sink: nail, rock, marble.

Objects that float have a lower density than water.

Objects that sink have a higher density than water.

5. Complete the table about the physical states of matter. Write *fixed* or *not fixed*. Then, answer the question.

solids: fixed, fixed.

liquids: fixed, not fixed.

gases: not fixed, not fixed.

6. Match. Then, write an example of each.

sublimation: A solid turns into a gas. MA. Air freshener.

reverse sublimation: A gas turns into a solid. MA. Frost.

EXTENSION

PAGE 64

1. Read the text and complete the table about plasma.

description: plasma are gases with electrically charged particles.

examples of natural plasma: the Sun, other stars, lightning, Northern Lights.

examples of man-made plasma: neon signs, plasma screens, plasma lamps, fluorescent light blubs.

2. Search the Internet for more information about other uses of man-made plasmas.

OA

PAGE 65

1. Read the text and make an index card.

MA

Description: a thin, clear, flexible, strong and light material.

Components and structure: made of layers of chitin and fibroin.

Advantages: it can be rigid or elastic; it can be produced at very low cost.

Uses: film, rubbish bags, nappies, packaging materials and medical supplies.

2. Search the Internet for general information about other bioplastics. Write their names and some of their advantages.

OA

ASSESSMENT

PAGE 66

1. Complete the table.

general or specific property: general; general; specific.

definition: the amount of matter in an object; the amount of space that an object occupies; the concentration of matter in a particular volume.

measurement unit: kilograms or grams; litres, millilitres, cubic centimetres; grams per cubic centimetre.

2. Look at the photos and answer the question.

MA

The ball in photograph A has the higher density. It has more mass concentrated in the same volume than the ball in photograph B.

3. Look at the photo of oil and water. Which substance is denser? Explain.

The water is denser. The oil is floating on the water so the density of the oil is lower than the density of the water.

PAGE 67

4. Complete the table about the states of matter.

state of matter: solid; liquid; gas.

description: atoms are very close together and cannot move; atoms are further apart and can move more freely; atoms are much further apart and can move more freely than in liquids.

5. Write an example of each.

MA

paper; glass; honey; perfume.

6. Which properties of gases do these pictures illustrate? Explain.

MA

They show that gases do not have a fixed volume or a fixed shape. The syringe contains air, which is a gas. When the air is compressed, its mass remains the same, but its volume decreases.

TEST

PAGE 68

1. b; 2. a; 3. c; 4. b; 5. a; 6. c; 7. c; 8. a; 9. b; 10. c.

INVESTIGATE

PAGE 69

OA

ENERGY

REINFORCEMENT

PAGE 70

1. Cross out (✗) the odd one out. Then, write the corresponding form of energy.

a. ~~computer~~, mechanical; b. ~~blender~~, thermal; c. ~~water~~, chemical; d. ~~snow~~, light.

2. Match each picture to its corresponding energy transformation. Then, complete the table with examples from your home.

A. chemical energy ► thermal energy.

B. electrical energy ► mechanical energy.

C. electrical energy ► thermal energy.

D. chemical energy ► mechanical energy.

MA

electrical ► mechanical: vacuum cleaner, sewing machine.

electrical ► thermal: cooker, toaster.

electrical ► light: lamp, television.

3. Write one energy source for each type of energy.

MA

a. wind; b. uranium atoms; c. biomass; d. the Earth's internal heat; e. the Sun.

PAGE 71

4. Write the energy source used in each type of power plant. Then, answer the question.

a. coal, petroleum and natural gas.

b. water.

c. uranium and plutonium.

Water will never run out.

5. Match and write sentences about environmental problems.

a. Fossil fuels are limited resources.

b. Burning fossil fuels causes global warming.

c. Toxic substances in the air produce acid rain.

d. Nuclear power plants produce radioactive waste.

6. Describe the ways of saving energy shown in the pictures. Then, add another example.

A. Drying clothes on a clothes line.

B. Using public transport.

C. Turning off lights when not in use.

MA

Taking showers instead of baths.

EXTENSION

PAGE 72

1. Read the text and answer the questions.

a. Geothermal energy is thermal energy generated inside the Earth.

b. Geothermal energy is always available.

c. Geothermal energy can be used to heat buildings or to generate electricity.

d. The United States, the Philippines and Indonesia are the leading producers of geothermal energy.

e. The Geysers is the largest geothermal power plant.

f. Iceland is the leading user of geothermal energy.

2. Search the Internet for information about geothermal energy in Spain and write a brief description.

OA

PAGE 73

1. Read the text and answer the questions.

a. Bioclimatic architecture saves energy and achieves optimal thermal and lighting conditions.

b. Andalusian courtyards.

c. The orientation is important because different sides of a building receive different amounts of light and heat from the Sun.

d. Using thermal insulating materials and double windows helps maintain the indoor temperature.

2. Look around your home. Make a list of architectural elements that can be considered bioclimatic.

OA

ASSESSMENT

PAGE 74

1. Write the form of energy for each situation.

a. mechanical; b. light; c. electrical; d. nuclear; e. chemical.

2. Complete the mind map.

Energy can be transformed. Energy can be transferred. Energy can be stored. Energy can be transported.

3. Find eight energy sources and classify them. Then, answer the questions.

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

renewable sources: wind, water, Sun, biomass.

non-renewable sources: petroleum, uranium, plutonium, coal.

Uranium and plutonium are found in minerals.

Biomass is organic matter.

PAGE 75

4. Name the energy source in each photograph. Then, write the name of the power plant where each energy source is used.

the earth's internal heat; geothermal power plant.

flowing water; hydroelectric power plant.

5. Complete the mind map about fossil fuels.

Burning fossil fuels releases greenhouse gases causing global warming.

Burning fossil fuels releases toxic substances causing air pollution.

Toxic substances react with water producing acid rain.

6. Use the words to write about ways of saving energy.

MA

Use public transport to save energy.

Reduce the thermostat settings to save energy.

Remember the three Rs: recycle, reuse and reduce.

Take showers instead of baths.

TEST

PAGE 76

1. c; 2. b; 3. b; 4. a; 5. a; 6. b; 7. c; 8. b; 9. b; 10. a.

INVESTIGATE

PAGE 77

OA

LIGHT AND HEAT

REINFORCEMENT

PAGE 78

1. Use the clues to write the properties of light.

a. Light travels at 300,000 kilometres per second.

b. Light travels in a straight line.

c. Light travels in all directions.

2. Unscramble the words and label the pictures.

glass: transparent.

bowl: opaque.

lampshade: translucent.

3. Complete the text about the reflection of light.

Most objects are not sources of light. We can only see them because they reflect part of the light that hits their surface. When light hits an object, it bounces off the object. This is called reflection. The reflected light enters our eyes. This is how we see objects. Smooth and shiny surfaces reflect most of the light.

PAGE 79

4. Describe two properties of light shown in picture A. Then, use picture B to explain how we see objects.

picture A: Light travels in a straight line. Light travels in all directions.

picture B: MA. The book reflects the light. This reflected light enters our eyes.

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

a. F; b. F; c. T; d. T; e. T.

Heat is the transfer of thermal energy from something hotter to something cooler.

Heat causes changes.

6. Write *conductor* or *insulator*. Then, answer the question.

hat: insulator.

fork: conductor.

plastic cup: insulator.

iron: conductor.

The iron is made of metal and plastic. MA. The metal part of the iron allows heat to be transferred to the clothes when ironing. The plastic handle allows us to hold the iron without burning our hand.

EXTENSION

PAGE 80

1. Read the text and complete the index card.

Composition: hydrogen and helium.

Heat and light produced by: the core.

Temperature in the core: 15 million degrees Celsius.

Temperature at the surface: 5,500 degrees Celsius.

Lifetime remaining: about 5 billion years.

2. Search the Internet for more information about the Sun. Write a few sentences.

OA

PAGE 81

1. Read the text and answer the questions.

a. A shadow is a dark area caused when an object blocks light.

b. No, translucent objects do not produce shadows because they allow light to pass through.

c. Indoors, shadows get bigger as you move closer to the light source and smaller when you move away from the light source.

d. Outdoors, shadows change as the position of the Sun changes.

2. Turn off all the lights and close the curtains in a room. Turn on a lamp and put your hand close to the light source. Explore ways of making the size of the shadow of your hand change. Draw and write your observations.

OA

ASSESSMENT

PAGE 82

1. Colour the diagram and label the colours of light. Then, write a sentence about the composition of light.

top to bottom: red, orange, yellow, green, blue, indigo, violet.

MA. White light is made up of different colours.

2. Complete the word map.

Light travels at 300,000 km/per second; Light travels in straight lines; Light travels in all directions.

3. Explain how the black bowl and the white bowl interact with light. Then, explain how a red bowl interacts with light.

The black bowl does not reflect any light. It absorbs all colours of light.

The white bowl reflects all light. It does not absorb any colour of light.

A red bowl reflects red light and absorbs all other colours of light.

PAGE 83

4. Look at the photographs and complete the sentences.

photos: reflection; refraction.

When light hits an object, it bounces off and changes direction.

When light passes from one material to another material with a different density, it bends.

5. Look at the photographs and draw an arrow to show the transfer of thermal energy. Then, answer the question.

ice cream: thermal energy goes from the boy's hand to the ice cream.

cup: thermal energy goes from the hot liquid into the air.

The transfer of thermal energy will stop when both objects reach the same temperature.

6. Match and write examples of materials for each.

conductors: materials that transmit heat quickly. MA. Metals.

insulators: materials that transmit heat slowly. MA. Cork.

TEST

PAGE 84

1. b; 2. a; 3. c; 4. a; 5. b; 6. c; 7. a; 8. b; 9. c; 10. b.

INVESTIGATE

PAGE 85

OA

ELECTRICITY

REINFORCEMENT

PAGE 86

1. Explain why the pen attracts the pieces of paper.

MA

When the boy rubs the pen against his jumper, the pen gains negative charges. The pen is then electrically charged, so it attracts small pieces of paper.

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

See page 89 of the Student's Book.

a. These charges attract because they are opposite charges.

b. These charges repel because they are the same.

c. These charges repel because they are the same.

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

left: copper wire.

right: plastic covering.

MA. Copper is used because it is a good conductor, so electrical charges can move freely through the wire. Plastic is used for the covering for safety reasons. Plastic is a good insulator, so the electrical charges in the wire do not pass through it.

PAGE 87

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

Electric current can produce heat, for example, in a toaster; sound, for example, in a television; light, for example, in a lamp; movement, for example, in a fan.

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

Bulbs A, B and C will light up.

MA. These bulbs are on a complete circuit that goes from one terminal of the battery to the other. Bulbs D and E are on paths that do not go back to a terminal, so they are not in the circuit and will not light up.

6. Write a sentence with each group of words.

MA

Every socket in your home is connected to the national grid by cables.

In wind power plants, wind moves a turbine, and the turbine is connected to a generator.

EXTENSION

PAGE 88

1. Read the text. Then, match the columns.

a. Michael Faraday: electric generator.

b. Thomas Alva Edison: incandescent light bulb.

c. Hans Christian Oersted: electromagnet.

d. Samuel Morse: electric telegraph.

e. Heinrich Hertz: radio transmitter.

f. Alessandro Volta: first electric battery.

2. Search the Internet for more information about one of the inventions from the text.

OA

PAGE 89

1. Read the text and complete the index card.

Description: a layer of carbon that is one atom thick.

Properties: transparent, very thin and stronger than steel.

Uses: solar cells, optical devices, personal communication devices.

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

OA

ASSESSMENT

PAGE 90

1. Look at the pictures and answer the questions.

a. In picture A, both the cloth and the pen are electrically neutral.

b. In picture C, the cloth is positively charged; the pen is negatively charged.

c. In picture B, negative charges are passing from the cloth to the pen.

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

A: The charges are both positive, so they repel.

B: The charges are opposites, so they attract.

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

MA

conductors: Electric current flows easily through conductors. Some examples are water and metals.

insulators: Electric current does not flow through insulators. Some examples are plastic, air, glass and wood.

PAGE 91

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

left to right: light; heat; movement.

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

left column: cable, device.

right column: generator, switch, device.

MA

The cable transports electricity around the circuit.

The generator provides the electricity.

The switch controls the flow of electricity.

6. Read the energy transformations. Write the type of power plant.

a. hydroelectric power plants; b. thermal power plants; c. wind power plants; d. solar power plants.

TEST

PAGE 92

1. a; 2. b; 3. a; 4. c; 5. a; 6. b; 7. c; 8. c; 9. c; 10. b.

INVESTIGATE

PAGE 93

OA

FORCES AND MACHINES

REINFORCEMENT

PAGE 94

1. Look at the swing. Why is it moving?

MA

The swing is moving because the boy is pushing it. Objects move when a force acts upon them.

2. Draw arrows to show movement and the force of friction.

movement: an arrow pointing in the same direction as the car.

friction: arrows under the wheels, pointing against the direction of the car.

3. Look at the photograph and answer the questions.

a. The forces of pedalling and friction must be the same.

b. If he stops pedalling, the bike will slow down and stop because there is friction between the wheels and the ground.

4. Solve the problem.

3 x 100 = 300. He will drive 300 km.

PAGE 95

5. You throw a ball in the air. Use the words to explain what happens to the ball.

MA

As the ball moves upwards, gravity slows it down until it stops and begins to fall. As the ball moves downwards, its speed increases until it hits the ground.

6. Read these definitions of machine components and write the names.

a. sensors; b. engine; c. cover; d. mechanism; e. gears; f. springs.

7. Label four operating parts on the bicycle.

operating parts: wheels, gears, axles, chain, levers (pedals and brakes), cranks (the long part of the pedals).

8. Cross out (✗) the odd one out. Then, write *modern structure*, *home*, *free time* or *communication*.

a. ~~refrigerator~~, free time; b. ~~tower~~, communication; c. ~~animation~~, modern structure; d. ~~bridge~~, home.

EXTENSION

PAGE 96

1. Read the text and answer the questions.

a. Friction slows down the movement of an object when the object is in contact with a surface or another object.

b. Friction is greater on sand than on ice, because there is less friction on smoother surfaces.

c. Skiers wax their skis so the skis will slide faster.

d. MA. Goalkeepers wear special gloves to create friction between the ball and the gloves. This can help to slow down the ball.

2. Search the Internet to find out how friction affects another sport. Write a paragraph describing how friction is increased or decreased to gain advantage.

OA

EXTENSION

PAGE 97

1. Read the text and complete the table.

type of watch: mechanical; battery-operated; smartwatch; Eco-Drive watch.

description: no batteries, has springs and gears; has batteries and electrically charged quartz crystals; computerized, touch screen, phone and Internet capability, many other functions; new technology, recharges continuously.

energy source: the mainspring; a battery; a rechargeable battery; any source of light.

2. Search the Internet for photographs of the wristwatches described above. Print, cut and paste them onto a sheet of paper and write a short description.

OA

ASSESSMENT

PAGE 98

1. Use the words to complete the text about forces.

Forces cause changes. They can make objects change shape or break. Some objects change their shape permanently and do not return to their initial shape. Other objects change temporarily and return to their initial shape. Rigid objects break when sufficient force is applied. Forces can also make objects start to move, change direction or stop.

2. Describe what is happening in the picture.

MA

The ball is moving along the floor. There is friction between the ball and the surface of the floor. Friction is slowing down the ball and will eventually stop it.

3. Calculate the speeds. Then, answer the questions.

a. Andrea's speed is 80 km/h.

b. David's speed is 90 km/h.

To know their speed at a particular moment, they can look at the speedometer in the car.

Friction and air resistance slow down moving cars.

PAGE 99

4. What is gravity? Define in your own words. Then, answer the question.

MA

Gravity is a force that pulls everything towards the centre of the Earth.

When an object is moving upwards, gravity slows it down until it stops moving upwards.

When an object is moving downwards, gravity causes it to increase in speed until the object hits the ground.

5. Look at the picture. What force makes the ball fall? Explain.

Gravity makes the ball fall. It moves upwards because of the force applied by the person who threw it. Then, gravity slows down the ball until it stops and begins to fall near the basket.

6. Unscramble the words and write the names of eight machine components. Then, tick (✓) the ones that may work together in a mechanism.

a. wheel (✓); b. motor; c. axle (✓); d. screen; e. structure; f. chain (✓); g. indicator; h. lever (✓).

TEST

PAGE 100

1. a; 2. c; 3. b; 4. b; 5. c; 6. a; 7. b; 8. c; 9. b; 10. c.

INVESTIGATE

PAGE 101

OA

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