UNIT 3 – HOW DO LIVING THINGS WORK?

VITAL FUNCTIONS

You already know (unit 1) that all living things can carry out three vital functions: nutrition, interaction and reproduction. In this unit we are going to learn more about these functions.

ACTIVITY 1 (individually)

What do you remember?

From the following words, indicate those which are related to obtaining energy (N), those which are related to reproduction(R) and those that are involved in interaction(I).

. heart
. CO2
. ovary
. stem
. sunlight
. embryo
. food
. bone
. nucleus
. seed
. mitochondrion
. brain
. leaf
. spermatozoid
. nerve
. mineral salts
. protein
. egg cell
. photosynthesis
. stamen

Write a definition of the vital functions:

Nutrition is the process which ……..

Interaction is ……..

Reproduction is ……..

NUTRITION

ACTIVITY 2

In groups of four you will complete the mind map the teacher will give you. It is about nutrition and you will have to answer to four questions:

Why do organisms need food?

What matter do organisms need?

How do organisms obtain food?

How do nutrients become useful for organisms?

Afterwards, we will put the information together and we will make a new mind map with the contributions by each group.

ACTIVITY 3

Now, read the following text and correct the mistakes (7):

Nutrition consists of all the processes through which a living thing obtains the substances it needs to live.
Through nutrition, organisms obtain matter and energy. They are necessary to build new cells, to increase in size, to renew cells, to reconstruct lost parts etc. Energy is required to carry out some processes. There are processes that do not require energy, for example when we sleep we don't use energy.
Depending on the way in which they obtain nutrients, there are heterotrophic organisms, like plants, for example. They make their own food. And there are the autotrophic organisms, like animals and fungi, which need to have food made by other living things.
Plants do not respire because they photosynthesise. This process only takes place in leaves. Nutrition in animals involves digestion, circulation, respiration and excretion. Plants do not digest food and do not have a circulatory system either. Plants do not remove waste.

ACTIVITY 4 (at home)

Copy the composition of the milk you drink at home.

Energy (it is measured in Kilocalories)
Protein
Carbohydrate
Fat
Other:

a) What is the percentage of protein, fat and carbohydrate in milk?

b) Which mineral does milk contain? What is its function?

c) After looking at the milk label, can you say if milk is highly nutritious? Why?

UNIT 3 – HOW DO LIVING THINGS WORK?

THE MATTER THAT LIVING THINGS ARE MADE UP OF

In the mind map we have seen that organisms need different kinds of matter. Milk is a product made by mammals.
The substances that make living things are called **biomolecules**. Biomolecules are required as a source of energy and for the manufacture of new cells. We can find biomolecules only in living things (nowadays some of them can also be made in laboratories).
The chemical reactions that take place inside cells are called **metabolism**.

Some biomolecules are:

- **Carbohydrates (Glucids)**: They are used mainly as a source of energy. Some of them are called sugars because they are sweet. They are soluble in water. Examples: glucose (the "fuel" for living things"), sucrose (common sugar) and starch which is the energetic reserve of plants and is stored in their cells.

- **Fats (Lipids)**: They are generally used as store of energy and for insulation. They are insoluble in water. In this group there are oils and animal fats, which float in water.

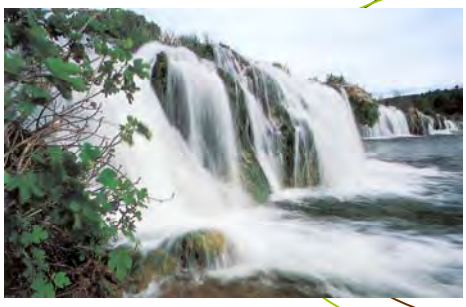
- **Proteins**: They are made of basic units, the amino acids, which are held together by chemical bonds. They are generally used for building new cells. Other proteins help reactions take place in the cells. Proteins that control metabolism are called enzymes.
  We can find proteins in the muscles, in the blood, the connective tissue, hair and feathers.

- **Nucleic acids**: They are also made of basic units, the nucleotides. They store and transmit genetic information (heredity), like, for example, the DNA. DNA is in the nuclei of all cells.

Other essential substances for organisms are **water** and **mineral salts**.

The cell cytoplasm is made up of about 75% **water**. It plays an important part in the transportation of materials around the body, in the removal of waste products, in maintaining a constant body temperature and in all the chemical reactions taking place inside our bodies.

Mineral salts cannot be made by living things. We acquire them from food. We need them in small quantities for a variety of purposes: for example, calcium is required for bone formation, teeth and blood clotting; sodium is a constituent of body fluids and iron is used for the formation of red blood cells.



Water and salt, two necessary substances for organisms.

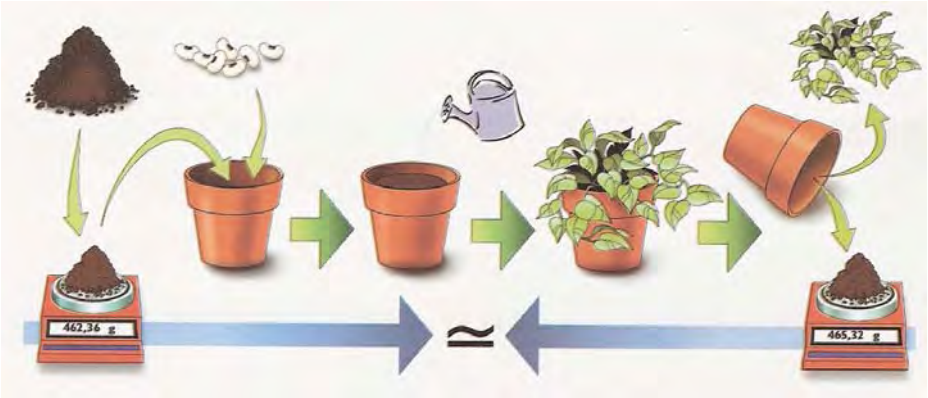
UNIT 3 – HOW DO LIVING THINGS WORK?

NUTRITION IN PLANTS

ACTIVITY 1

Imagine the following experiment:

We plant some plant seeds in a flowerpot. Beforehand, we have to weigh the soil. We water the plant until it grows. When the plant is big enough and has got fruits, we extract it from the pot and we weigh the plant and the soil. The soil weighs more or less the same as when we began the experiment.



a) From where has the plant obtained the matter needed to grow?

b) How does this plant get the matter?

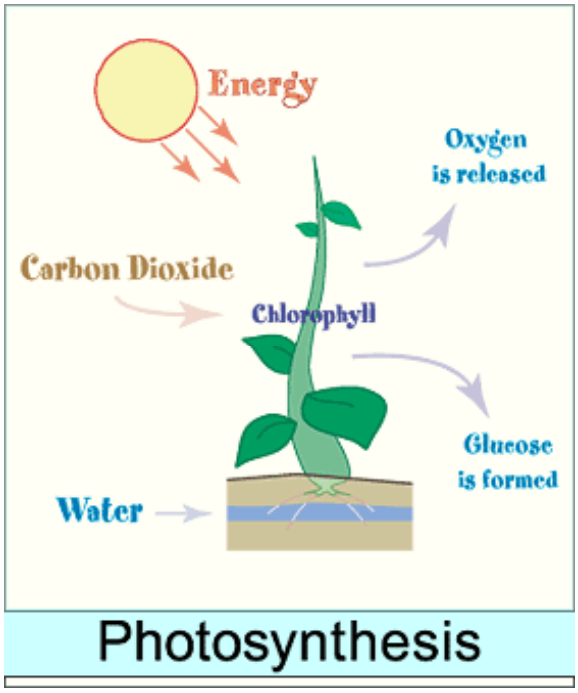
c) Which is the path followed by it?

d) How does the plant get energy?

UNIT 3 – HOW DO LIVING THINGS WORK?

ACTIVITY 2

Look at this diagram and complete the text below:



Photosynthesis takes place inside _____where we can find a green substance called _____ .It can trap energy from the sun.
The process begins when plants get _____ and minerals from the soil by the plant's roots and move up to the leaves.
The plant also takes in _____ from the air.
Thanks to sunlight, water and carbon dioxide combine to make _____ and _____ that goes into the air.
Plants can only photosynthesise in the light, so photosynthesis only takes place during the _____.

We can show **photosynthesis** as this word equation:

_____ + _____ + light energy →

_____ + _____

(Use: H2O for water, CO2 for carbon dioxide, O2 for oxygen)

How do plants get energy from nutrients? Do plants respire? Where does **respiration** take place?

Plants cells respire, just as animals cells do. If they stop respiring they will die. Respiration is carried out by roots, stems and leaves.
Plants respire all the time, whether it is dark or light. They are always taking in oxygen and releasing carbon dioxide.
They combine oxygen with glucose, to get the energy they need to live and produce other bio molecules like protein and fats.
So, what happens to a plant depends on whether it is in the dark or the light and how bright the light is.

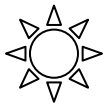
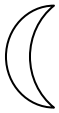
We can show **respiration** as this word equation:

_____ + _____ →

_____ + _____ + chemical energy

ACTIVITY 3

With all the information that is given to you try to complete this chart.

Conditions	Photosynthesis and/or Respiration
	
	

UNIT 3 – HOW DO LIVING THINGS WORK?

LABORATORY 1- TESTING LEAVES FOR STARCH

http://www.footprints-science.co.uk/Starch.htm

INTRODUCTION

Plants are autotrophic, they make their own food by carrying out photosynthesis. Then, they store the food made in the form of starch.

AIM

The aim of the experiment is to compare a covered part of a leaf to an uncovered part of a leaf to see which part produces starch.

MATERIAL

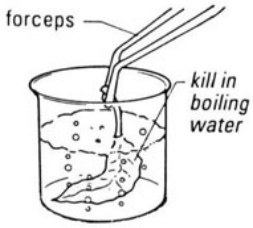
- baker for boiling water.
- boiling tube, 1 for each type of leaf used
- leaf
- forceps
- iodine solution
- Bunsen burner
- Petri dish
- water
- ethanol
- dropper

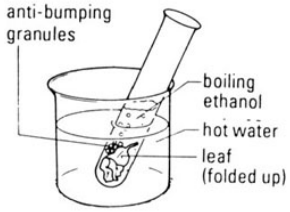
PROCEDURE

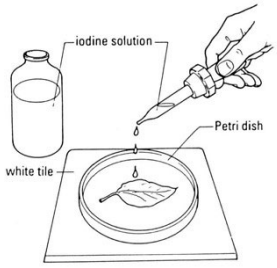
We are going to test the presence of starch in two types of leaves: one leaf has been covered with foil for three days and the other leaf is in normal conditions. We use iodine solution to test the presence of starch.

- Collect the leaves from the plant to be tested.
- Hold the leaf with forceps and dip it into a beaker of boiling water for about 30 seconds. Using forceps, remove the leaf from the boiling water and note how it has changed.
- Drop the leaf into a boiling tube and push it to the bottom. Add enough ethanol to cover the leaf, and stand the boiling tube in your beaker of hot water.
- Watch as the ethanol boils and the green colouring (chlorophyll) is removed from the leaf. This will take a few minutes.
- Using forceps, remove the leaf from the boiling tube and

rinse the leaf in cold water.







- Put the leaf in a Petri dish. Add iodine solution to the leaf from the dropper bottle. Make sure the leaf is completely covered with iodine.
- Watch for a few minutes to see if a blue-black colour develops in any part of the leaf. A blue-black colour with iodine solution indicates that starch is present.

RESULTS

Answer these questions.

- What has happened with the covered leaf? Why?

- What has happened with the non- covered leaf ? Make a drawing.

CONCLUSIONS

UNIT 3 – HOW DO LIVING THINGS WORK?

Plants, as you know, have got leaves, stem and roots.
How are all these parts connected? They are connected by the **vascular system**.
The **vascular system** is a group of vessels that go all along the plant, and its function is to transport water and minerals from the roots to the leaves **(xylem**), and nutrients from the leaves to the rest of the plant **(phloem)**


Slice of a tree showing the vascular system

Remember that there is a group of plants that don't have a vascular system, can you name it? How can they survive?

Which is the name of the vascular system in animals?

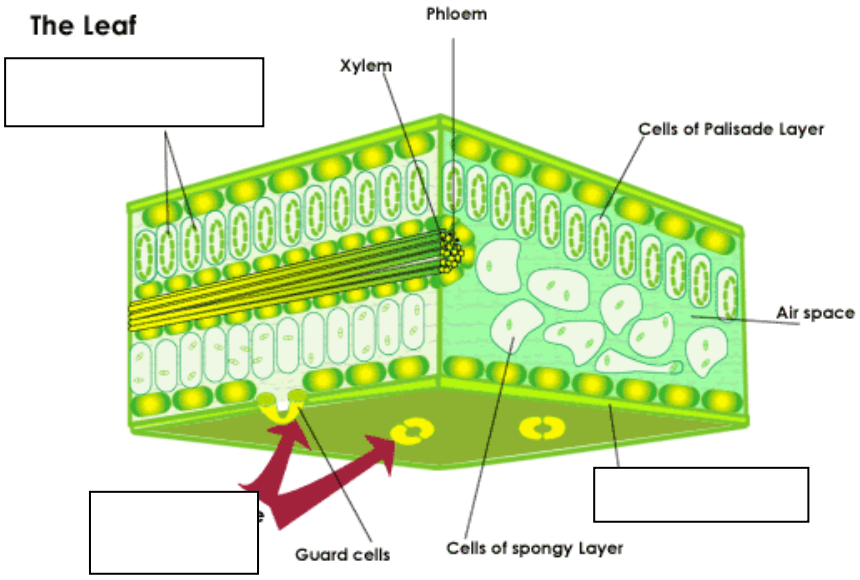
UNIT 3 – HOW DO LIVING THINGS WORK?

MORE ABOUT PHOTOSYNTHESIS

Photosynthesis is carried out in all green parts. But let's look at a leaf:
All leaves have the same parts. These parts work together to help the plant. The **epidermis** is the top layer of cells. The cells of the epidermis make a thin coating called the **cuticle**, it stops water from leaving the leaf. The leaf has cells that make food for the plant. These cells have **chloroplasts**. Chloroplasts need sunlight, water, minerals and carbon dioxide to make food. Most leaves have pores called **stomata** (stoma in singular) in their lower surface. One stoma is a hole between a pair of **guard cells**. Stomata let carbon dioxide into the leaf and oxygen and water vapour pass out.

ACTIVITY 1

With the information that is given to you in the text above complete the following scheme of a slice of leaf under a microscope:



UNIT 3 – HOW DO LIVING THINGS WORK?

LABORATORY 2- LOOKING AT STOMATA

INTRODUCTION.

Most leaves have pores called **stomata** in their lower surface. One pore or stoma is a hole between a pair of guard cells. Stomata let carbon dioxide into the leaf and oxygen and water vapour pass out.

Look at the diagram above and complete the text:

When a plant has plenty of water the _____ become curved and the _____ between them opens. This allows _____ to escape from the leaves of the plant.

When a plant begins to lose water faster than its _____ can take it up, guard cells become less _____. This _____ the stomata and slows down the loss of water from the plant.

- What are stomata?

- Where can we find them?

- What is their function?

MATERIAL

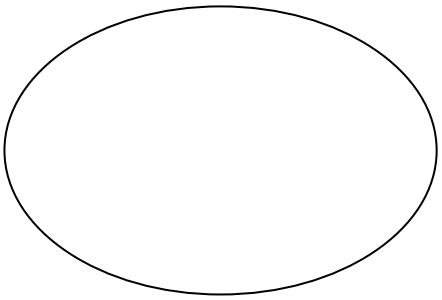
- leaves
- microscope
- slide
- cover slip
- mounted needle
- dropper
- nail varnish

PROCEDURE

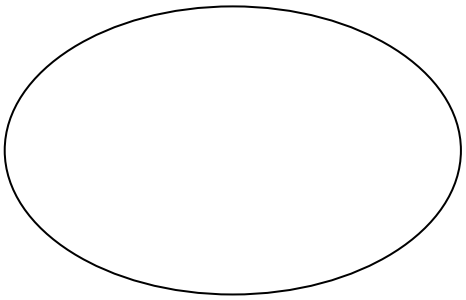
We are going to view stomata in different parts of the leaf and in different leaves.

The easiest way to view stomata is to take a nail varnish impression of it. Notice that their shape, number and position in the leaf are very different.

- Paint about one square centimetre of the lower and upper surface of the leaf with transparent nail varnish.
- Wait about 20 minutes in order to let it dry out.
- Peel off and place them on a microscope slide. Stomata leave a visible impression in the nail varnish.
- Make a drawing, and count the number of stomata you can see.



lower surface



upper surface

Finally, say if the following sentences are true or false and correct the mistakes:

The stoma opens when a plant has plenty of water.

The loss of water from the plant slows down when the guard cells are curved.

The tiny holes in a leave are stomata.

The stoma closes when the guard cells become curved.

Plants adapted to dry climate have got more stomata than the ones wet climate.

ACTIVITY 2 (Self assessment) (10 minutes-10 points)

Answer these questions:

1. Which of these is not a job of the root of the plant?
a. To make food
b. To hold the plant in place
c. To take in water and minerals from the soil

2. The part of the plant that respires is:
a. roots, stems and leaves
b. leaves
c. all green parts

3. The parts of the plant that are mainly in charge of making food for the plant are the:
a. roots
b. all green parts
c. leaves

4. Little openings in the leaf that allow for the taking in of carbon dioxide and the emission of oxygen during photosynthesis are:
a. xylem
b. cuticle
c. stomata

5. Stomata have _____ on either side of the stomata to help regulate the amount of carbon dioxide and oxygen that flows in and out of them.
a. guard cells
b. xylem
c. phloem

6. The part of the vascular system which carries nutrients from the green parts to the rest of the plant is:
a. phloem
b. xylem
c. stomata

7. In photosynthesis ……. energy is transformed into …… energy.
a. chemical/light
b. light/light
c. light/chemical

ACTIVITY 3

Answer the following questions:

- All the plants make photosynthesis? What is the condition to make photosynthesis?

- What would happen to a plant if we put it in a dark place for too long? Why?

- What would happen to the atmosphere if all plants and algae became extinct? Why?

ACTIVITY 4 (in groups)

People eat many different parts of plants. We all know that an apple is a fruit—it contains the apple tree's seeds. But can you say which plant part each food is? Justify your answer.

Asparagus

- Roots
- Stems
- Leaves
- Flowers

Carrots

- Roots
- Stems
- Leaves
- Fruits

Onion

- Roots
- Stem
- Leaves
- Flower

Peach

- Roots
- Stems
- Fruit
- Flower

Broccoli

- Stems
- Flowers
- Leaves
- Fruits

Peanuts

- Fruits
- Flowers
- Seeds
- Leaves

UNIT 3 – HOW DO LIVING THINGS WORK?

NUTRITION IN ANIMALS

ACTIVITY 1

Look at the pictures and think about how these animals obtain their food. Then, fill the gaps with the words given.




triturate **chew** **suck in** **filter**

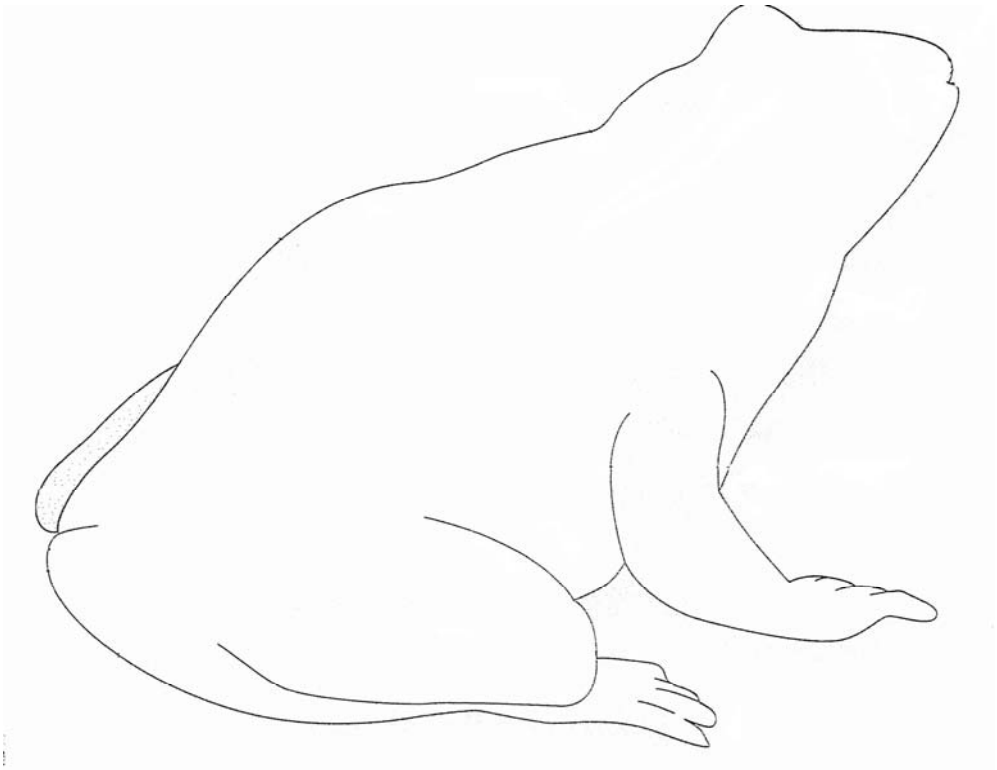
Insects …… the nectar of flowers.
Whales …… water to obtain food.
Tiger …… meat.
Cows …… plants.

Can you say which of these are herbivores, carnivores or omnivores?

Do you remember what the way of obtaining food from other living things is called?

ACTIVITY 2

Draw in the picture below the path that an insect eaten by the frog would follow from the mouth to the cells.



Food must be changed into a liquid inside the body in order to be used.
Digestion is the process of breaking down food molecules into smaller ones. These small molecules (called nutrients) go to the cells to be used for energy, growth and cell repair.

ACTIVITY 3

In the text below some words are coloured according to a code. Can you break the code in less than 5'? DO NOT READ THE TEXT.

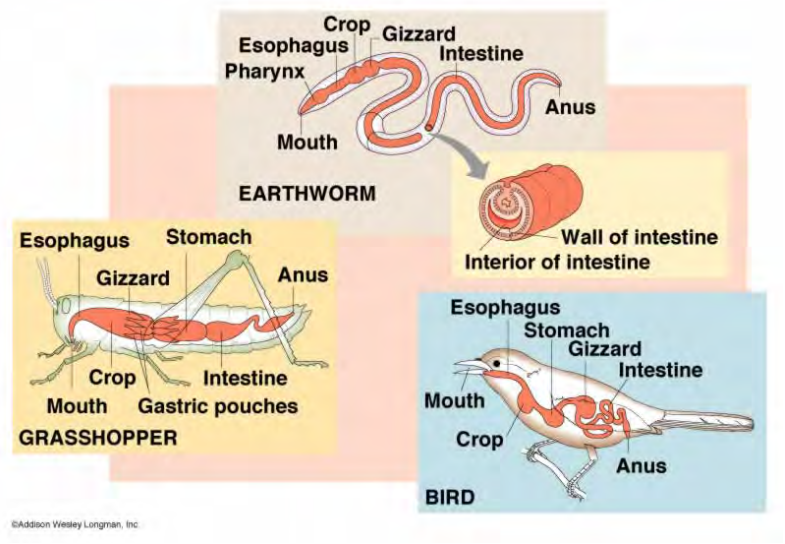
UNIT 3 – HOW DO LIVING THINGS WORK?

Digestion starts in your mouth. There food is chewed and mixed with saliva. Food becomes a bolus and moves into the oesophagus or gullet. From the gullet, food passes to the stomach.
In the stomach muscles squeeze and relax mixing the food with gastric juice. From the stomach the food passes into the small intestine. There three liquids are mixed with the food:
The juice of the pancreas, the juice from the liver (bile) and the intestinal juice. Digested food is absorbed into the blood through the wall of the small intestine. Undigested food passes into the colon and becomes a solid waste called faeces.

Yellow means ……
Red means ……..
Blue means ……..

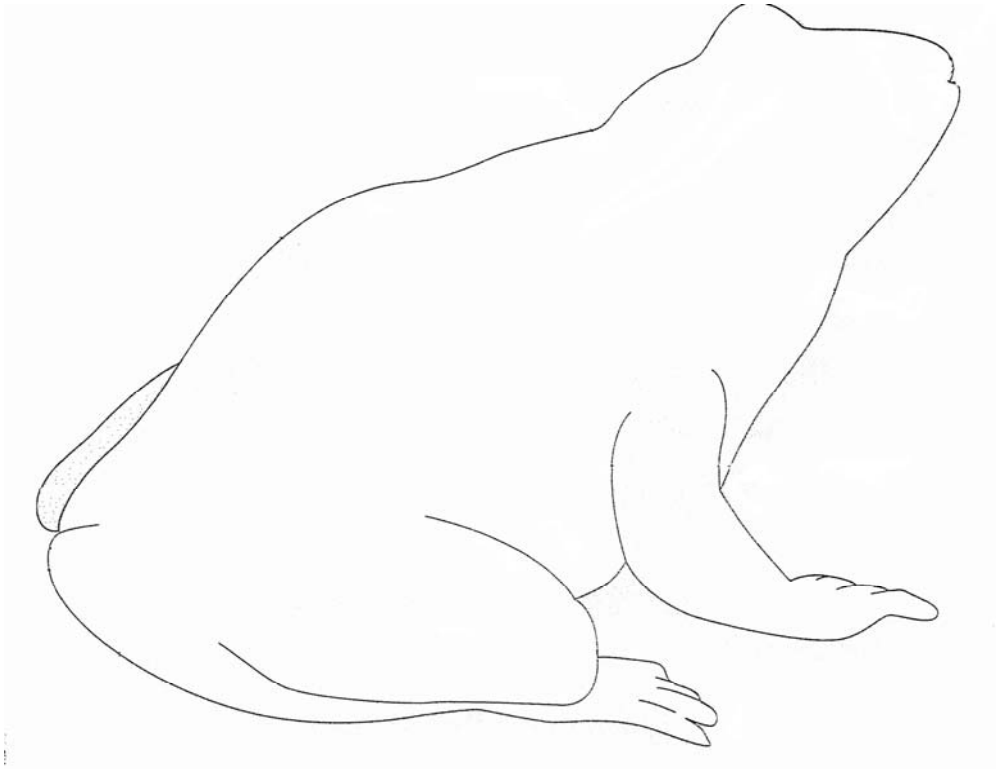
ACTIVITY 4

Identify some common characteristics of the digestive tube of the following animals:



ACTIVITY 5

Draw (in red) in the frog the path followed by the digested fly (nutrients). Which is the system that transports them to the cells? What makes them flow?



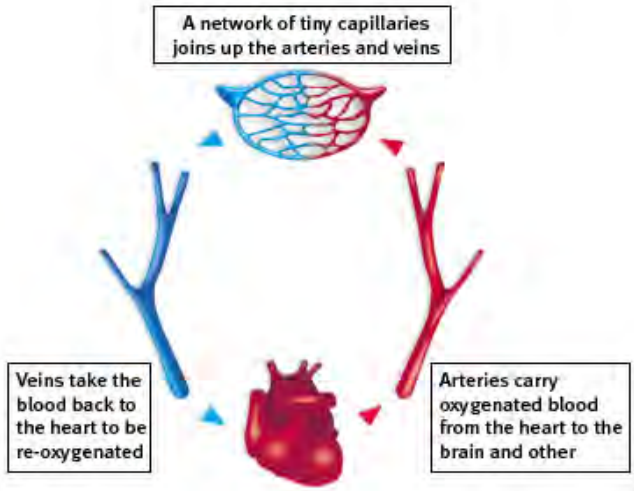
Draw (in blue) in the frog the path that oxygen will follow from the air to the cells. How does oxygen arrive at the cells?

CIRCULATION:

Read the following text:

Circulation is the transport mechanism in which nutrients and oxygen go through all cells from the body and remove all waste matter from them.

UNIT 3 – HOW DO LIVING THINGS WORK?



The circulatory system is made up of the heart, the blood and the vessels (arteries and veins).The **heart** is a muscle that pumps blood around the body. **Arteries** are tubes that carry blood away from the heart to the body. The arteries branch into tiny little tubes called **capillaries**. The walls of capillaries are very thin and liquid from the blood can pass through them. The capillaries join together to form **veins**. Veins bring blood to the heart from all parts of the body except the lungs.

RESPIRATION

All animals respire. A lot of people think respiration means breathing - this is not true. Respiration is a chemical process that produces energy thanks to nutrients and oxygen. It takes place inside every cell of every living thing. Respiration usually needs oxygen and produces carbon dioxide as a waste product.

Do you remember the part of the cytoplasm where respiration takes place?

There are 4 types of external respiration or breathing in animals:

	Cutaneous	Branchial	Tracheal	Pulmonary
Main characteristic	Gas exchange is carried out through the **skin** which is very thin and moist.	Gas exchange takes place through the **gills**. Gills are thin extensions on the surface of the body, surrounded by blood vessels.	Gas exchange takes place through internal tubes or **tracheae**. The tracheae end in orifices called **spiracles** where the air enters	Gas exchange takes place in the **lungs**. Lungs are internal cavities which have very thin walls full of blood vessels
Examples	earthworm	fish	arthtropoda	Birds mammals

ACTIVITY 6

Here you have a list of different kinds of animals. Can you write which type of respiration or breathing they carry out?

Elephant
Snake
Spider
Snail
Earthworm
Crocodile
Dog
Pigeon
Frog
Grasshopper
Tadpole
Mussel

EXCRETION:

Excretion is the process of collecting waste products and expelling them outside the body.

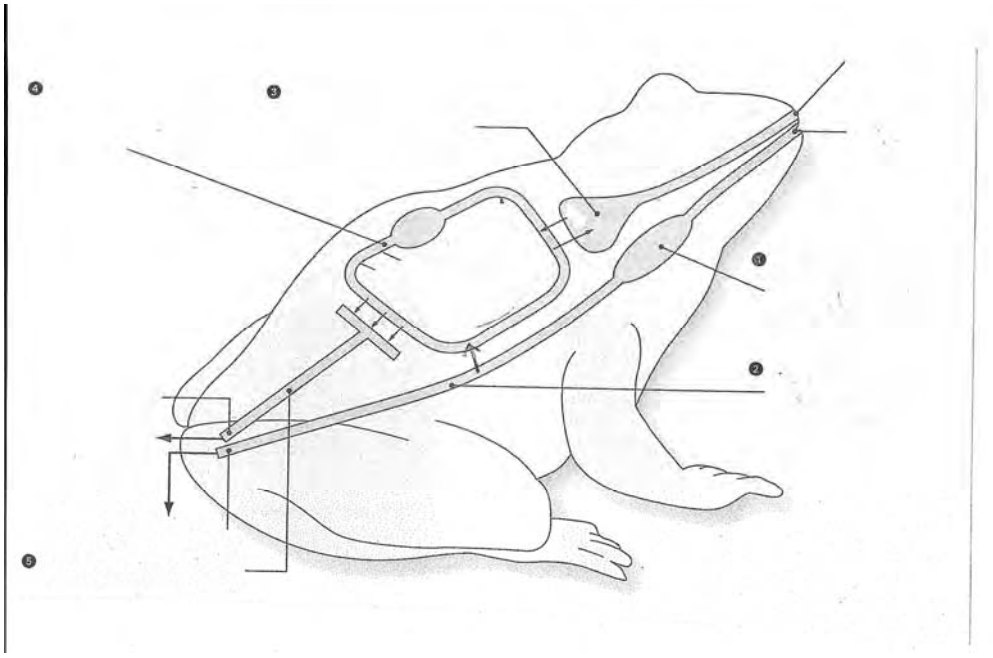
Insects use **Malphigian tubules** to expel waste products. The excretory system in vertebrates consists of various organs. Our **lungs** excrete carbon dioxide. Our main excretory organs are the **kidneys** that remove urea, water, and other unwanted substances from the blood. Urea is a waste produced by the liver.

ACTIVITY 7

Apart from kidneys, do you know another way which human can expel waste products like water and salts? (Hint: it is the largest organ in our body).

ACTIVITY 8

This is a diagram of the frog with the four systems related to nutrition. Identify them. Label: mouth, nostril, O2, CO2, cells, urea, urine, faeces.



3.2. INTERACTION

Mind map about interaction

In groups of four students you will complete the mind map the teacher will give you. It is about interaction and you will have to answer three questions:

1. Which changes can organisms perceive?
2. How are stimuli perceived?
3. What responses can organisms give?

Afterwards, we will put the information together and we will make a new mind map with the contributions by each group.

UNIT 3 – HOW DO LIVING THINGS WORK?

Interaction in plants

In the case of plants the capacity of reaction is known as **excitability or sensitivity**. The most important difference between plants and animals is that plants do not move from place to place. Plants can perceive external stimuli (stimulus in singular) and produce responses. Gravity, light, and water are examples of stimuli. The responses can be classified into **tropisms** and **nastics**.

Tropisms are the movements of the plants towards (positive) or away from (negative) the stimulus. For example, roots have positive geotropism because they respond by growing down into the ground. Stems and leaves have positive phototropism because they bend towards light.

Nastics are responses that have a passing effect and that consist of a movement that is not a change in the direction of the growth of the plant. For example, the mimosa leaves close when they are brushed, the stomas close when it is very hot, some leaves or flowers change their position at sunset.

UNIT 3 – HOW DO LIVING THINGS WORK?

Plants produce automatic responses. They do not need to decide the response.

On the other hand, animals have **sensorial organs**, which collect information, a **nervous system** which give information about what is happening, and **effector organs**, which allow them to react.

UNIT 3 – HOW DO LIVING THINGS WORK?

LABORATORY 3- INTERACTION IN PLANTS

In this picture there are two plants: a spike and a field bindweed. In spring it is easy to see these plants in the woods. Look at them carefully. Can you tell the plants apart? Are you a good researcher? Find out!

Plan of action

- Colour the plants according to the colour code and answer the related questions.
- Interpret the picture.

Colouring

Colour code:

1)SPIKE:
a. Colour the STEM yellow
b. Colour the LEAVES yellow
c. Colour the FLOWER yellow
d. Colour the SPIKE yellow

2) FIELD BINDWEED:
a. Colour the STEM green
b. Colour the LEAVES green
c. Colour the FLOWERS rose

Questions

What does field bindweed do to expose its leaves to the sun? How does it do it?

1. In pairs, use what you learnt about stimuli and responses and try to answer these questions. Prepare to answer to the class.

2. Marc, Ariadna and Rosa are students in 2n ESO. This is what they answered to these questions. Which explanation is the best? Use checklist 1 to decide.

a)Marc:
It is a response to stimuli. When a plant changes the direction of its growth, the process is called tropism. This process is called thigmotropism.

b) Ariadna:
Bindweed makes runners when it contacts with an object like a spike. This is a response to contact. Then, runners twist themselves around the spike in order to grow towards the sunlight.

c) Rosa:
I think field bindweed is a beautiful plant. It reacts to sunlight by running around a spike to get more light.

3. Can you write a better explanation? Try!

4. Check your explanations in pairs. Use checklist 1 & 2.

Assessment Checklists

Checklist 1:

The text ....

CONTENT & LANGUAGE	Exemplary	Adequate	Poor
A. says **what** the plant does? (it describes the relevant aspects in the picture).			
B. Explains **how** the plant does so. (it relates stimuli and response).			
C. Says why the plant does so (it justifies how useful the mechanism is).			
E. Uses appropriate scientific terms.			
F. answers the initial questions (it doesn't include other information referring to the plant).			
D. is an explanatory text (there are suitable connectors: because, due to, consequently, etc.; and verbs in the present tense: grows, wraps around, etc.			

Checklist 2:

WRITING CONVENTIONS	Always	Sometimes	Never
G. Sentences are short or medium length (less than 15 words).			
H Every sentence begins with a capital letter and ends in a full stop (.).			
I. Every sentence begins with a SUBJECT and has a VERB.			
J. The spelling is correct.			

UNIT 3 – HOW DO LIVING THINGS WORK?

Interaction in animals

In animals there are **receptors** to receive stimuli from the environment. The receptors are the sense organs. Then, the **coordinating systems** process the information. Finally, the responsive organs or **effectors** produce a response.

Receptors

The receptors in animals are the **sense organs**. These detect stimuli.
Senses are: **sight, smell, taste, hearing and touch**.

ACTIVITY 1

Complete the following chart about senses. Use the words given:
Pressure, touch, pain and temperature changes, taste, sound, light, nose, ears, touch, chemical substances dissolved in water, sight, smell.

Sense	Sense organ	Stimuli detected
	Eyes	
		Chemical substances dissolved in water or in air
	Tongue	
Hearing		
	Skin, in most animals	

Coordination systems

Animals have two coordination systems: **the nervous system** and the **endocrine system**. The nervous system works by means of specialised cells called **neurons** which transmit information through nerve impulses. The speed of response is quick. The endocrine system regulates the body functions by means of chemical substances called **hormones**. Hormones are produced by glands and are transported in the blood. The speed of response is slow.

3.3. REPRODUCTION

Mind map about reproduction

In groups of four students you will complete the mind map the teacher will give you. It is about reproduction and you will have to answer three questions:

1. What are the two ways of reproduction?

2. What are the differences between both ways?

3. Which types of reproduction you know in plants and in animals?

Afterwards, we will put the information together and we will make a new mind map with the contributions by each group.

UNIT 3 – HOW DO LIVING THINGS WORK?

Reproduction in plants

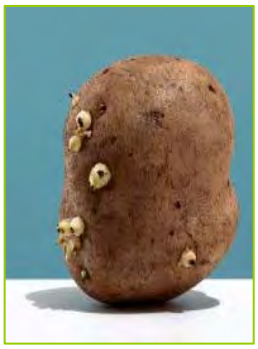
You know that there are some techniques used in agriculture to rapidly reproduce roses, tulips, geraniums, strawberries, fruit trees, potatoes, onions…

In spring you can see a lot of large and coloured flowers and bees or butterflies carrying pollen from flower to flower, or the wind carrying pollen from flowers that do not attract insects.
These situations show that plants reproduce, so they multiply and produce new individuals.

Plants can reproduce sexually or asexually.

Flowers have male and female organs. When a male cell joins a female cell, the ovule becomes a seed. When the seed "comes to life", the embryo germinates and a new plant grows.
Plants without flowers reproduce asexually, for example by spores, buds, stolons, stem tubers, cuttings, grafts…





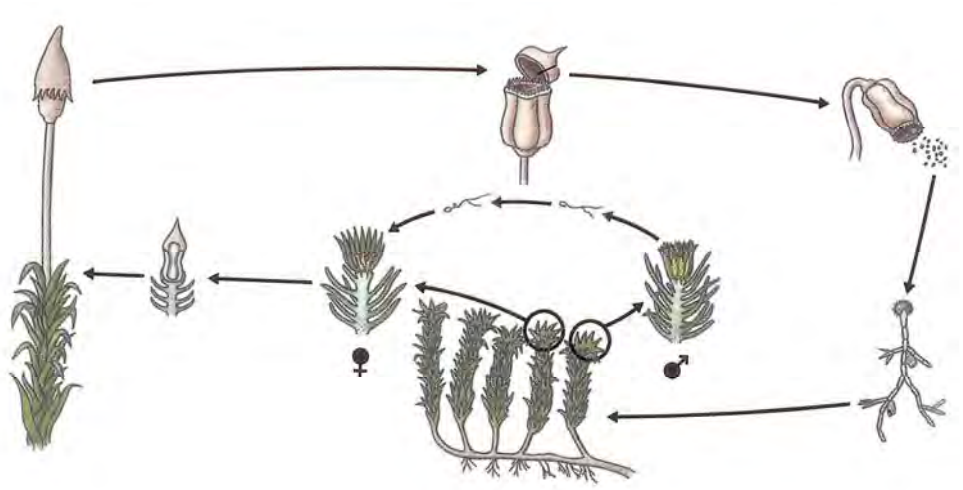

We studied in unit 2 different kinds of plants: mosses, ferns, flowering plants without fruits and flowering plants with fruits.

Mosses and ferns have two steps in their life cycle. One step is asexual and the second step is sexual.

ACTIVITY 1

Fill in this diagram about life cycle of a moss:

Use the following words: spores, egg, fertilized egg, leafy moss, sperm, female branch, male branch, spore case, new moss plant.

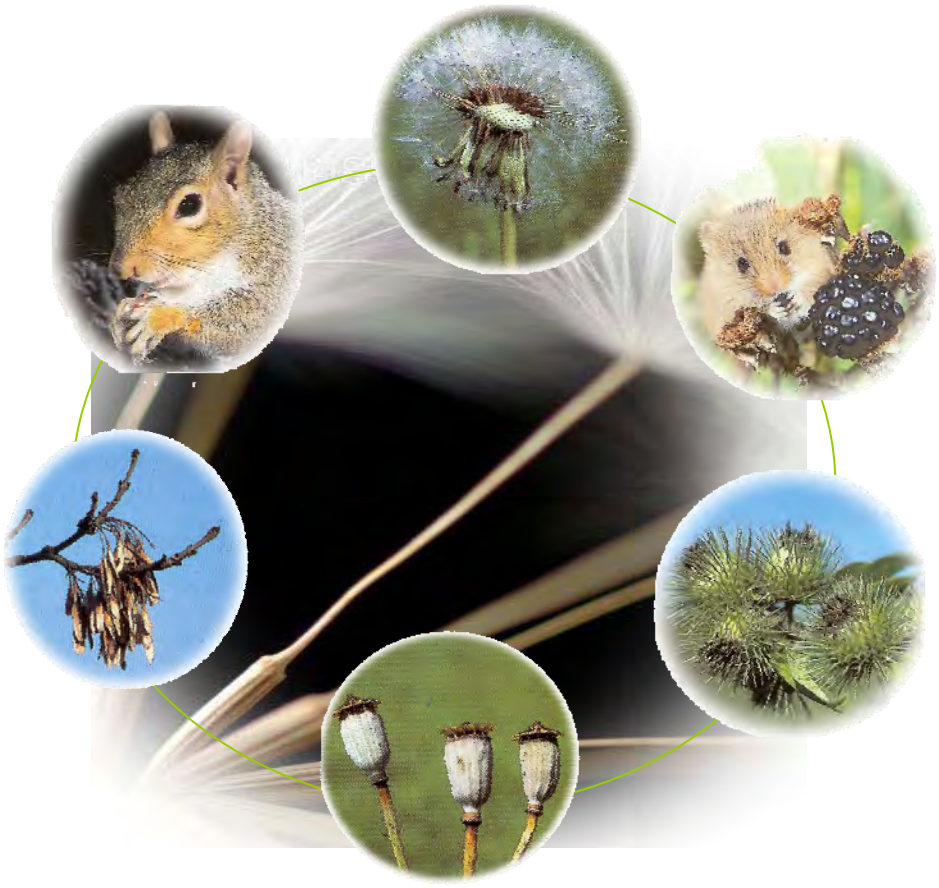


We studied the life cycle of angiosperms in unit 2.

Most plants produce hundreds of seeds at the same time. Fruits and seeds need water, minerals and light, so they must be dispersed. The dispersal can be by animals, by the wind or by plants.

ACTIVITY 2

a) Name the kind of dispersal of the following fruits and seeds



b) Describe how you may have helped disperse seeds without knowing it.

Reproduction in animals

You already know that reproduction is the creation of new living things. There are two ways it can happen: by asexual reproduction, or by sexual reproduction.

Asexual reproduction

Remember that in asexual reproduction there is only one parent, and its young are exact copies of itself.

There are many invertebrates, including sea stars and sea anemones for example, that reproduce by asexual reproduction. Common forms of asexual reproduction include:

Budding

In this form, an offspring grows out of the body of the parent.

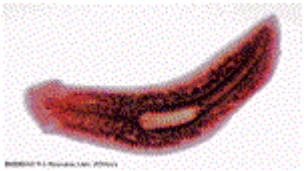
- Hydras exhibit this type of reproduction.


Hydra Budding

Fragmentation

In this form, the body of the parent breaks into distinct pieces, each of which can produce an offspring.

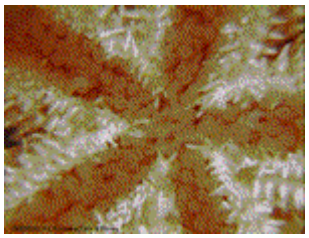
- Planarians exhibit this type of reproduction.


Planarian

Regeneration

In this type of reproduction, if a piece of a parent is detached, it can grow and develop into a completely new individual.

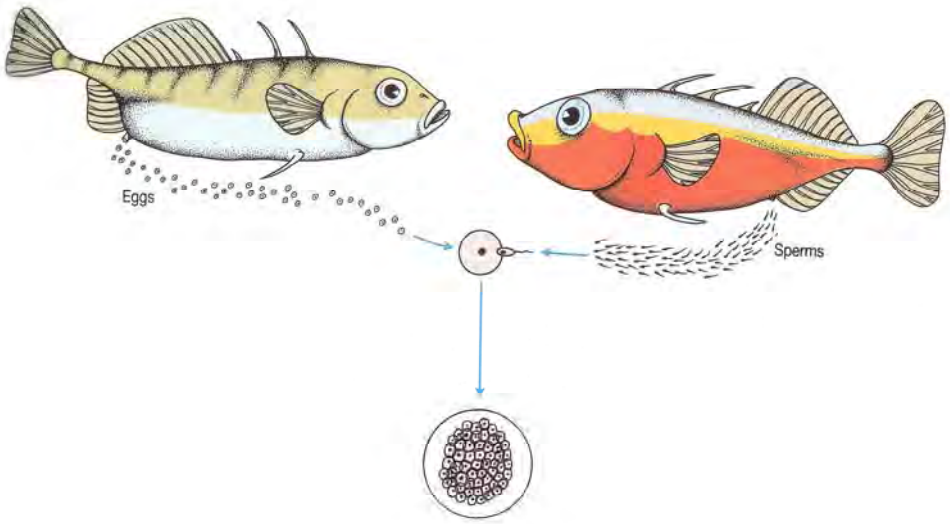
Echinoderms exhibit this type of reproduction.



Oral surface of a star fish.

Sexual reproduction

In sexual reproduction there are two parents, and each has sex organs, which produce **sex cells**. Male sex cells are **sperms** produced by sex organs called **testes**. Female sex cells are **eggs or ova** (ovum in singular), produced by sex organs called **ovaries**. In **fertilization** sperm enters an egg. A fertilized egg divides many times to form a ball of cells. The cells develop into a baby. A partly-formed baby is called an **embryo.**



When eggs are fertilized outside the female's body, it is called **external fertilization.**

In insects, reptiles, birds, and mammals the male puts his sperm into the female's body. So the eggs are fertilized inside her. This is called **internal fertilization.**

Development:

Animals **oviparous** can lay eggs with little or no other embryonic development within the mother. This is typical of fish, amphibians, reptiles, all birds, most insects and arachnids.
Some animals are **ovoviviparous**. The eggs are hatched inside the mother's body (or, in case of sea horse inside the father's). Non-oviparous fish, amphibians and reptiles are ovoviviparous.
Placental **viviparity** is employed by almost all mammals.

ACTIVITY 1

There are two mammals native to Australia that are oviparous. Which are they?

.