Natural Science and Technology

Grade 5

Life and Living and Structures

Term 1

Contents

Topic 1: Plants and animals

Unit 1: Different plants and animals

Vocabulary

Habitat*: the natural home of a plant or an animal*
Biodiversity*: the variety of all the plants and animals on Earth*
Indigenous*: plants and animals that have always lived in a certain area*
Shelter*: a place that gives protection from bad weather and danger*

The **biodiversity** of the Earth is made up of all the plants and animals, and their **habitats.** Habitats are natural homes for plants and animals. Animals and plants have special features to survive in their habitat.

South Africa has a wide variety of **indigenous** plants and animal. The plants and animals have always lived and survived in a particular area.

A. Plants grow in different habitats

- Water lilies grow in water. The leaves are large and flat and float on water
- Aloes live in dry areas. Their leaves are thick and fleshy and store water.

Activity 1

Redraw the following table in your workbook. List 3 other indigenous plants, their habitats and how they have adapted to that living environment. An example has been included to assist you.

Plant	**Habitat**	**Adaptation**
Example: Rooibos plants	Dry, sandy soil	The leaves are thin and small. Less water is lost from the leaves.

A. Animals live in different habitats

Habitats are places where animals and different organisms get there food, water, air and **shelter.** Shelter protects animals against their enemies as well as the weather elements.

- Toucans live in forests. They have small wings to easily fly through the branches and leaves of the rainforest trees.

- Zebras live in grasslands. The white stripes on their bodies, temporarily confuse their predators vision when they run away from them.

Activity 2

Redraw the following table in your workbook. List 3 other animals, their habitat and how they have adapted to that living environment. An example has been included to assist you.

Plant	Habitat	Adaptation
Example: Fish	Water	Gills are used for breathing. Fins are used for movement.

Unit 2: Interdependence

Vocabulary

Interdependence*: when living and non- living things depend on each other for survival*
Ecosystem*: areas where certain types of plants and animals live. In these areas they depend on each other as well as non- living things to survive*

A. Interdependence between living things

1. Interdependence and feeding

Animals depend on each other for food. Included, are the following groups:

a. Herbivores eat plants.
b. Carnivores eat other animals.
c. Omnivores eat both plants and animals.
d. Scavengers feed off dead animals and plants.
e. Decomposers eat and break up dead animals and put the chemicals from their bodies (carbon, phosphorus and nitrogen) back into the soil to feed the plants.

2. Interdependence and pollination

We call animals that pollinate flowers pollinators.

Bees are an example of pollinators

Plants produce **nectar** that attracts pollinators. However, it could also be a special smell or a bright coloured flower that attracts them. Animals use pollination for **reproduction.**

3. Interdependence and seed dispersal

Birds are an example of animals that disperse seed

Plants make the fruit sweet and tasty, so that animals eat and excrete the seeds. Seeds could stick to the animal's fur as well. In these ways the animal assists the plant in dispersing the seed.

B. Interdependence between living and non- living things

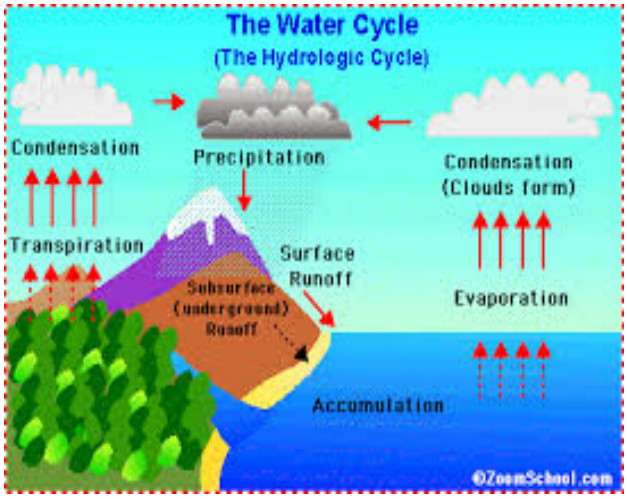
Living and non- living things depend on each other in an ecosystem.

The following table shows the relationship between living and non-living things.

NON-LIVING THING	FUNCTION
Shelter	Protection from predators or weather.
Air	Oxygen, either from the air or dissolved in water, is required for respiration.
Water	All living things require liquid water.
Food	Al living things need food for energy.
Space	Space is needed for food, water, shelter and reproduction

Water and oxygen are extremely important for all living things.

Water that we drink is part of a gigantic system called the **Water Cycle.**



Activity 3

Carefully draw and label the Water Cycle. Ensure that the following labels are included:

- Evaporation
- Condensation
- Precipitation
- Freezing
- Melting
- Run off

Unit 3: Animal types

Vocabulary

Exoskeleton*: the shell or hard covering on the outside of animals*
Endoskeleton*: a skeleton found inside of an animal's body*
Invertebrate*: an animal that does not have a backbone made of bones*
Vertebrate*: an animal with a bony backbone*
Moult*: to shed the outer covering of the body and to grow a new, bigger one*
Cartilage*: flexible, tough substance that cushions bones at the joints*
Features*: important or noticeable parts of something*

Animals without bones- Exoskeletons

- Some animals have no bones at all. These animal's bodies are covered and protected with a hard exterior layer called an exoskeleton.
- Animals with exoskeletons are called invertebrates.
- Exoskeletons are plates joined together to make hard shells.
- The only soft parts are at the parts where the body bends, e g. the leg.
- These animals have to moult to grow.

The six groups of invertebrates

Group Name	Examples
Sponges	Sponge
Jellyfish	Jellyfish, anemone
Worms	Earthworm, flatworm
Molluscs	Snail, octopus
Starfish	Starfish, sea urchin
Arthropods	Spider, crab

Crab

Octopus

Snail

Flatworm

Anemone

(Say: an air moan ee)

Jellyfish

Sea sponge

Sea urchin

Starfish

A. Animals with bones – Endoskeletons

- Some animals have backbones made of small bones called vertebrae.
- These animals are called vertebrates.
- A frame structure made of bone and cartilage is called an endoskeleton.
- The skeleton is covered by muscles and soft body tissue.
- The animal is able to grow without having to moult.

elephants

bluecrane

surgeon fish

crocodile

newt

The five groups of vertebrates

Group Name	Examples
Mammal	Elephant, human, rat
Birds	Blue crane, ostrich
Fish	Shark, surgeon fish
Amphibians	Frog, newt
Reptiles	Snake, crocodile

Activity 4

Find and paste at least two pictures of each vertebrate group in your class work book.

Topic 2: Animal skeletons

Unit 1: Skeletons of Vertebrates

Vocabulary

vital organs*: organs in the body that are absolutely necessary for life*
limb*: body attachments such as legs, arms or tails*
joint*: place where two or more bones meet*
backbone (spine)*: the backbone that stretches from the skull to just below the hipbone*
shoulder blades (scapular)*: upper limbs (arms) are attached at the shoulder blades*
ribs*: joint to the spine to form a rib cage around the chest area*
hip bone (pelvis)*: the lower and back limbs (legs) are attached at the hips*
skull (cranium)*: head bone that protects the brain*

Skeletons of vertebrates

Skeletons **support** and give **shape** to the body. They **protect** the soft organs of the body. The skeletons of vertebrates are made of **bones** and **cartilage**. Cartilage is found at the joints. Cartilage is a **tough**, **flexible** substance that allows bones to rub together smoothly without causing pain. **Joints a**re places in the body where the bones meet.

Bones

Bones are hard and form a very strong frame structure to support and protect a vertebrate animal's body.

The functions of the bones:

1. **The skull**

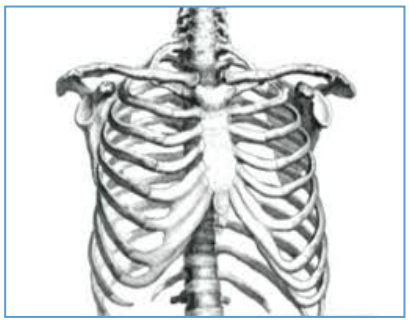
- Protects the eyes, ears, nose, mouth
- Protects the brain
- Teeth and the lower jaw are also attached to the skull

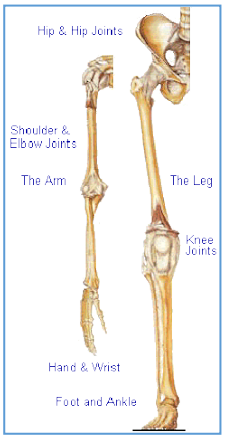
2. **The spine**

- Made up of vertebrae
- A hole runs through each vertebra.
- The backbone has two functions:
    a. It protects the spinal cord with all the nerves vessels in it.
    b. It supports the upper body.

3**. The ribs**

- Where the ribs are in the chest area, it protects the lungs, heart and other important organs
- In snakes, the ribcage can protect and support the whole body





4. **Shoulder blades, hip bones, arms legs**

- The upper limbs (arms) are attached to the body at the shoulder blade
- The lower limbs (legs) are attached at the hips.

Unit 2: Movement in vertebrates

Vocabulary

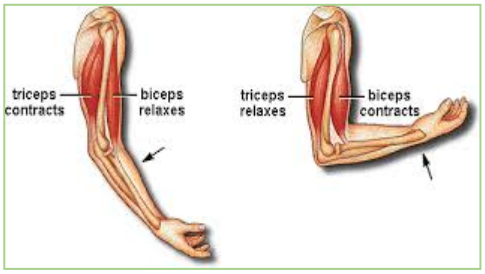
muscles*: masses of tough elastic tissue that pull our bones when we move*
tendons*: tough cords that attach muscles to bones*
ligaments*: bones that connect bone to bone and strengthens the joint*
adaptation*: changes in a body over time to suit the environment*

Bones are very hard and cannot bend, yet your body can move in many ways. You can move because your body has **joints** and you have **muscles** that pull your bones to move your body. Muscles are attached to bones by **tendons**. Bones are connected to each other by **ligaments.**

Muscles

If you move your fingers as if you are pretending to be playing piano, you can see the tendons on the back of your hands. These strong bands join your muscles to your bones.

Muscles work in pairs. When one muscle **contracts**, or becomes shorter and fatter, it pulls the bone to which it is joined. The bone is able to move. The other muscle in the pairs becomes larger and **relaxes.**



There are two muscles that enable you to move your arm – your **triceps** and your **biceps**.

Joints

We find joints at places in the body where two or more bones meet. Joints make our skeletons flexible. There are different kinds of movable joints in the bodies of vertebrates that allow animals to move in different ways.

To bend your arm, the bicep muscle "contracts' and pulls on the **radius** bone and the tricep muscle "relaxes". Your arm then bends at the elbow joint. To straighten your arm, the tricep muscle "contracts" and pulls on the **ulna** bone and the bicep muscle "relaxes".

Activity 5

1. In a paragraph of about 5 sentences, describe how people would move without joints.
2. Your arms have more than one joint. See how many ways you can move:
   a. your elbow joint
   b. your wrist joint
   c. your shoulder joint
   d. your thumb joint
3. Which joint in question 2 allows you the most movement?

Topic 3: Skeletons as structures

Unit 1: Frame and shell structures

Vocabulary

struts*: strong structures that is able to support a weight*
frame structure*: framework of struts that are joined in together. Mainly in triangular shapes called triangulation*
shell structure*: a structure that has a strong layer on the outside that holds itself up*

A. Frame structures

Struts are very strong structures that can support a lot of weight. We are able to join struts together in triangular shapes to create strong **frame structures** like bridges and cranes.

The vertebrate skeleton as a frame structure

One of the most important frame structures for all vertebrates is their skeleton. The material used to make this frame is bone that is attached to the muscles that move the skeleton. This skeleton supports and protects their bodies.

Did you know...?

The ribcage is a frame structure that protects the heart and lungs – but can be damaged by as little as a sneeze.

B. Shell structures

A **shell structure** is a structure that has a strong layer on the outside that holds itself up. It is not strengthened by joining struts together like a frame structure. The outer layer is strong enough to support the weight of the structure and to keep its shape.

Some invertebrates' exoskeletons are shell structures

Some invertebrates have strong **exoskeletons** that protect their bodies from the outside. A crab's body is covered by a strong exoskeleton. This protects the body and organs of the crab and gives the crab its shape. The exoskeleton is an example of a **shell structure.**

The shells of some invertebrates that live in the sea, like molluscs and oyster, are shell structures. The hard shell protects the animals inside it. Starfish, crayfish and snails are other examples of invertebrates with exoskeletons that are shell structures.

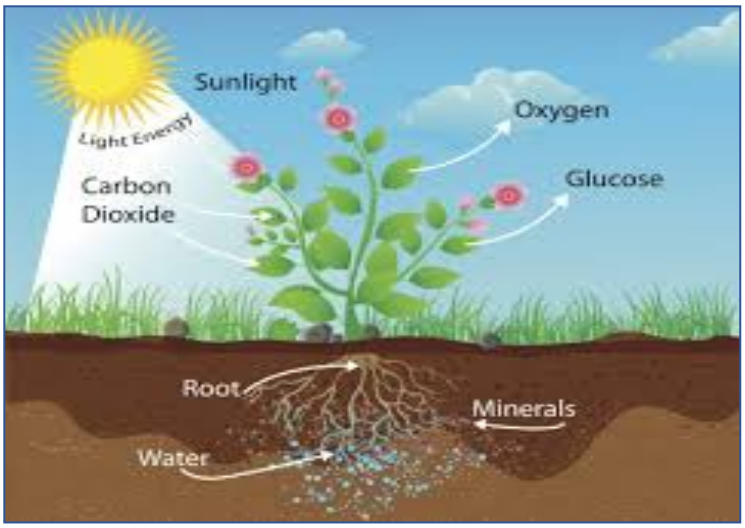
Activity 6

Answer the following questions:

1. What type of structure is a pylon? Give a reason for your answer.
2. What type of structure is a skeleton? Give a reason for your answer.
3. What shapes are you likely to find in a pylon. Briefly explain why these shapes make the structure strong.
4. What shapes are likely to be found in a human skeleton. What makes the structure strong?
5. How are the struts of the skeleton joined together?
6. How are the struts of the pylon joined together?
7. Can you think of other ways in which these two structures are the same?
8. How are they different?

Topic 4: Food chains

Unit 1: Food and feeding



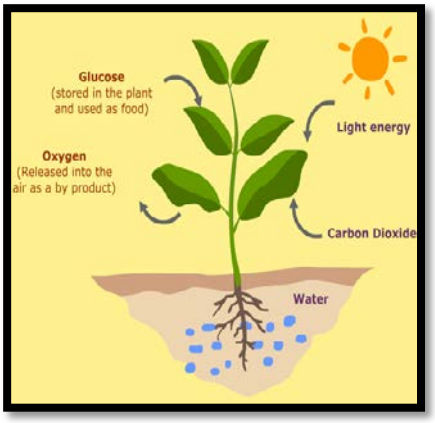
Vocabulary

substance*: any part of a solid, liquid or gas*
nutrients*: substances that help living things grow*
photosynthesis*: the process that plants use to manufacture food*

Green plants make their own food

Green plants do not eat food like animals do. Green plants make their own food. They use the food that they make to grow and build their branches and stems as well as other parts, such as roots, flowers and fruit.

Plants use energy, water and other **substances** from the air and soil to produce food.

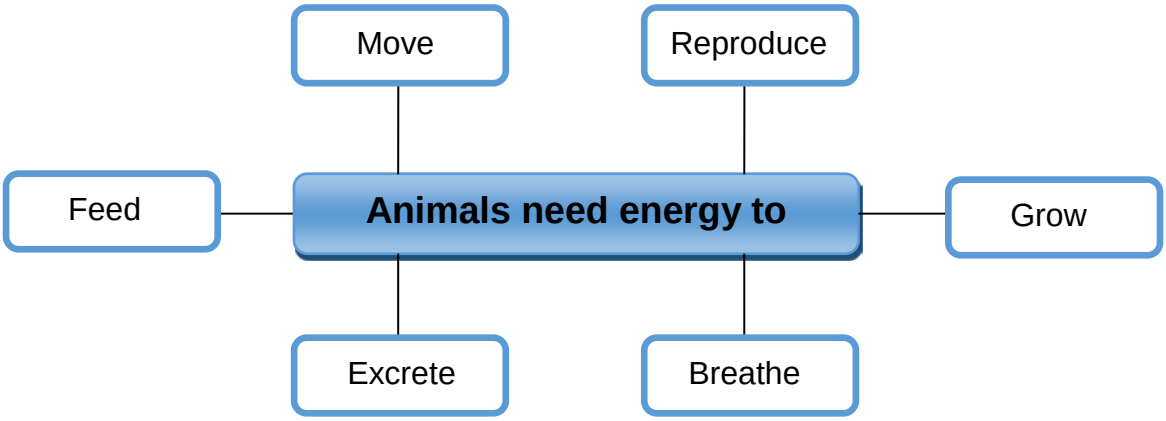


Photosynthesis

- They absorb water and **nutrients** through their roots.
- The **water** travels to the leaf or stem where the plants make the food.
- The plants use the gas **carbon dioxide** from the air.
- They also use **sunlight energy** from the sun for this process.
- The plants use the water and carbon dioxide gas with the sunlight energy to make food that we call sugars.
- The plants give off the **oxygen** as a **by- product** of this process.
- The plant can use the food (sugars) that it produced to carry out the life processes.
- Plants generally make far more food than they need to live. They store the extra food that they make in different parts of the plant.
- Animals then eat these parts of the plant (or the whole plant) to get food.

Animals need food to carry out life processes

Animals cannot make their own food. They must eat food to stay alive. Food gives animals energy. They use this energy for their life processes.



Living things that get energy by eating either a plant or animals are called **consumers.**

- Many animals eat plants to get energy. We call these animals **herbivores**.
- Some animals eat other animals to get energy. We call these animals **carnivores**.
- Other animals can eat plants and animals, like baboons or people. We call these animals **omnivores**.
- We get special animals called **scavengers** and **decomposers**. They eat dead animals and break their bodies into tiny pieces that can go into the soil as compost.

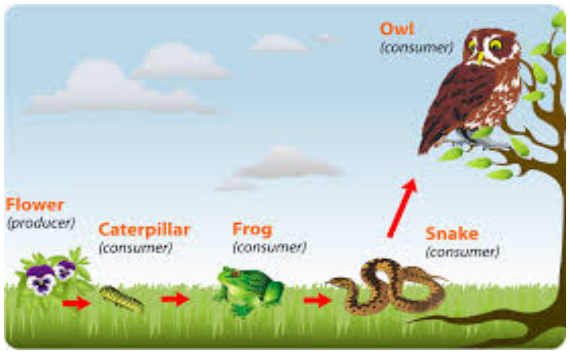
Cows are herbivores

Lions are carnivores

Humans are omnivores

Ants are scavengers

Unit 2: Food chains



Vocabulary

***producers**: plants that produce or make their own food*
***energy flow**: energy that is passed on from one organism to the next*
***consumers**: animals are unable to produce their own food, so they consume plants and animals*
***food chain**: the order in which animals eat plants and other animals to get energy*

There is a feeding relationship between **producers** and **consumers**.
We call this relationship a **food chain.**

- Plants are the producers.
- Animals are the consumers.

A food chain describes how each living thing gets food and **how energy is passed from one organism to the next.**

- When we draw a food chain we use an arrow (→) between organisms to show that one eats the other and that energy is transferred from the one organism to the next.
- A simple food chain is: grass → cow → human
- Many food chains that are interdependent linked are called a **food web.**

The organisms that make up a food chain **cannot** be in any random order. They have to be in the **specific** order in which the energy is transferred between them in an ecosystem.

Activity 7

1. Write a food chain poem.
2. The heading of your poem must describe or label the type of habitat in which the food chain is located.

3. The body must explain the flow of energy in the food chain.
4. The ending must repeat the heading and your name.
5. Use a thesaurus to get ideas for different verbs instead of only using “EAT”.

Example:

The Jungle

There are the tiger cubs
that were fed by the fierce tigress
that caught the rabbit
that munched on grass
that grows in the jungle where
Themba would love to play!

Topic 5: Life cycles

Unit 1: Growth and development

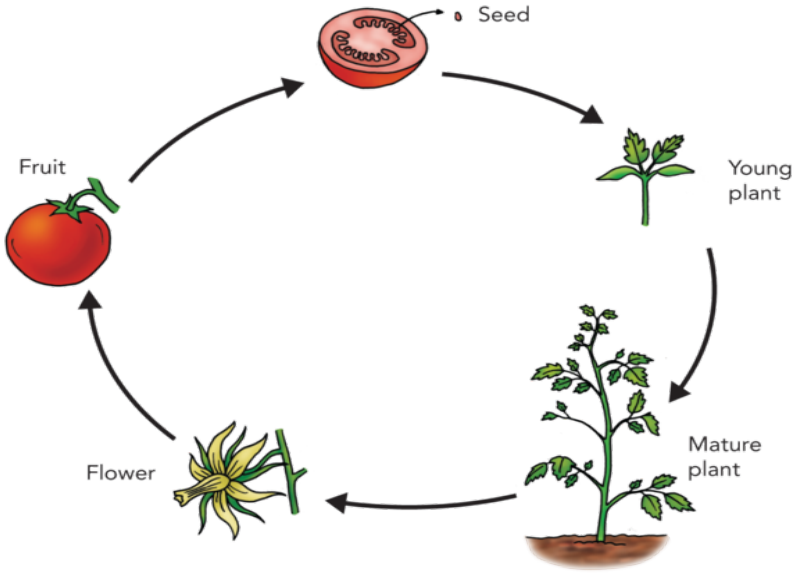
Vocabulary

life cycle*: stages through which a living thing passes during its lifetime*
extinct*: no longer exists on Earth*
offspring*: the young of an animal or plant*

- All living things have a life cycle.
- Plants and animals grow and develop throughout their lives.
- All plants and animals need to reproduce or they will become extinct.

- An adult animal or plant needs to reproduce offspring that will grow over time into a new adult that will reproduce offspring of its own.
- This is called a **life cycle** because when a new plant or animal is made the cycle begins again.
- The plant or animal can die anywhere in its life cycle-at birth, as a young or old plant or animal.

Unit 2: Life cycle of a plant



Vocabulary

pollination*: when pollen from the male parts of a flower reaches the female parts of the flower*
germinate*: begin to sprout or grow into seedling*

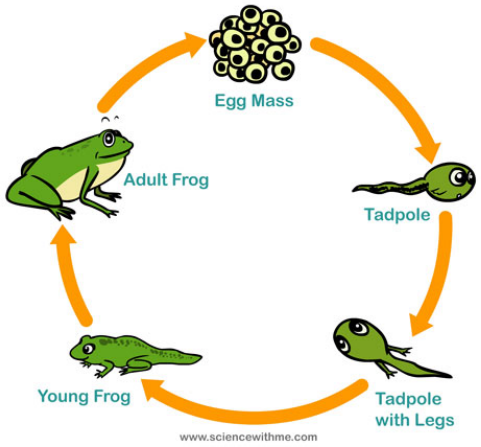
Nearly all the flowering plants that you see around you began their life as little as seeds. When the conditions are right, seeds grow into seedlings.

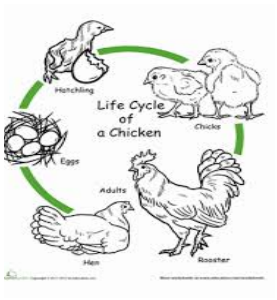
Seedlings eventually grow into adult plants. Adult plants grow into flowers.

After the flowers have been **pollinated**, they can turn into fruit with seeds in them. These seeds will **germinate** in soil and grow into new plants.

In this way, the **cycle of life** continues.

Unit 3: Life cycle of an animal





Vocabulary

reproduce*: when plants and animals produce offspring*
extinct*: when all the individuals of a type of plant or animal die and no more are left*
internal fertilization*: joining of male cells and female eggs inside the body*
external fertilization*: joining of male cells and female eggs outside of the body*

All living things need to **produce**. That means that they need to make more living things like themselves. **Reproduction** makes sure that different kinds of living things do not become **extinct** or die out.

Animal reproduction

- The life cycle of an animal shoes all the stages it goes through from the time it is born until it dies.
- Animals are either born alive from their mother or they hatch from eggs.
- They then grow and mature into adults.

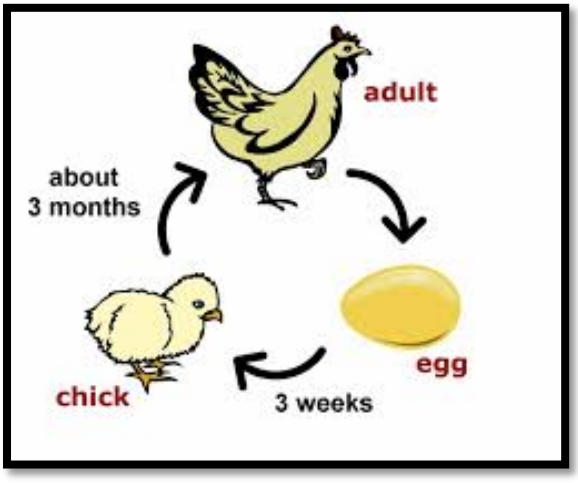
Fertilization

- Most animals need a partner to reproduce.
- Males produce cell that are called sperm.
- Females make eggs inside of their bodies.
- The sperm and eggs must join together to form new life. This is called **fertilization.**
- **Internal fertilization** occurs when the eggs and sperm join inside the female's body.
- **External fertilization** occurs when the female lays eggs and the male spreads his sperm over the eggs.

Activity 8

Read the following text about the life cycle of a chicken and use the information to answer the questions that follow.

The hen and the rooster mate. The rooster puts sperm inside of the hen.
When the sperm cell joins with the egg cell inside the hen's body, fertilization takes place. After about 24 hrs the hen can lay eggs. The embryo grows into a chick within 21 days. The hen keeps her eggs warm and the hard shell protects the developing chick. The baby bird hatches by breaking through the shell with its little beak. After about 4 weeks, the chicks will grow feathers. Chicks are fully grown within 6 months. The life cycle will then begin again.



Questions

1. Draw a picture for each for each stage in the life cycle of a chicken. Draw the picture in the correct order to make a cycle. Link the stages with arrows. Use the following words as clues: hen and rooster; egg; hatch; more feathers fully grown.
2. Next to each arrow, write the approximate time it takes for one stage to lead to the next.
3. Write a sentence underneath each picture to say what stage of the life cycle of the chicken is shown.

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