



CLASSIFICATION OF LIVING ORGANISMS

CLASSIFICATIONS OF VERTEBRATES

WARM-BLOODED

MAMMALS



1/6/2025

BIRDS



COLD-BLOODED

REPTILES



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AMPHIBIANS



FISH



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INTRODUCTION.



- Classification is the *process of placing animals and plants into groups according to their similarities* in structure, physiological processes and behavioral.
- This involves **collecting organisms, observing their structural characteristics** and **sorting them into groups** known as **taxa**.
- The branch of biology concerned with classification is called **taxonomy**.
- The word taxonomy is derived from a Greek word **taxis-** meaning **arrangement** and **nomia**-meaning **distribution**.



LEVEL OF CLASSIFICATION

- The level of classification is called **taxon**. Plural –**taxa**.
- A taxon is a ***unit of classification made of similar organisms***. The **largest taxon** is the **kingdom** and the **smallest taxon** is the **species**. All organisms have been put in **seven** major taxa and these include:
 1. Kingdom
 2. Phylum (phyla)
 3. Class
 4. Order
 5. Family
 6. Genus (genera)
 7. Species



KINGDOM

- A kingdom is the largest taxon, and all the other taxa (groups of living organisms) are placed in one the kingdoms. In modern classification system, there are 5 kingdoms:

1. *Monera (bacteria)*
2. *Protoctista*
3. *Fungi (Mycota)*
4. *Plantae*
5. *Animalia*

Note: Viruses are not classified in any of the five kingdoms because ***they do not have all the characteristics of all living things***



SPECIES

- A species is the smallest taxon which is made up of individuals that have almost the same characteristic features and *can interbreed freely to produce viable off springs* i.e. reproductively fertile off springs

| Taxon | Human | Honeybee | Maize | Meadow mushroom |
|----------------|----------------|------------------|------------------|-------------------|
| Kingdom | Animalia | Animalia | Plantae | Fungi |
| Phylum | Chordata | Arthropoda | Angiospermophyta | Basidiomycota |
| Class | Mammalia | Insect | Monocotyledoneae | Basidiomcetes |
| Order | Primates | Hymenoptera | Commelinaceae | Agaricales |
| Family | Hominidae | Apidae | Poaceae | Agaricaceae |
| Genus | <i>Homo</i> | <i>Apis</i> | <i>Zea</i> | <i>Agaricus</i> |
| Species | <i>sapiens</i> | <i>Mellifera</i> | <i>mays</i> | <i>campestris</i> |

BINOMIAL SYSTEM OF NOMENCLATURE



- Binomial nomenclature is the system of giving a scientific name to an organism. The word binomial comes from two words **bi-** meaning **two** and **nomio** meaning **name**.

Rules of binomial system of nomenclature

- Each organism should be given two Latin or Greek names which include generic (genus) name followed by specific (species) name.
- The generic name should start with a capital letter and a specific name starts with the small letter
- When written both names should be underlined separately or printed in italics



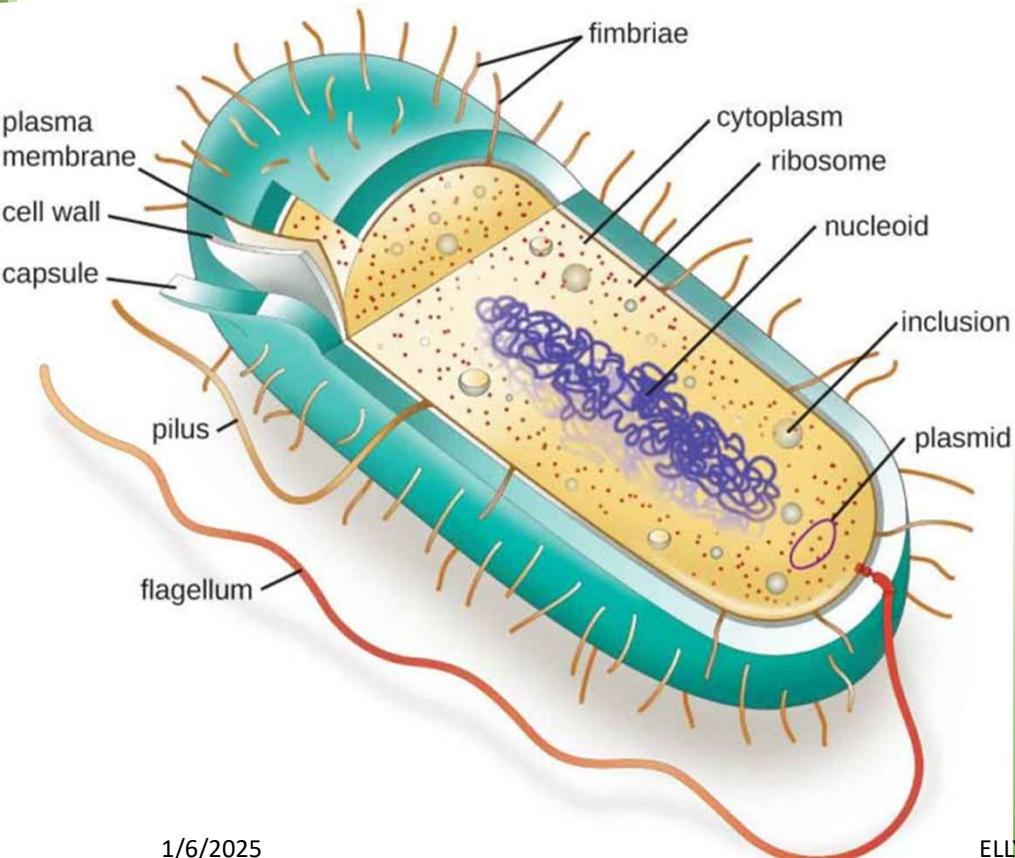
KINGDOM: MONERA

This basically comprises of bacteria which are prokaryotes

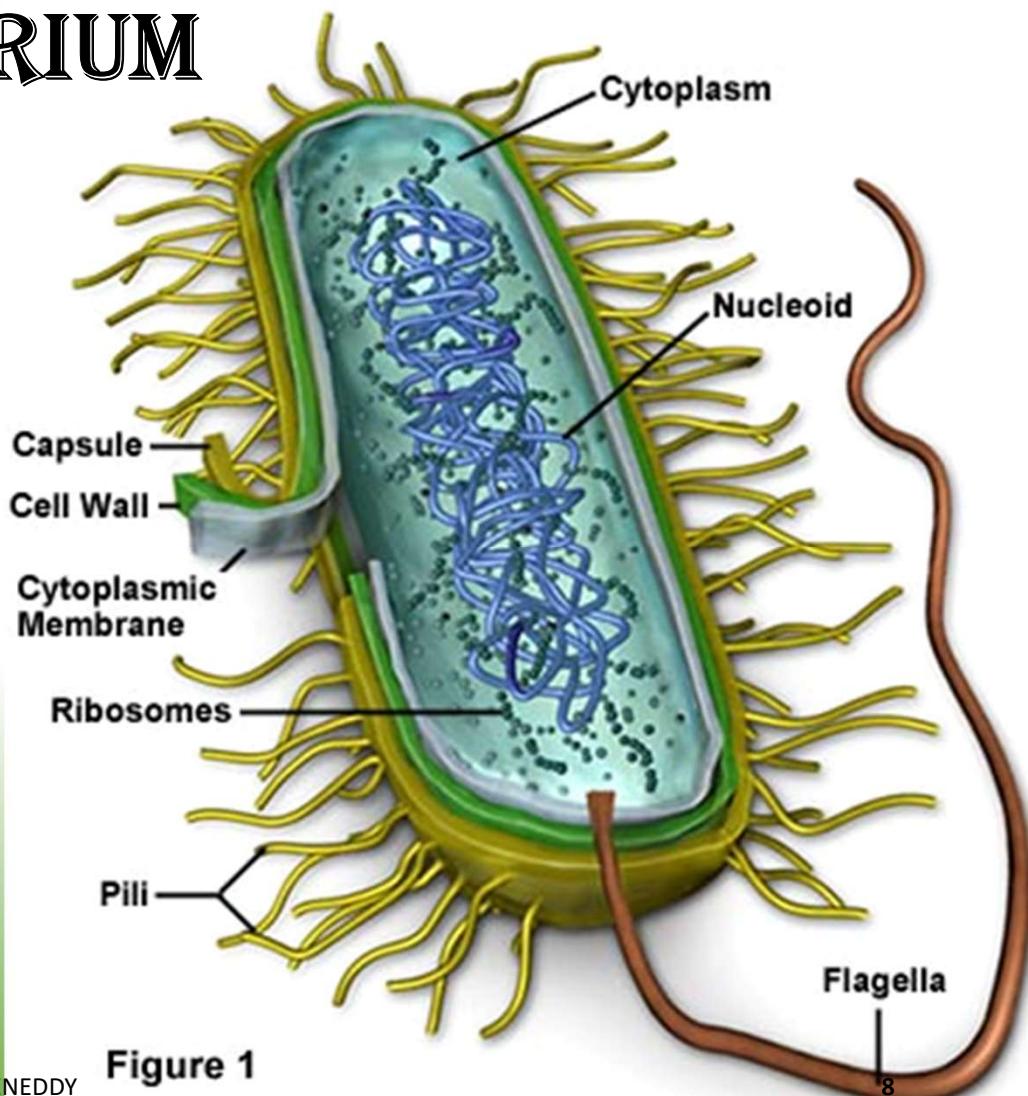
General characteristics

- They are unicellular with cells occurring either alone or in colonies.
- The cells lack membrane bound organelles.
- The free-living bacteria have flagella
- Some are parasitic and others are saprophytic
- The cell wall is covered with mucin
- They reproduce asexually by means of spores or binary fission.

STRUCTURE OF BACTERIUM



Prokaryotic Cell Structure



ECONOMIC IMPORTANCE OF BACTERIA



- Bacteria causes decay of dead plants and animals thus releasing nutrients for use by green plants
- Rhizobium converts the nitrogen into nitrates in the soils
- Bacteria manufacture vitamin B12 and k
- Used in curing tea and tobacco, making silage /retting flax. Curing is process of treating and preserving tea / tobacco
- Bacteria destroys harmful organisms in sewage in the sewage treatment
- Used in industrial processing of food like vinegar, cheese, and yoghurt
- Symbiotic bacteria in ruminants help in digesting cellulose by secreting enzymes cellulose
- Bacteria cause decay and food spoilage
- Denitrifying bacteria converts nitrates in to free nitrogen in the soil.
- Some bacteria cause harmful diseases to man like anthrax.

KINGDOM: PROTOCTISTA



Examples of protocists are: **Amoeba, Euglena, Paramecium, Trypanosomes, Chlamydomonas, etc.**

Main features of Protoctista

- They are unicellular organisms i.e. single celled organisms.
- They have a true nucleus with a nuclear membrane.
- They have double membrane organelles.
- Some members locomote freely using either pseudopodia (false legs) in amoeba, cilia in paramecium or flagella in euglena and trypanosomes.
- They have varied forms of nutrition e.g. euglena and Chlamydomonas make their own food by photosynthesis, amoeba and paramecium by phagocytosis and simple absorption of digested food by trypanosomes.
- They live mostly in water or watery environments like wet lands.

PHYLUM: PROTOZOA



This is the main phylum of kingdom Protocista. It has several classes but the most important are:

- **Rhizopoda** e.g. Amoeba

These are free living organisms by means of pseudopodia or false legs

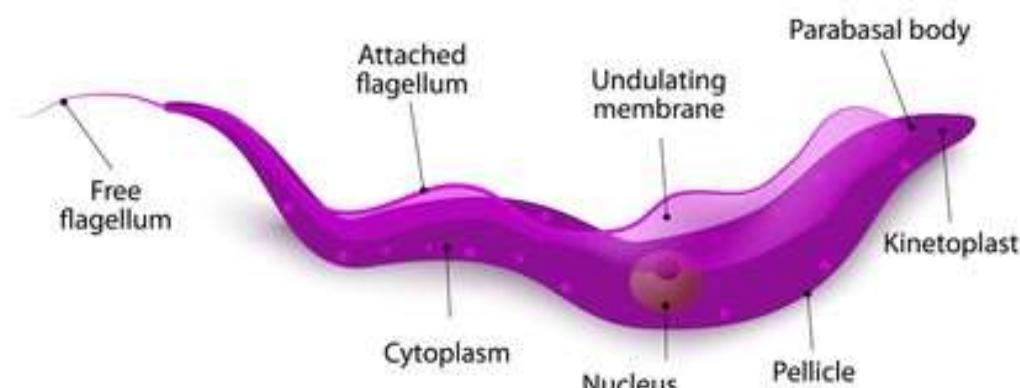
- **Ciliophora** (ciliata) e.g. paramecium

These possess cilia all over the body for locomotion or movement.

- **Mastigophora** e.g. trypanosomes.

These have a flagellum for locomotion.

Trypanosoma brucei





GENERAL CHARACTERISTICS OF PROTOZOANS.

- They are unicellular.
- They are mainly found in fresh or marine water and in the soil.
- They are mostly free-living but some are parasites.
- They carry out locomotion by means of flagella, cilia or pseudopodia.
- Euglena have autotrophs and others protozoa-such as amoeba.
- They reproduce asexually by binary fission or multiple fission.

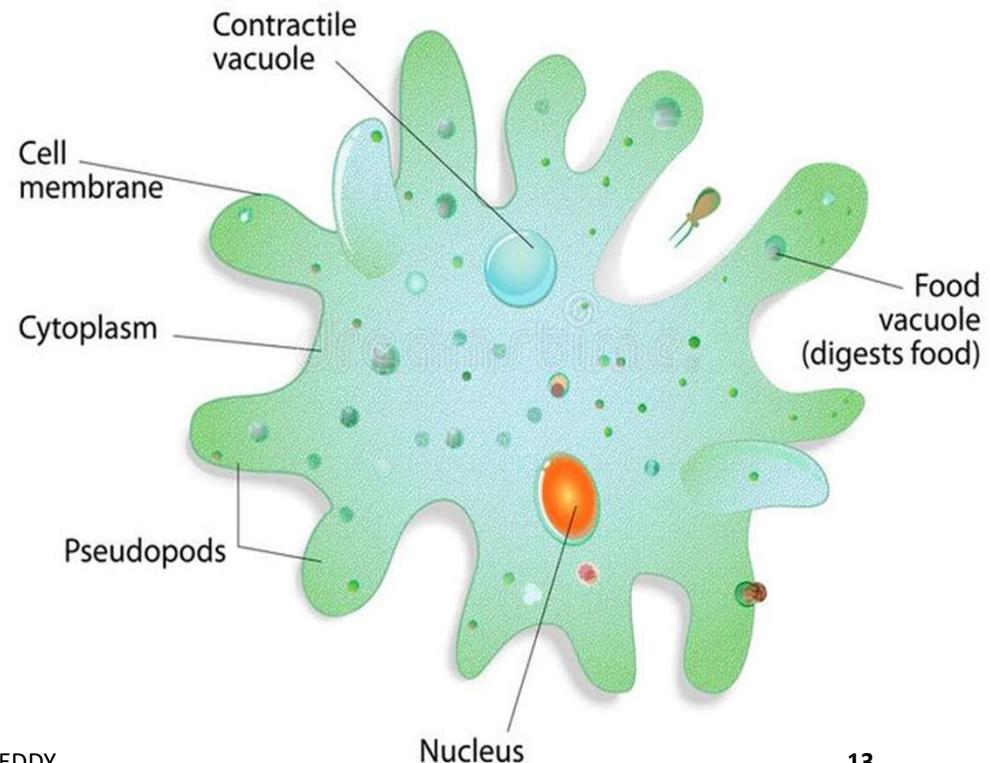
Examples of protozoa include Amoeba, Paramecium, Euglena, Trypanosome and plasmodium.

AMOEBA

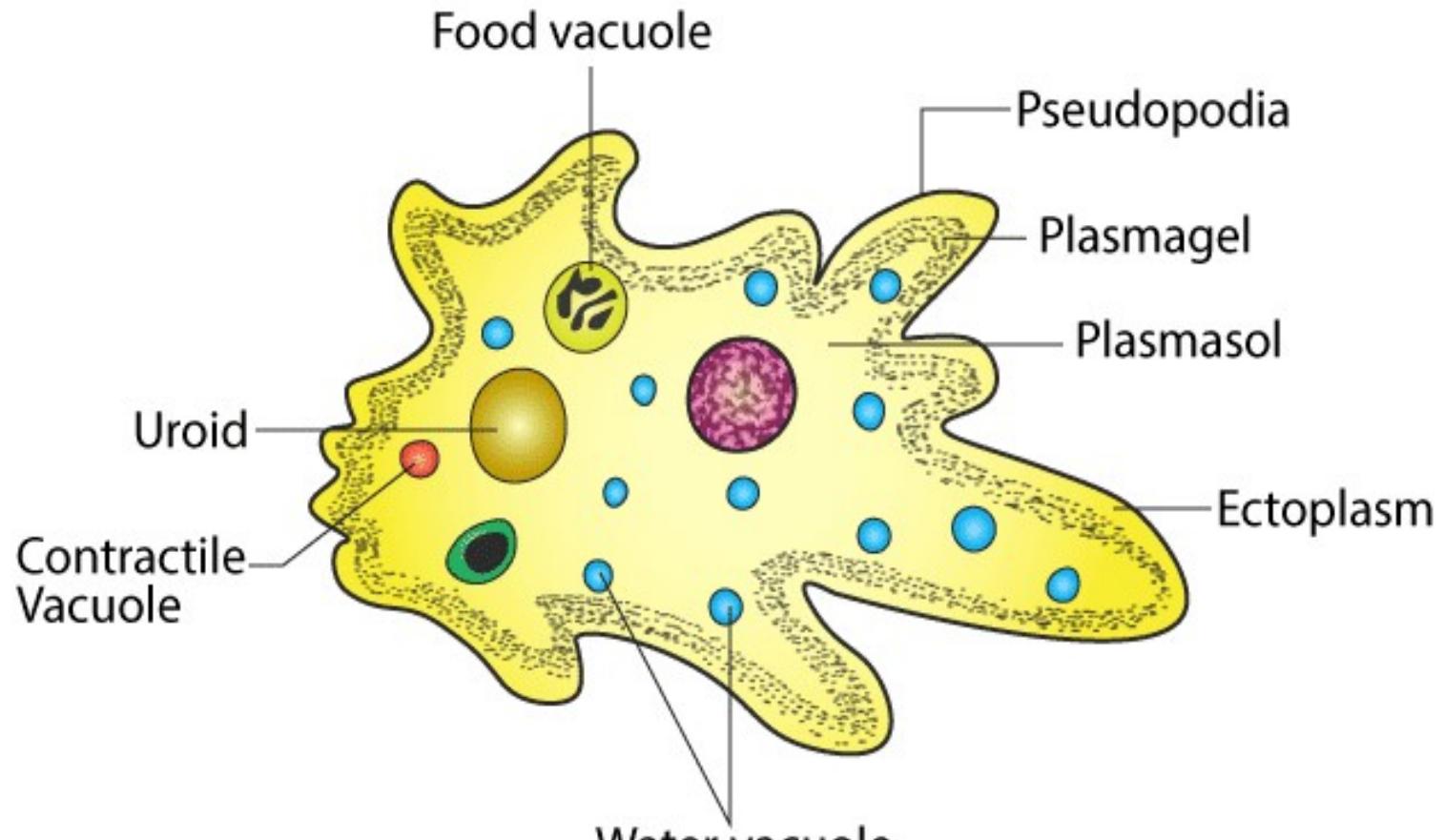


- Amoeba is a free-living protozoa found at the bottom of ponds.
- It has temporary extensions called **pseudopodia** used for locomotion.
- The pseudopodia are also used for enclosing food particles which form food vacuoles. The food in vacuole is digested by **phagocytosis**.
- The extra amount of water can be regulated by contractile vacuole.
- These have no permanent shape and cause **dysentery** in man.

AMOEBA



STRUCTURE OF AMOEBA



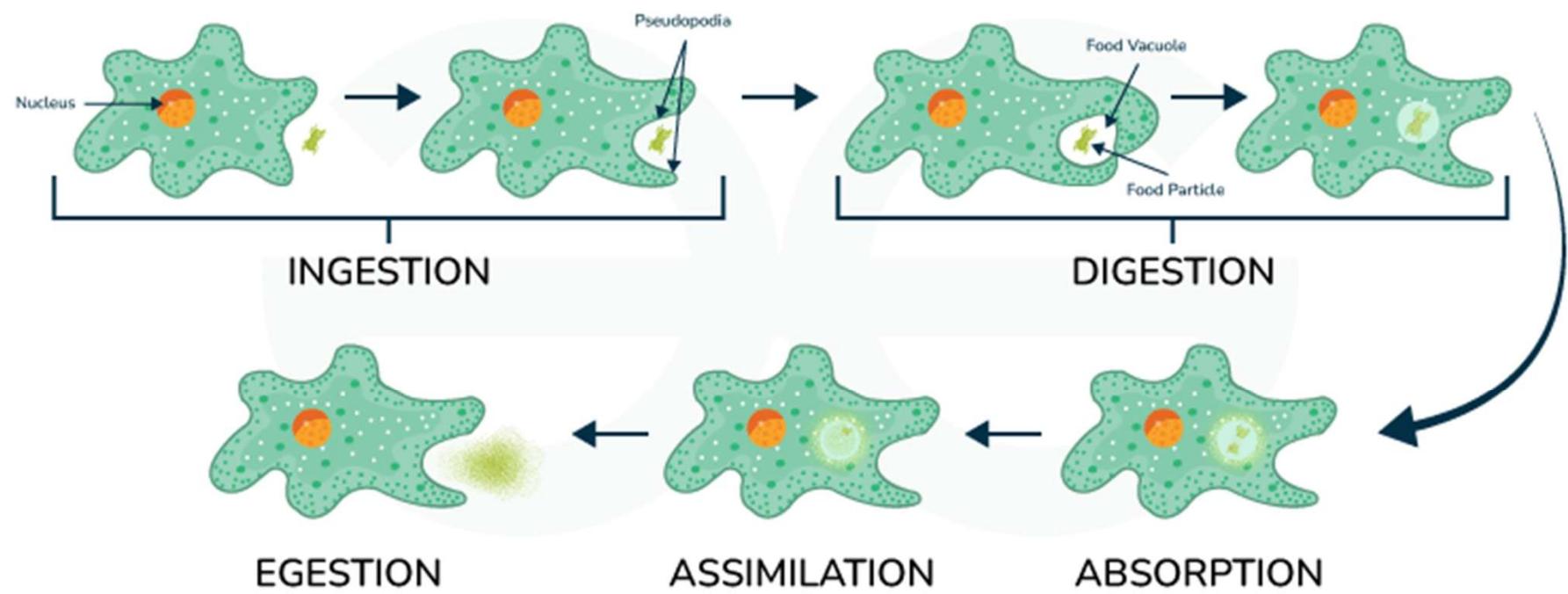


FEEDING IN AMOEBA

- Amoeba feeds on microscopic algae and bacteria.
- It captures the food by *developing pseudopodia around the food and it engulfs it.*
- The cytoplasm flows around the food. This one now **forms the food vacuole**.
- Digestive enzymes are produced which break the food particles into soluble food substances.
- The products are utilized and amoeba moves away from undigested food remains. This is called **egestion**.



Nutrition in Amoeba



Nutrition in Amoeba



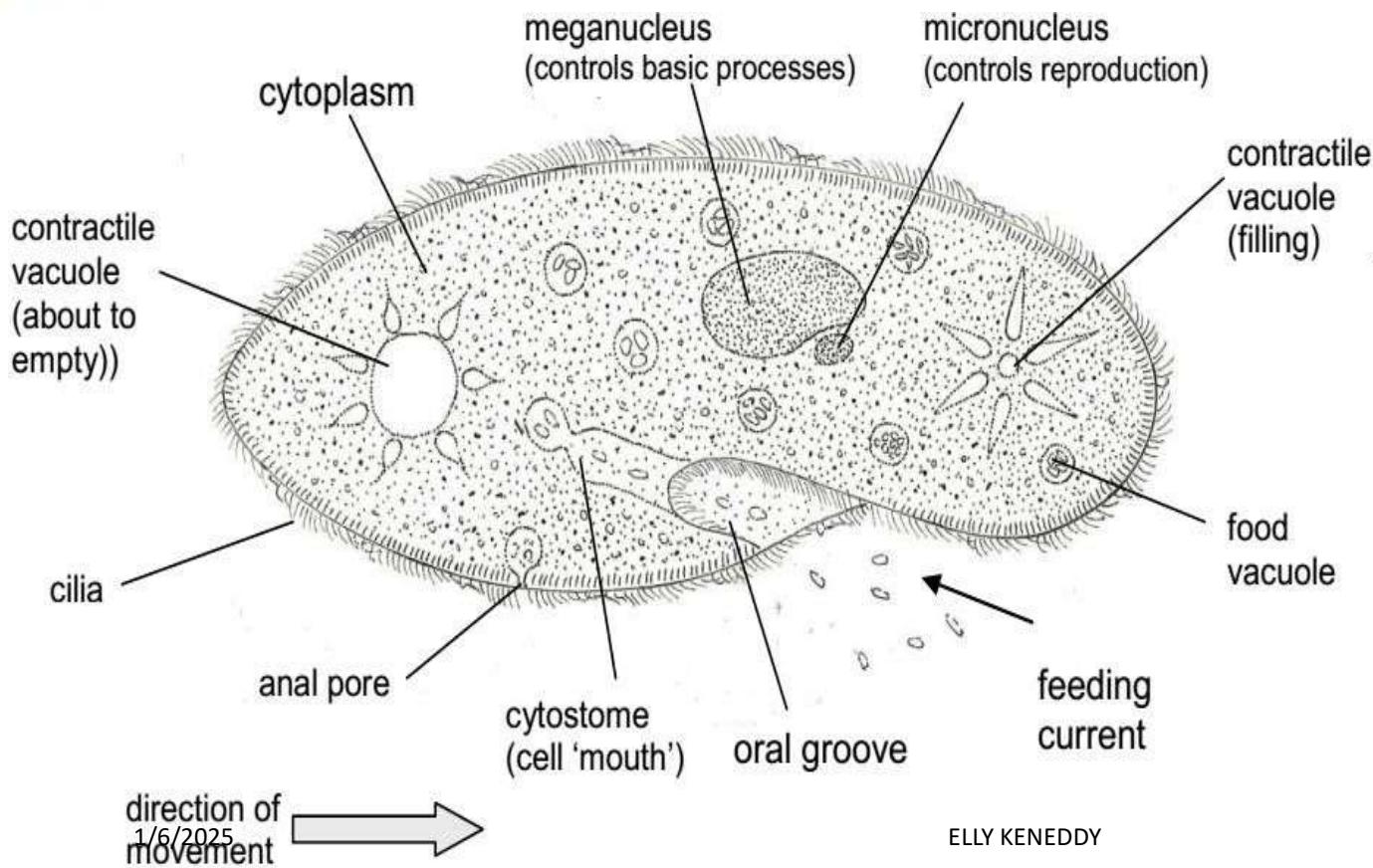


PARAMECIUM

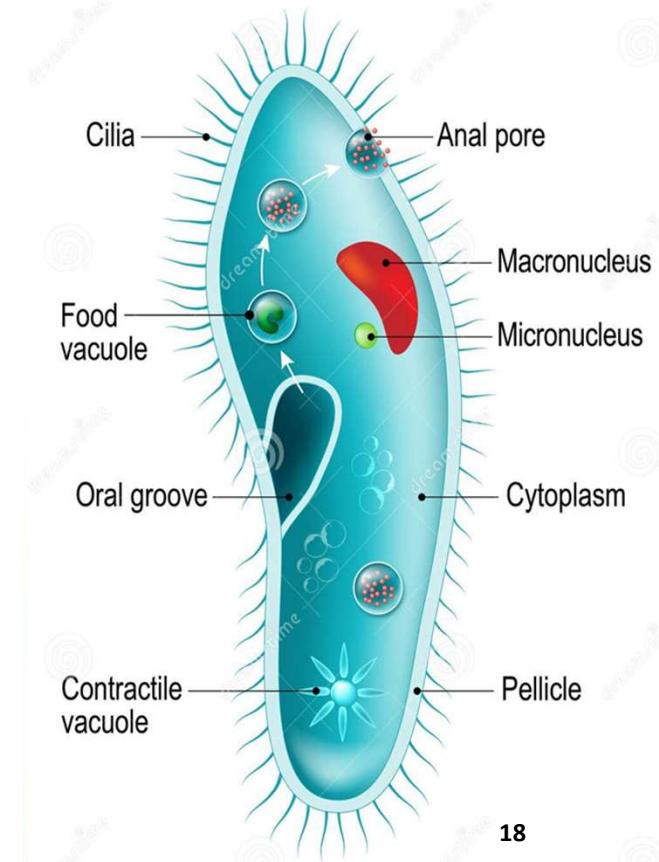
- Paramecium uses **cilia** for *movement and collection of food*. It has special row of cilia that waft food particles into the hollow gullet.
- The food vacuoles move in a very definite path through it and egestion occurs at only one point near the region of ingestion.
- Unlike amoeba, paramecium *has a distinct and permanent shape* and certain areas of cytoplasm, (cell organelles), are specialized to carry out specific functions.



STRUCTURE OF PARAMECIUM.



Paramecium



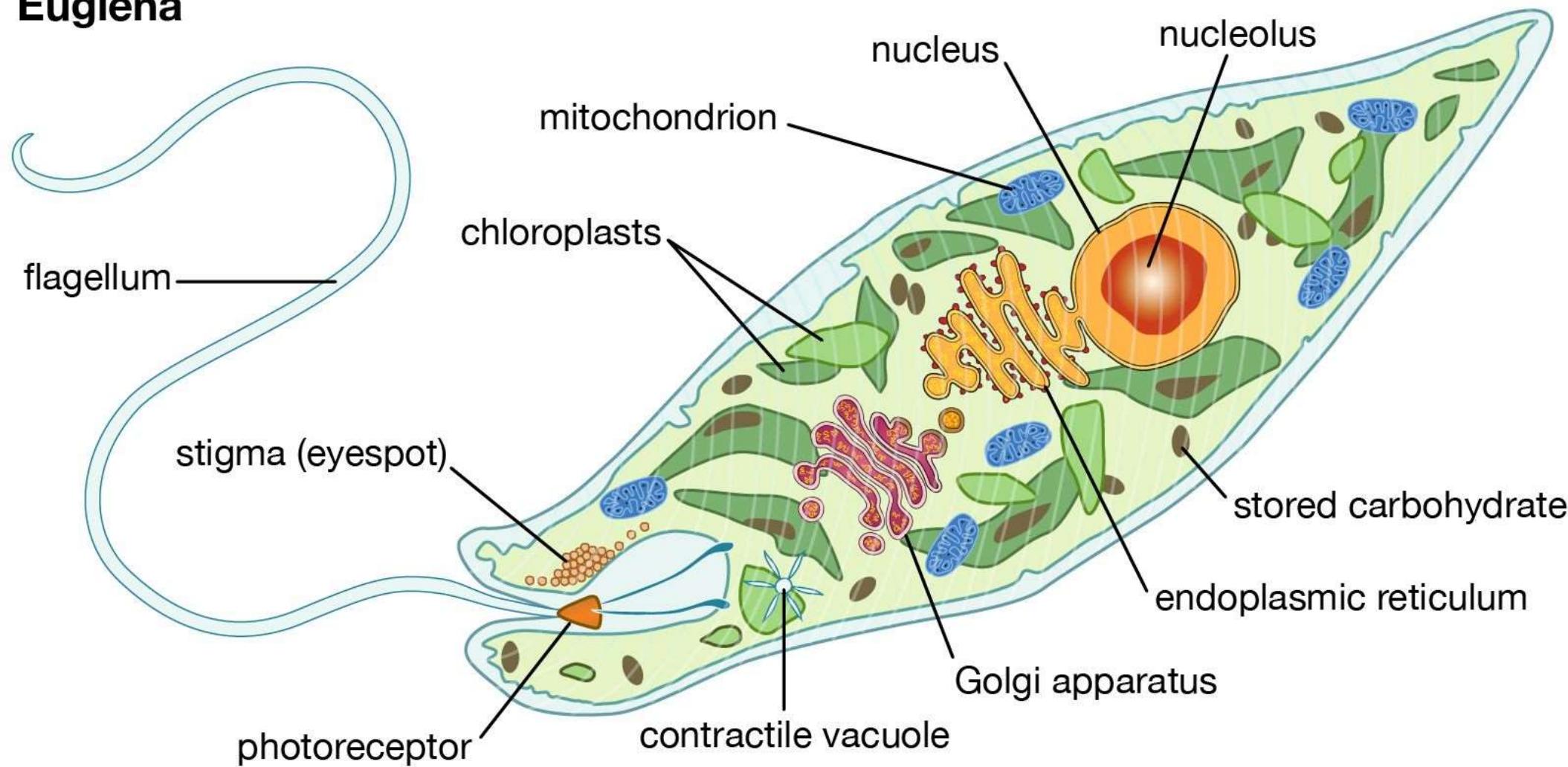
EUGLENA



- This is commonly found in water and in soil. It is photosynthetic and moves by means of flagellum.



Euglena





ECONOMIC IMPORTANCE OF PROTOCTISTS

- They cause diseases e.g plasmodium that causes malaria, Trypanosoma that causes trypanosomiasis, amoeba that causes amoebic dysentery.
- Some are used as food for aquatic organisms like fish eats algae
- Algae add oxygen and absorb carbon dioxide while carrying out photosynthesis
- They are used as specimens for research.
- Algae blooming brings about eutrophication which destroys aquatic life

KINGDOM: FUNGI



- Kingdom fungi mostly have multicellular eukaryotic organisms such as mushroom and mould. Some are unicellular like yeast.
- Other examples include toad stool, smuts, penicilium, mucor (grows on soil and dead plants), Rhizopus (common bread mould).
- Rhizopus is saprophytic fungus which grows on decaying food like bread and fruits.





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GENERAL CHARACTERISTICS

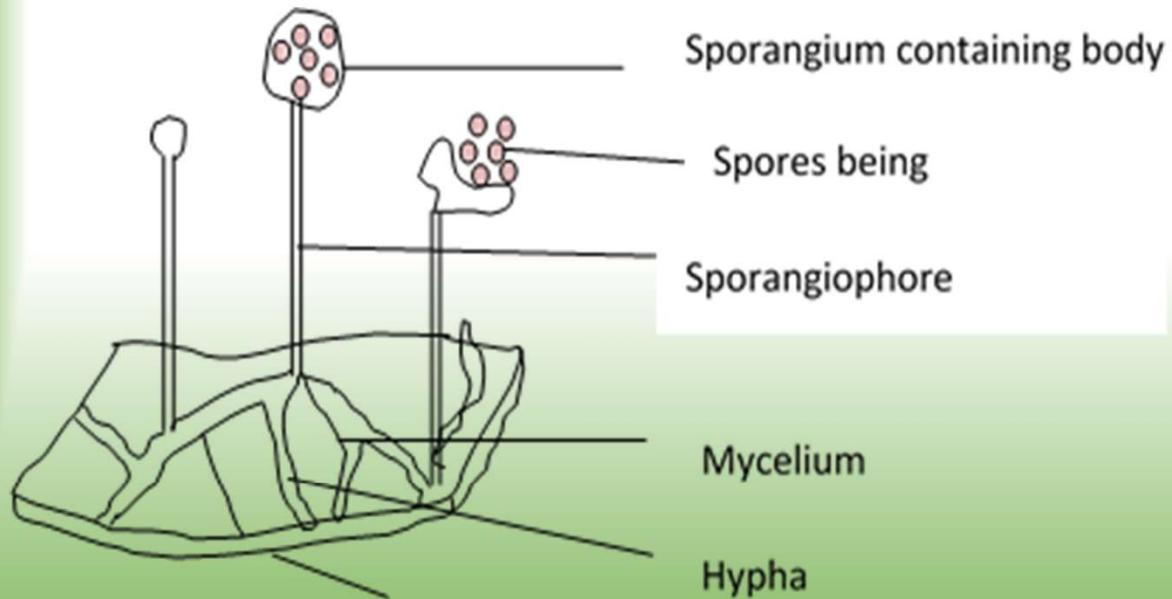
- Are multicellular except a few e.g. yeast.
- Fungi inhabit damp or aquatic plants
- They reproduce by means of spores. They have saprophytic or parasitic mode of nutrition.
- Have vegetative body called mycelium which consists of a network of hyphae.
- They have cell walls which consist of a material called chitin.
- They lack chlorophyll though majority are plant-like.





ILLUSTRATION

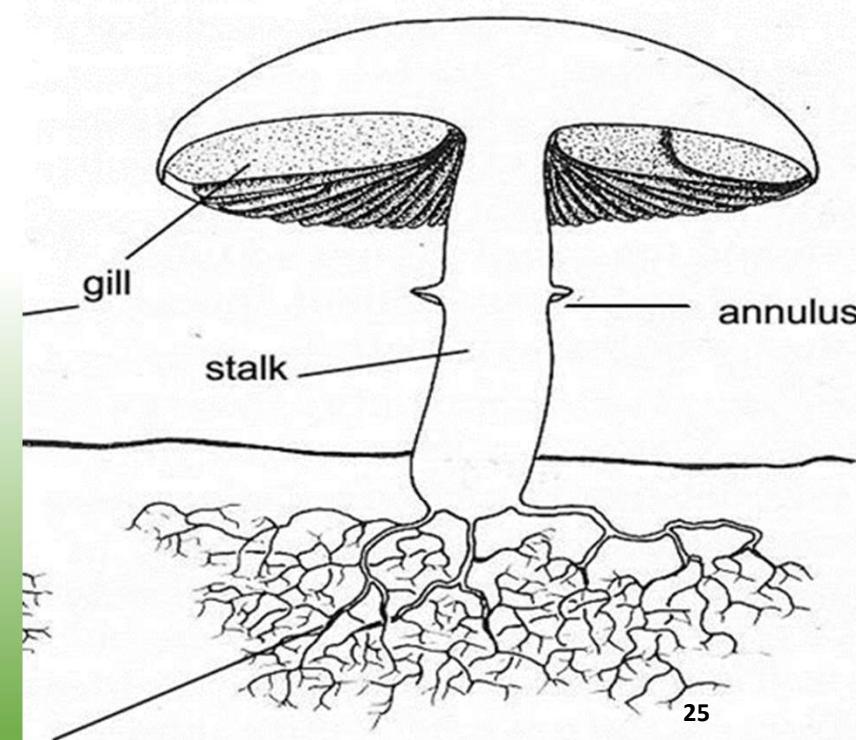
- Diagram of common bread mould (Rhizopus)



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Structure of a mushroom



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ECONOMIC IMPORTANCE OF FUNGI



- ✓ Fungi decay dead organic materials to release materials needed by green plants
- ✓ Yeast respiring anaerobically, provides alcohol for brewers and wine makers.
- ✓ Yeast cells are a source for vitamin B extract
- ✓ Fungi produce antibiotics e.g. penicillium.
- ✓ Fungi provide food e.g. mushroom also used in making cheese.



CONT.....

- ✓ Fungi can spoil food e.g. Rhizopus and penicillium on the bread, cakes, fruits and jam.
- ✓ Fungi causes plant disease e.g. rust, white bright and smut.
- ✓ Fungi can be used by military to prepare biological weapons to be used in the war fare.
- ✓ Dry rot fungus attacks the timber of houses.
- ✓ Fungi causes diseases to man e.g. ringworm, athlete's foot.

Activity

- Discuss the role of micro-organisms in food making and processing processes.



RESEARCH.



- Discuss the importance of bacteria and fungi in the production of yoghurt, cheese, bread and alcohol.

KINGDOM : ANIMALIA



Kingdom Animalia is composed of 9 main groups (**phyla**) each of which consists of a variety of organisms.

- **Porifera** e.g. sponges
- **Coelenterata** e.g. hydra
- **Platyhelminthes** e.g. flat worms
- **Nematoda** e.g. round worms
- **Annelida** e.g. ringed worms
- **Mollusca** e.g. snails
- **Echinodermata** e.g. star fish
- **Arthropoda** e.g. cockroach
- **Chordata** e.g. man

CONT.....



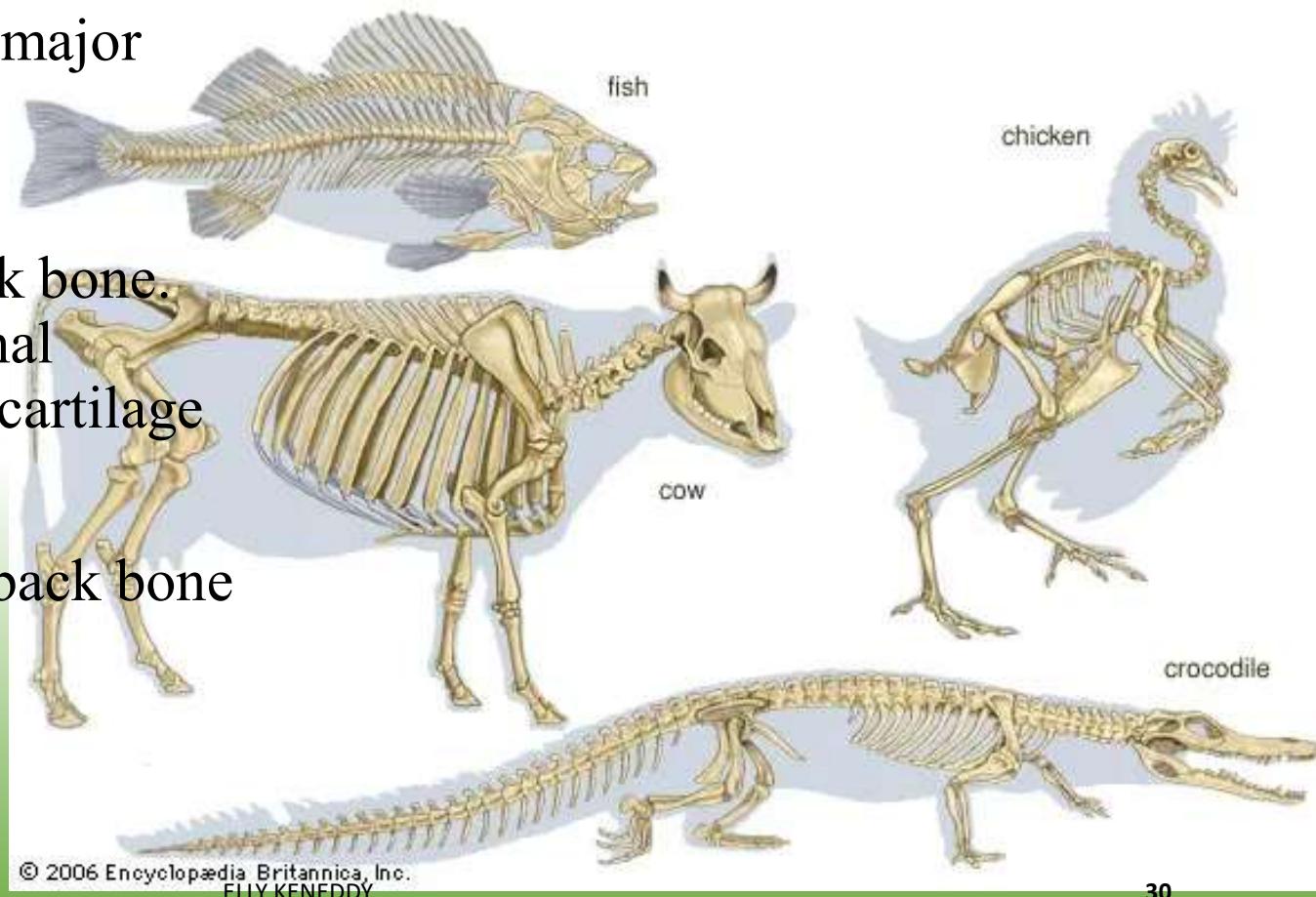
Animals are classified into 2 major groups **i.e.**

Vertebrates

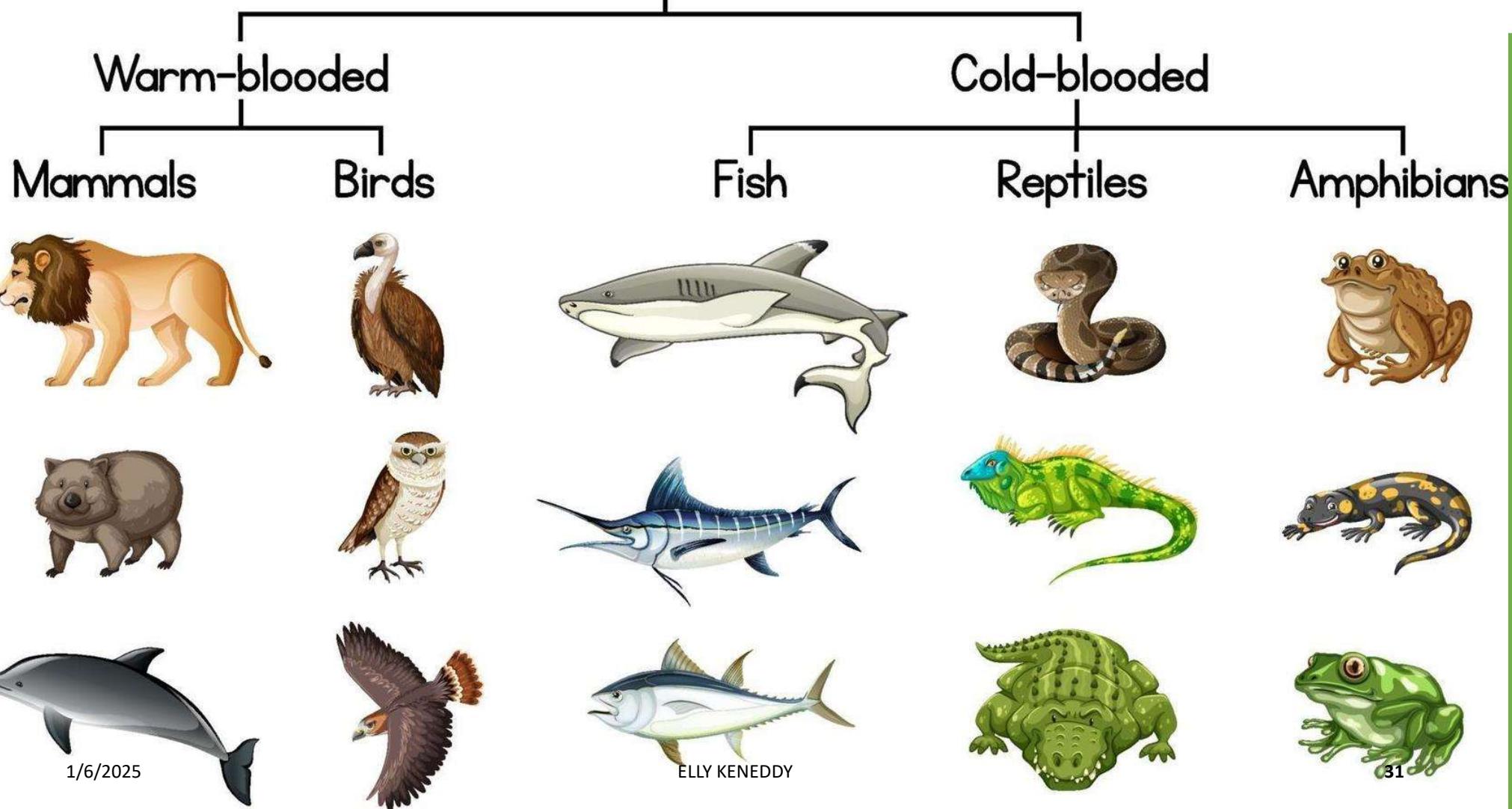
These are animals with a back bone.
All vertebrates have an internal skeleton made up of bone or cartilage

Invertebrates

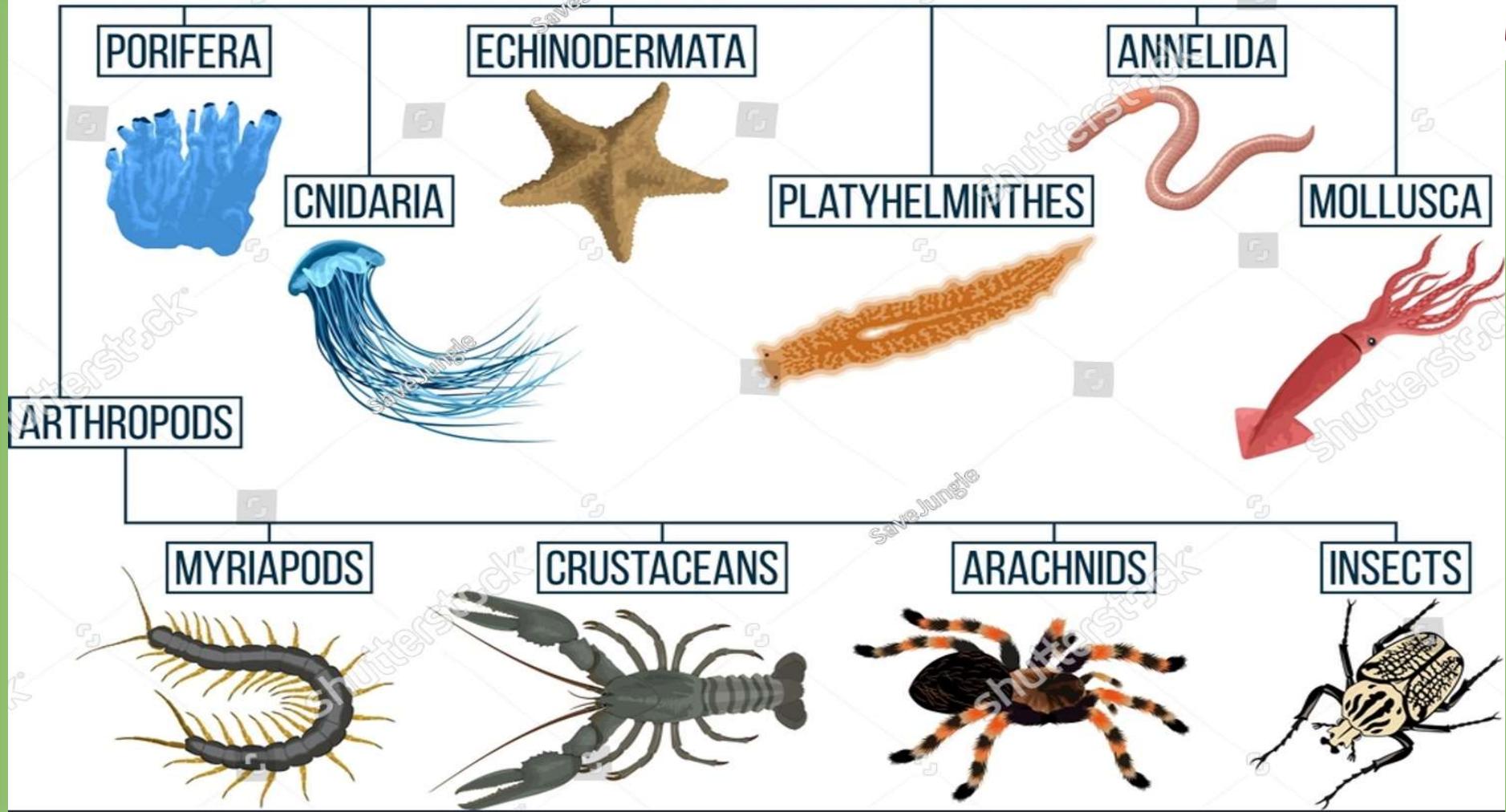
These are animals without a back bone



Classification of Vertebrates



CLASSIFICATION OF INVERTEBRATES

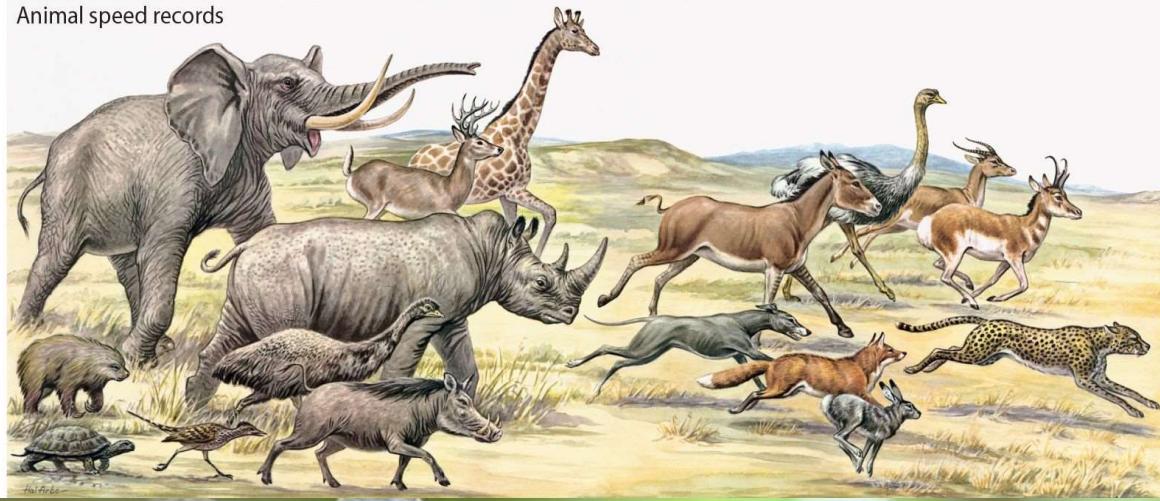


GENERAL CHARACTERISTICS OF ANIMALIA



- Animals carry out locomotion and possess locomotory devices
- They are multicellular organisms.
- They have cells without cellulose but contain true nucleus.
- They have heterotrophic mode of nutrition

Animal speed records



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PORIFERA – THE SPONGES

- The phylum is made of many types of sponges.
They have the following characteristics:
- ✓ Possess simple bodies which are hollow and sac-like.
- ✓ They are sedimentary or sessile organisms found attached to the rocks or coral reefs
- ✓ Some can live in colonies or individually.
- ✓ They lack a nervous system.
- ✓ They have only one opening in their bodies.
- ✓ They have a body made up of two layers of cells i.e. ectoderm and endoderm.
- ✓ They are marine dwellers



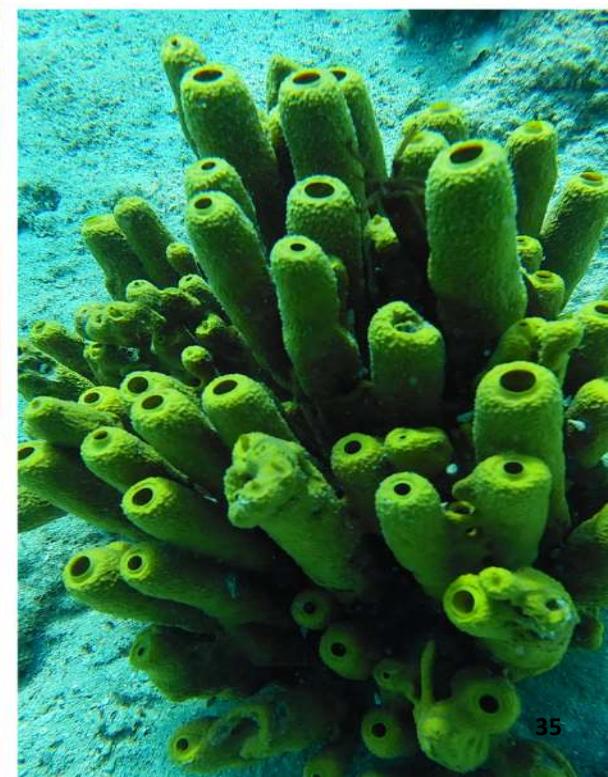


www.examplesof.net



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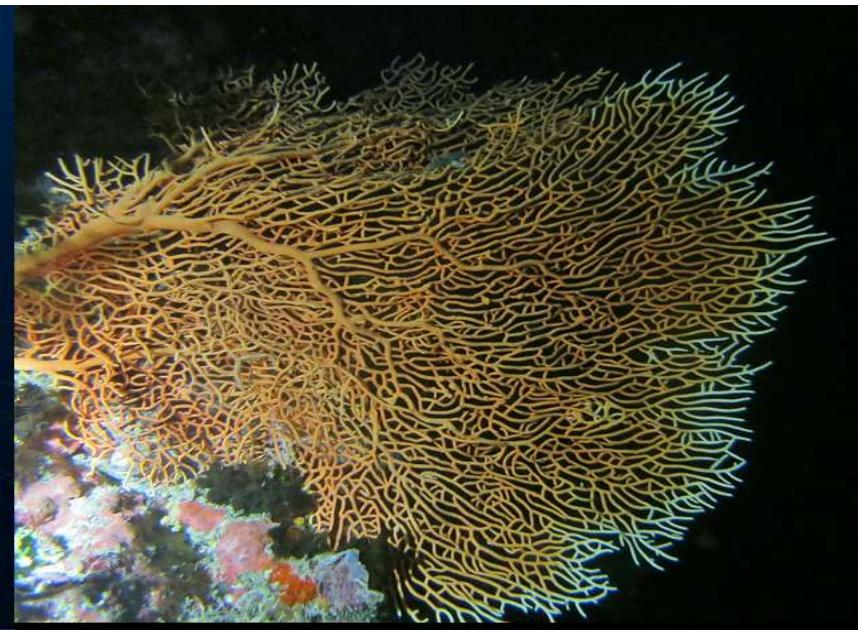


COELENTERATA (CNIDARIA)

- They include the following; the **jelly fish, sea anemones, hydra and corals**.

They have the following characteristics:

- They are multicellular organisms.
- They are aquatic or marine organisms.
- They have soft bodies which are sac-like with body cavity called enteron
- They have radial body symmetry.
- They have a single body opening.
- They have tentacles.
- They possess specialized cells such the stinging cells used for defense or paralyzing their prey.
- They have a ring of tentacles for capturing prey.





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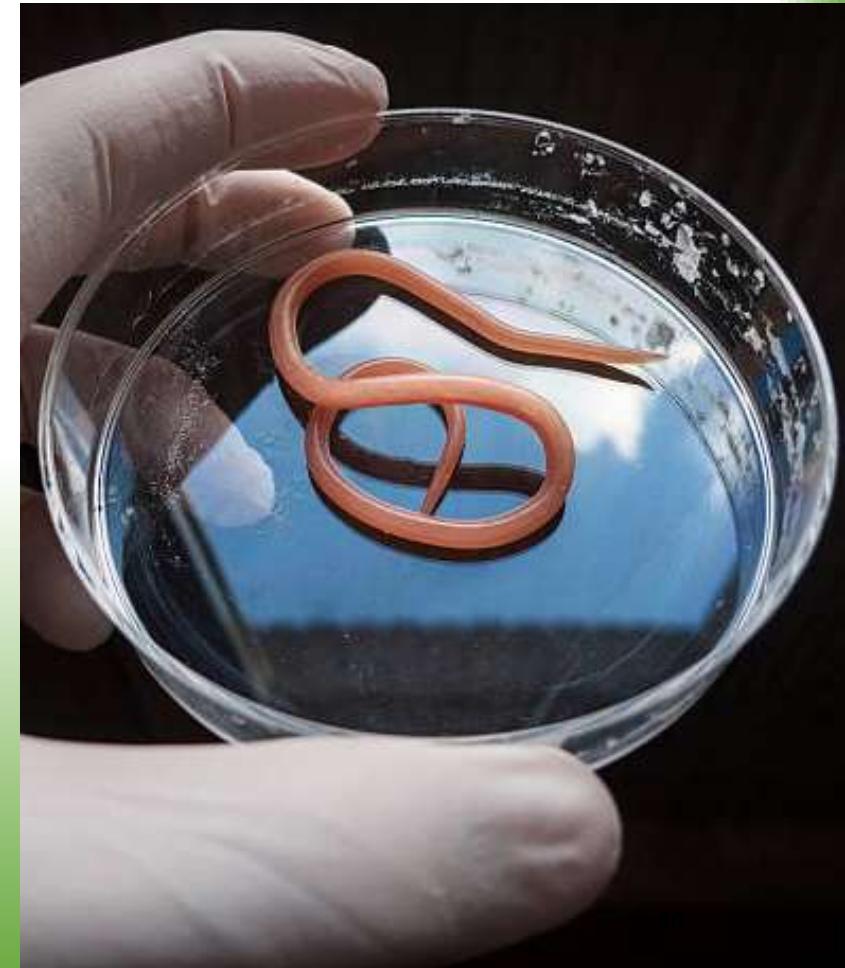
PLATYHELMINTHES (FLAT WORMS)

- The phylum consists of organisms like flukes and tape worms. They have the following **characteristics**:
- They have dorso-ventrally flattened body
- They have bilateral body symmetry.
- They are parasitic organisms.
- They have alimentary canal without mouth.
- The body wall has three body layers of cells (triploblastic) i.e. ectoderm (outer), mesoderm (middle) and endoderm (inner).
- They are hermaphrodites; have both male and female organs in the same organism.
- They lack blood circulatory system

NEMATODA (ROUND WORMS)



- The phylum has the examples like **hookworms**, **pin worms**, **guinea worms**, **whip worms** and ***Ascaris lumbricoides***. They have the following characteristics:
- They have segmented bodies.
- They have elongated and cylindrical bodies pointed at both ends.
- They have closed circulatory system.
- They have gaseous exchange occurs all over the body surface.
- They have a complete digestive system with both mouth and anus.
- Some are parasitic and others are free living.





ANNELIDA

- . These are the ringed or segmented worms e.g. **earthworms, leeches, rag worms, lugworms**, etc. They have the following characteristics:
- The body wall has three body layers of cells (triploblastic) i.e. ectoderm (outer), mesoderm (middle) and endoderm (inner).
- They have true coelom.
- They have a closed circulatory system.
- They have gaseous exchange all over body surface.
- They have complete digestive system with both anterior (oral) and posterior (Anal) openings.
- They are hermaphrodites and reproduce sexually but they often promote cross fertilization.

- They are carnivorous and some live as external parasites.
- They have bodies divided into section called septae.
- Externally the body shows ring- like segments.



Earthworm



leech





PHYLUM ARTHROPODA

- Arthropoda is the largest phylum in the animal kingdom has a wide variety of animals occupying a wide variety of habitats on land, sea and fresh water.

Main characteristics of arthropods

- They have a segmented body.
- Presence of an exoskeleton that is shed periodically.
- They have jointed limbs and appendages for feeding, locomotion, and irritability.
- They have a well-developed nervous system





CLASSIFICATION OF ARTHROPODS

- The exoskeleton is made up of chitin which is a fairly firm but flexible.
- The exoskeleton provides support to terrestrial arthropods. It also provides points of attachment for the muscles.
- The exoskeleton prevents the **desiccation** of the body by **secreting wax**.
- The exoskeleton also protects the organism from mechanical injury
- The phylum comprises of classes **Crustacea, Chilopoda, Diplopoda, Insecta and Arachnida**.



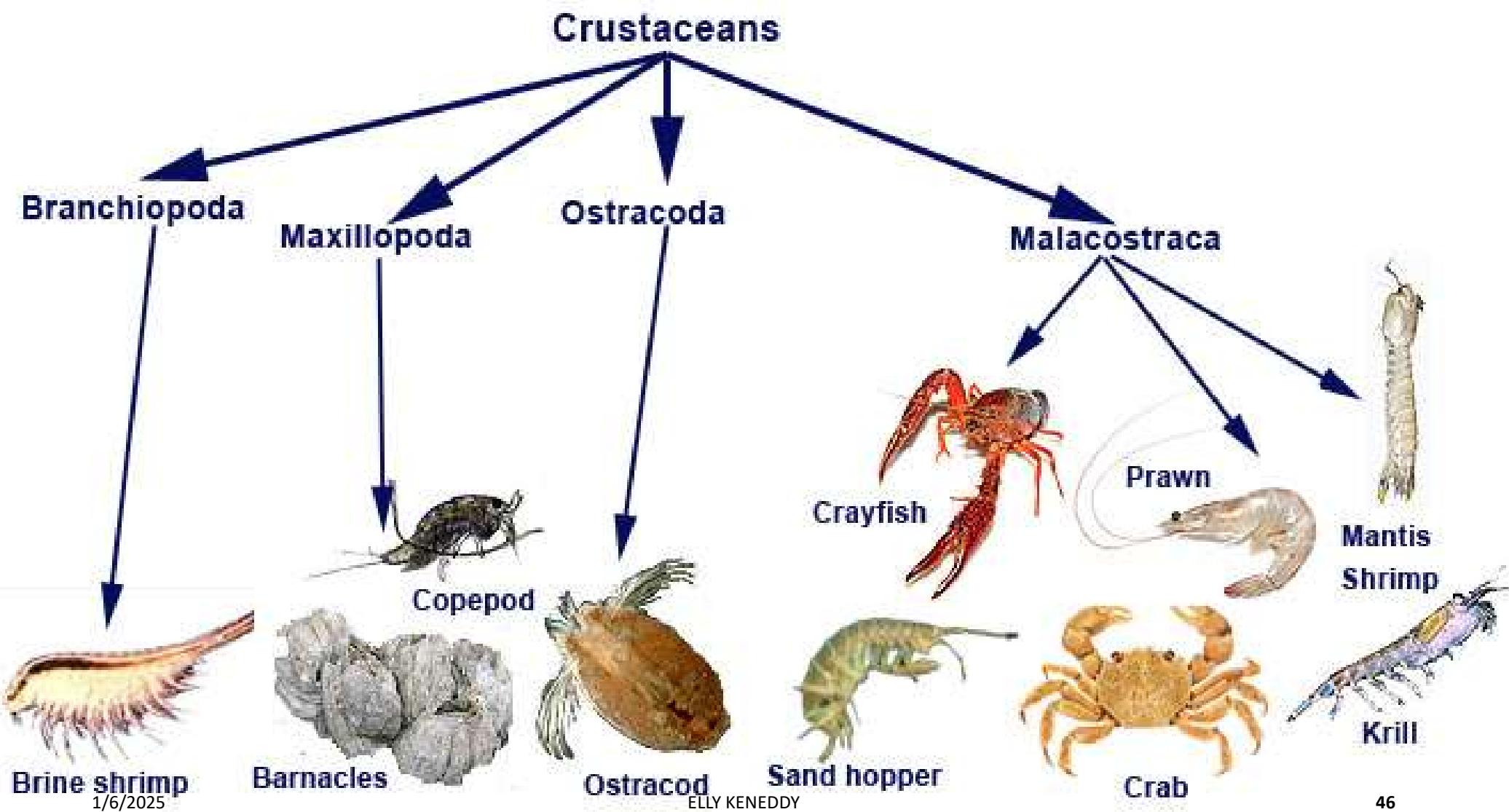


CLASS: CRUSTACEA

- Crustacea are organisms whose body is covered by a carapace. **A carapace is a hard shell.**

Examples of members of the class Crustacea include **crabs, crayfish, lobsters, prawns, woodlice and shrimps.**







DISTINGUISHING CHARACTERISTICS

- They occupy aquatic habitats. (found in marine and fresh water)
- They breathe by means of gills.
- Their body is divided into two parts. Their head and thorax are fused to form a cephalothorax.
- They have a pair of compound eyes each on a raised stalk.
- They have two antennae and small short pair called atenules.
- They have five pair of limbs that are modified for swimming.

CLASS: ARACHNIDA



- Arachnida are terrestrial arthropods. Members of this class all have 8 legs. Examples of arachnids include **spiders, ticks, scorpions and mites**



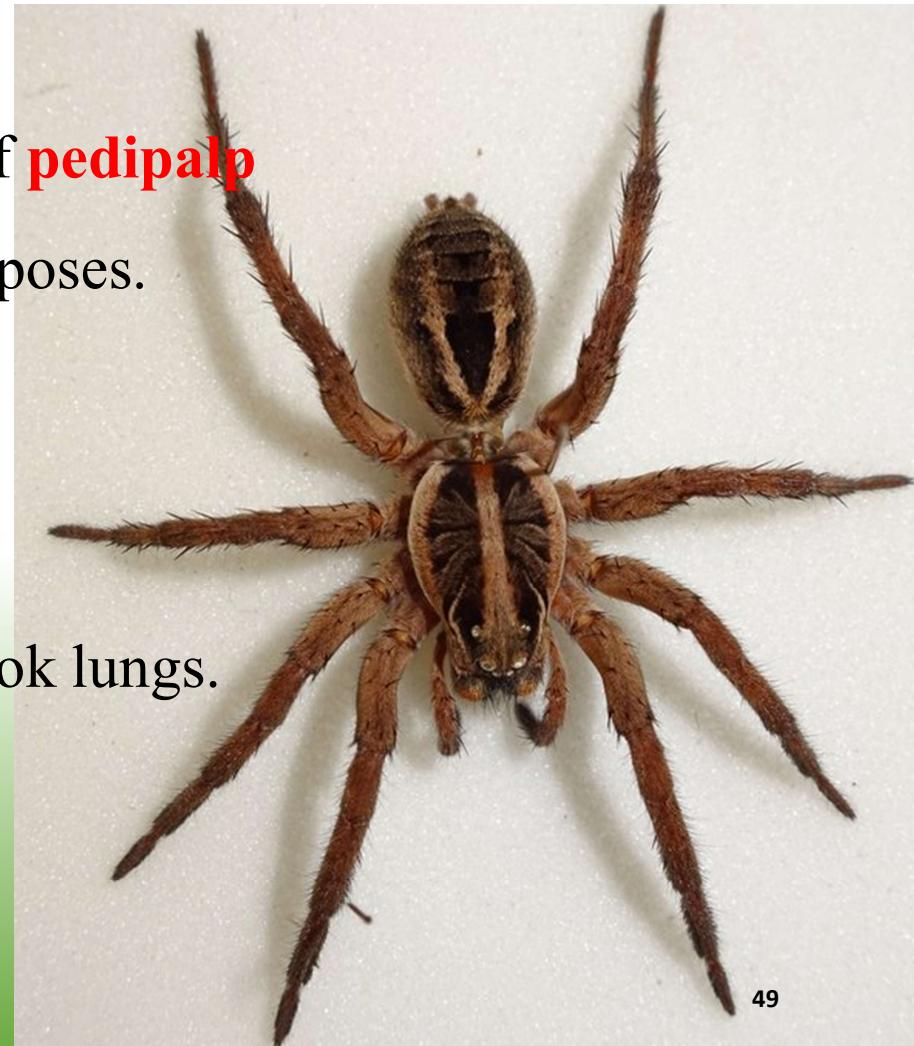
Distinguishing characteristics

- Arachnida have two main body parts. The head and thorax are fused to form the ~~cephalothorax~~ cephalothorax.

CONT.....



- They do not have antenna but have a pair of **pedipalp** which they use for sensory and defense purposes.
- They have simple eyes.
- They have four pairs of walking legs.
- They carry out gaseous exchange by the book lungs.
- Arachnids do not have wings.



CLASS: INSECTA



- Insects are the largest group of arthropods and most successful animals on earth since they possess an exoskeleton which reduces water loss from the body..
- They occupy every habitat on earth in such places as air, soil and water.
- **Identify any 10 examples of insects**



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DISTINGUISHING CHARACTERISTICS

- Insects have three body parts, namely: the head, thorax, and abdomen.
- They have three pairs of walking legs on the thorax. One pair of walking legs per segment of the thorax.
- They breathe by means of spiracles and carry out gaseous exchange in the tracheal system.
- Their thorax is divided into 3 segments that is to say, prothorax, mesothorax and metathorax.

CLASS: CHILOPODA

- Chilopoda is made up of **centipedes**. The centipedes are mainly found on land

Distinguishing characteristics

- Centipedes have a **clearly defined head**
- They have one pair of mouthparts known as mandibles.
- They have one pair of legs in each body segment.
- They carry out gaseous exchange by means of a trachea
- Their body is flattened dorso-ventrally.
- They have one pair of poison claws.





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PHYLUM: MOLLUSCA

- The organisms are generally aquatic and live both on fresh water and marine. Examples include **snails, slugs, octopus, squids, mussels and oysters**.



They have the following characteristics:

- They have soft and unsegmented bodies.
- Nearly all have shells with exception of octopus and squids. ü The foot is used for locomotion and attachment to the substratum.

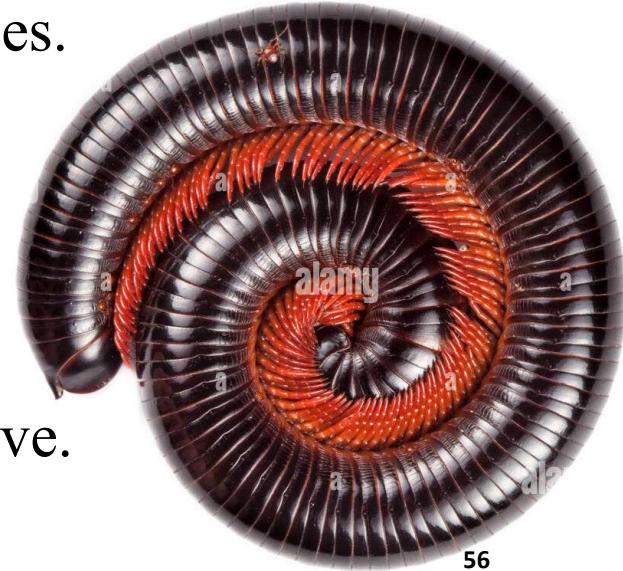


CLASS: DIPLOPODA

- Class Diplopoda is made up of millipedes. Millipedes are common on damp places.

Distinguishing characteristics

- They have one pair of antenna
- They have one pair of mouthparts, namely the mandibles.
- They have two pairs of legs in each segment.
- They carry out gaseous exchange through the trachea.
- They feed on plants.
- They have a cylindrical body
- They have the ability to coil when disturbed or not active.



ILUSTRATION



KINGDOM: PLANTAE

- The kingdom Plantae comprises a variety of plants.
- General characteristics**
- They are mostly green in colour thus carry out photosynthesis
 - They are multicellular.
 - They exhibit; limited movements such as opening and closing of petals etc.
 - Their cells are surrounded by cellulose cell wall.
 - They respond slowly to external stimuli and do not move from one place to another.



- The kingdom is sub divided into three divisions, **Bryophyta**, **Tracheophyta**, and the **algae**.



ALGAE

They include;

- **Green algae** (chlorophyta) e.g. spirogyra and chlamydomonas
- **Brown algae** (phycophyta) e.g focus and laminaria
- **Red algae** (Rhodophyta) e.g chondrus





FORMS OF ALGAE



*Sargassum
muticum*



*Pyropia
perorata*



*Ulva
lobata*



*Fucus
vesiculosus*



*Champia
expansa*



*Caulerpa
racemosa*

Brown Algae
(Phaeophyceae)

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Red Algae
(Rhodophyceae)

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Green Algae
(Chlorophyta) 60



CHARACTERISTICS OF ALGAE

- Commonly found in fresh and marine water.
- They are single-celled, colonial or filamentous.
- They are autotrophs.
- They have **wide range of pigments**, like brown, green, blue, red and yellow.
- They have a thallus body which is not differentiated into leaves, stem or roots. They reproduce asexually by fragmentation and binary fission.
- Few algae reproduce sexually by conjugation.



ECONOMIC IMPORTANCE OF ALGAE

- Algae are used in the manufacture of garments.
- They provide food for fish.
- When they die, they sink at the bottom of the sea bed on which they can turn into oil.
- During photosynthesis, they release oxygen that is necessary for the respiration of animals that live in water.
- They are used in the manufacture of ice cream, cosmetics, and plants.
- They pollute water, i.e. producing foul smell.
- They clog pool filters in hindering the flow of water.



DIVISION: BRYOPHYTA

- The division is comprised of **liverworts** and **mosses**.

Main characteristics

- ✓ They have simple leaves
- ✓ They have rhizoids that are root-like structures. They are used mainly for anchorage.
- ✓ Plants lack vascular bundles thus depend on diffusion for movement of materials.
- ✓ They are found in sheltered and moist areas.





DIVISION: TRACHEOPHYTA

- These show alternation of generations.
- The sporophytes differentiate into roots, stems and leaves with lignified vascular tissues that are used for conducting water and food.

This division is divided into **2 sub-phyla**:

- Pteridophyta
- Spermatophyta

Pteridophyta

- This is made up of **ferns**. Ferns are commonly found in shaded places which are damp with cool temperature.

CONT.....

- The body of a sporophyte fern is divided into leaves, stems and roots. The **leaves** are called **fronds** while the **stems are rhizomes**

Main characteristics

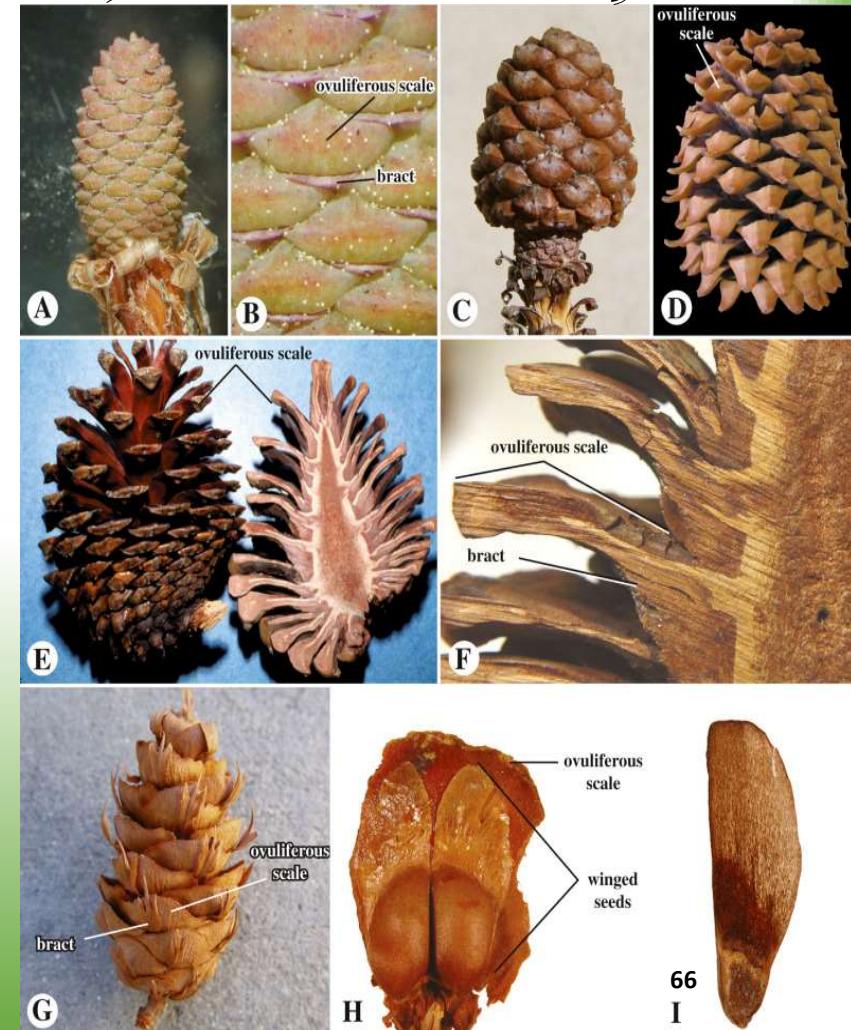
- ❖ Their plant body is called prothallus.
- ❖ The body of a sporophyte fern is divided into leaves, stem and roots.
- ❖ The rhizomes grow horizontally below the soil surface.
- ❖ Ferns have well-developed conducting tissues.
- ❖ They have the adventitious roots which an



GYMNOSPERMÆ (CONE BEARING PLANTS)



- These are commonly found in high lands/ altitudes areas.
- They show xerophytic characteristics such as sunken stomata, needle-like leaves, thick waxy cuticle to prevent or **reduce rate of transpiration**.
- Examples include pines, cypress, cedar tree, cycads, jacaranda, and bougainvillea.
- Gymnospermae refers to plants whose seeds are not enclosed





MAIN CHARACTERISTICS

- They are non-flowering plants.
- Their seeds are found in the cone scale.
- Have needle like leaves which reduce the rate of transpiration.
- Found in high altitudes and can carry out photosynthesis at low temperatures.





Zamia



Thuja



Podocarpus



Ginkgo biloba



Araucaria



Pinus

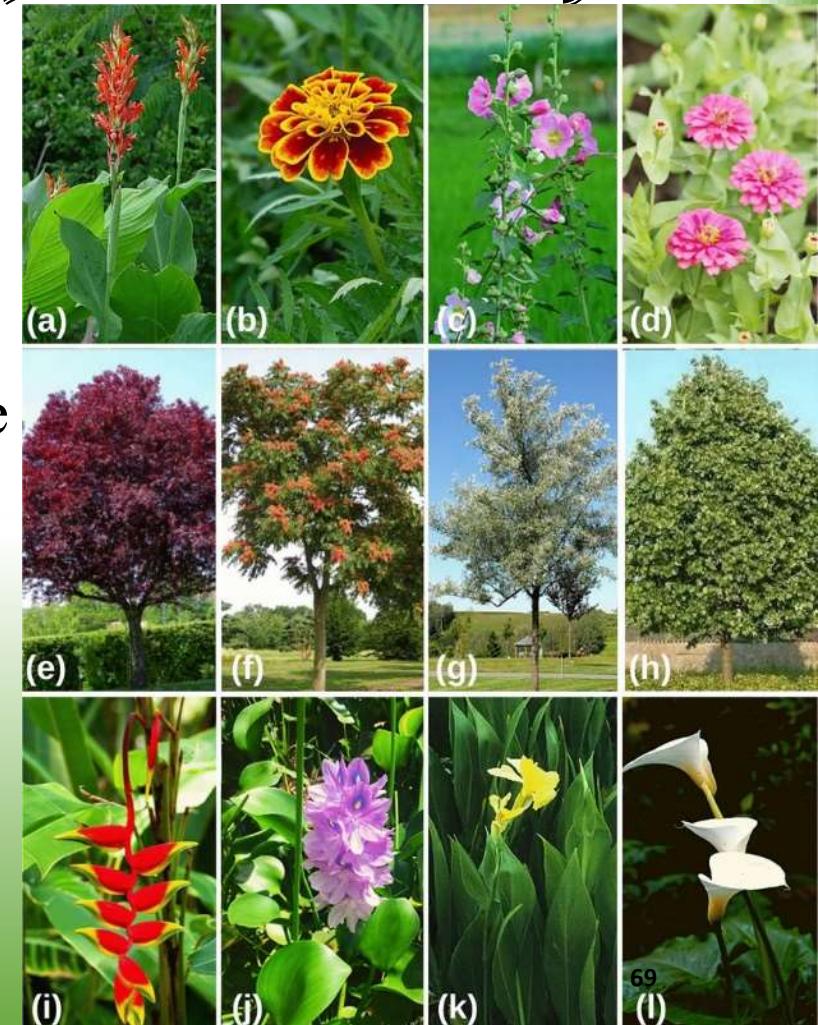
ANGIOSPERMÆ (FLOWERING PLANTS)



- These are flowering plants where seeds are enclosed in the ovary of the fruits.

General characteristics

- They are flowering plants
- Their seeds are enclosed in the ovary from where the fruits develop
- The reproductive organs are found within the flower
- These are sub divided into two classes.
Monocotyledonae and **Dicotyledonae**.

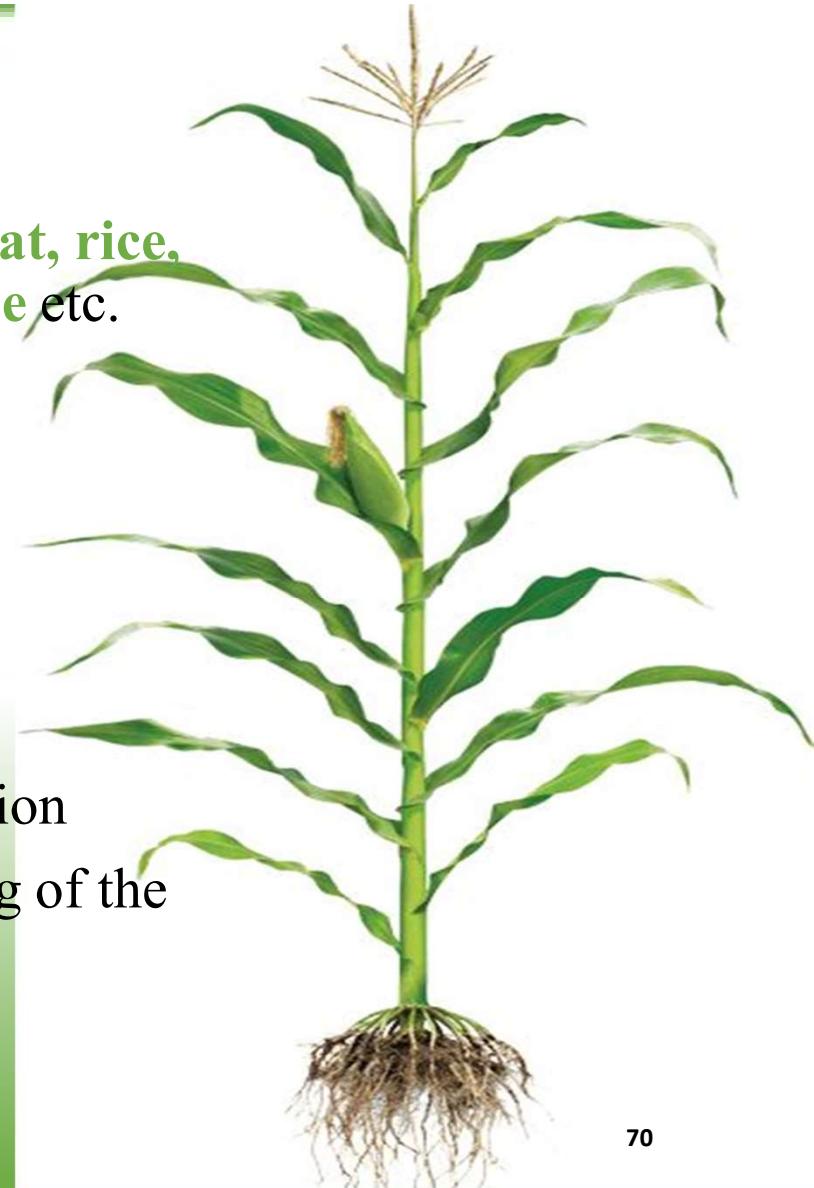


MONOCOTYLEDONAE

These are mainly grass family. Examples include **wheat, rice, barley, star grass, sorghum, maize, millet sugarcane** etc.

Distinguishing characteristics

- Seeds have **one cotyledon**
- Have **fibrous root system**
- Have parallel veins in their leaves
- Leaves are generally narrow and long.
- Vascular bundles are scattered in the stem cross section
- Lack vascular cambium, i.e. no secondary thickening of the stem.
- Flowers are held on an **inflorescence**.
- The floral parts are in threes or multiples of threes.
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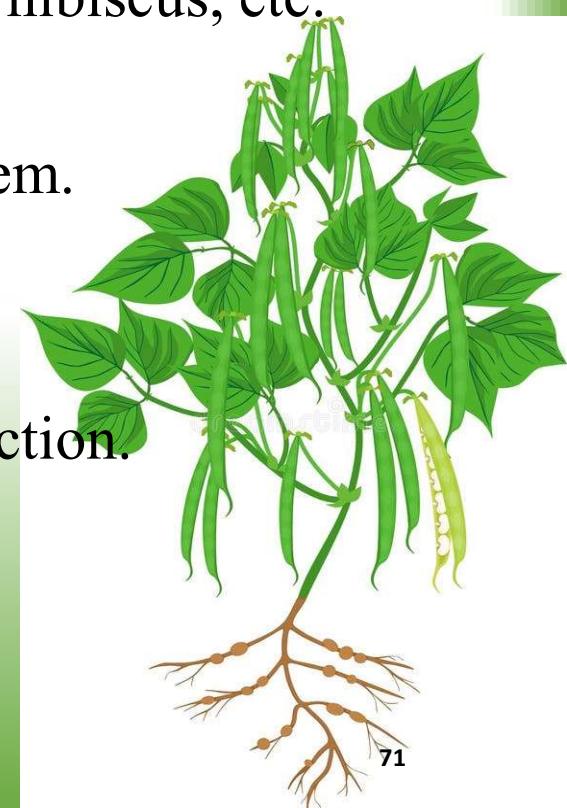


DICOTYLEDONAE

- These include **herbs**, **shrubs** and trees. Herbs are non woody plants so turgidity of cells supports them. Shrubs and trees have stems with supporting tissues such as xylem. Examples include beans, jacaranda, hibiscus, etc.

Distinguishing characteristics

- Have seeds with two cotyledons ü They have tap root system.
- Have network (reticulate) venation.
- Leaves are generally broad and short.
- Vascular bundles are radially arranged in the stem cross section.
- Have vascular cambium for secondary thickening.
- The floral parts are in fours or fives or in their multiples.





PHYLUM: CHORDATA

- Chordate refers to animals which possess a notochord.

Main characteristics

- ❖ The presence of a notochord during the early stages of development.
- ❖ The body is composed of head, trunk and usually a tail at some stage of development.
- ❖ Possess a hollow dorsal nerve cord.
- ❖ They have pharyngeal clefts.

CONT.....



This phylum mainly consists of the vertebrates and they are divided into 5 classes.

The 5 classes include the following;

- **Pisces** (fishes) e.g. tilapia and the Nile perch,
- **Amphibia**, e.g. frogs and toads
- **Reptilia** e.g. snakes, lizards, crocodiles
- **Aves** - birds
- **Mammalia** e.g. man and whale

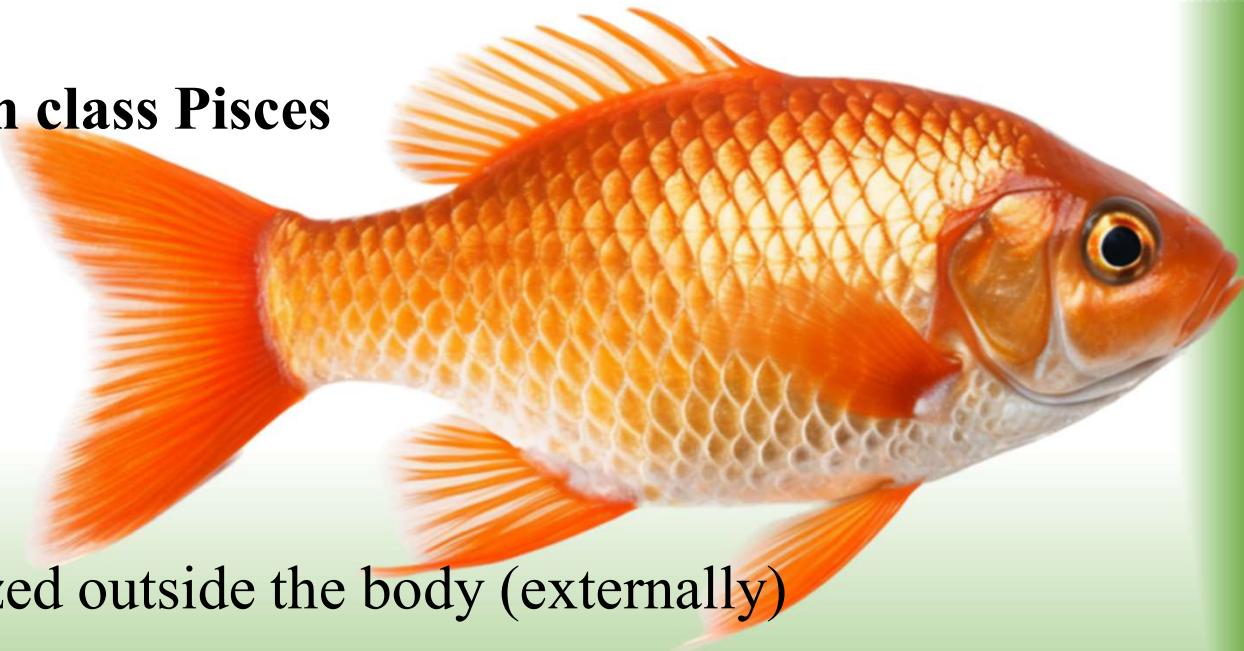


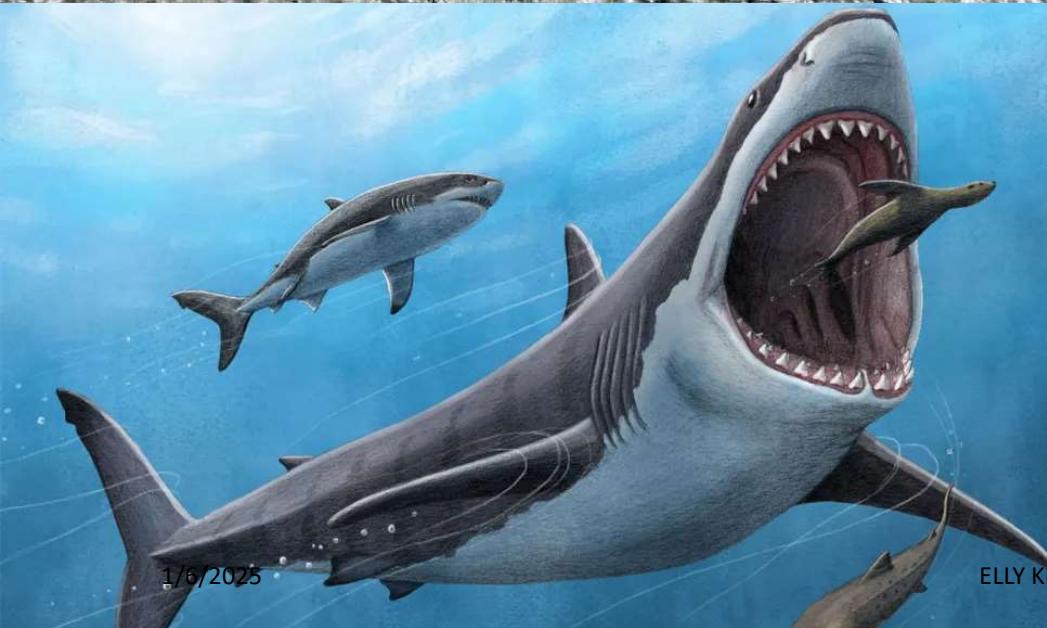
CLASS: PISCES

- This class contains fish.

Characteristics of organisms in class Pisces

- They live in water
- They have scales on their skin
- They breathe using gills
- They have fins for swimming.
- They have eggs that are fertilized outside the body (externally)
- They are ectothermic

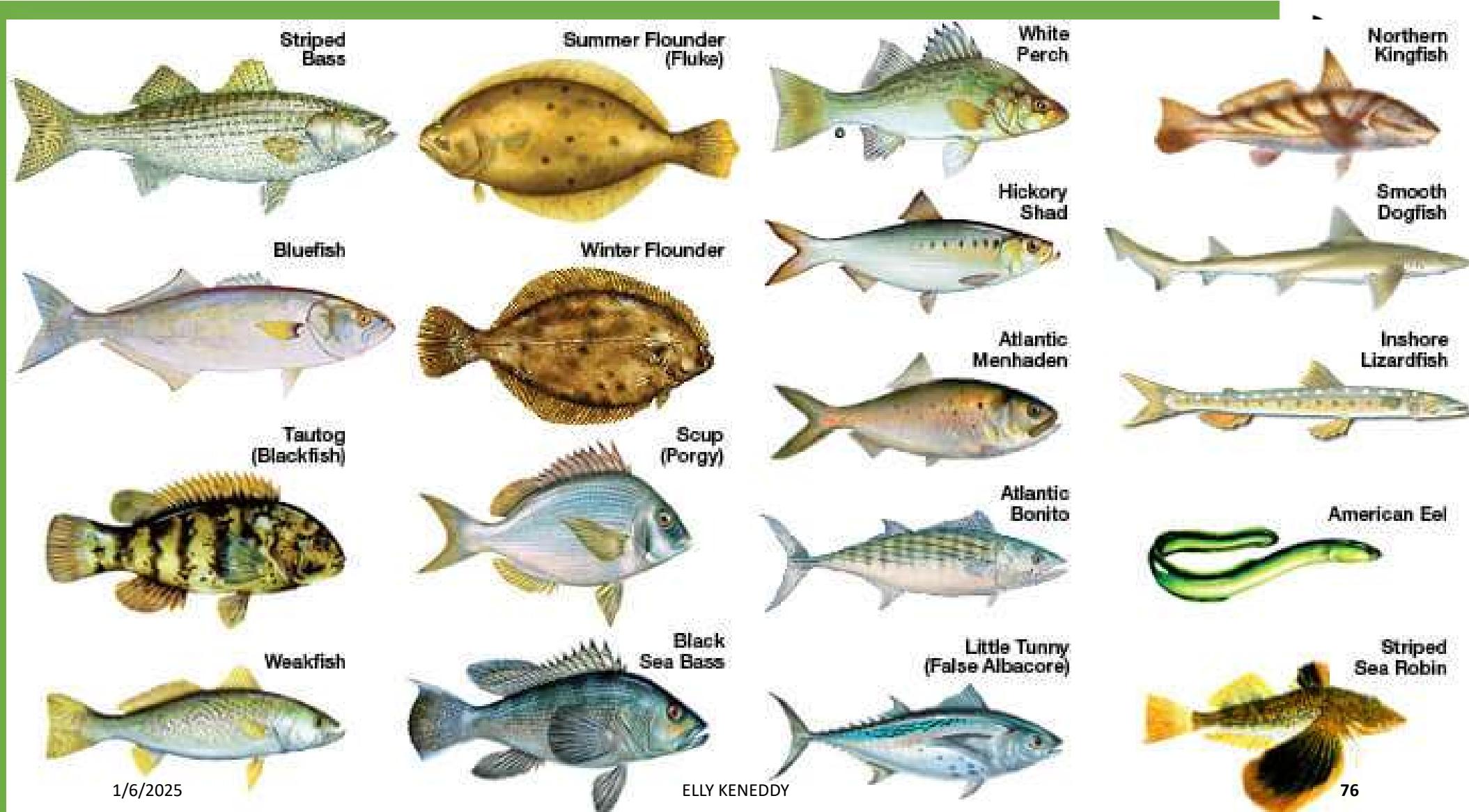




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CLASS: AMPHIBIA

- This class includes the newt, salamander, toad and frog.. Amphibians live on land but require water for breeding.

Distinguishing characteristics

- Amphibians have a soft moist skin without scales.
- They have a bony skeleton.
- They have two pairs of limbs.
- Amphibians have middle and an inner ear but no external ear.
- The egg of amphibians are laid in water and fertilized externally.
- An amphibian has a three-chambered heart with two auricles and a ventricle.
- They are ectothermic.





Salamander



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Toad



Frog

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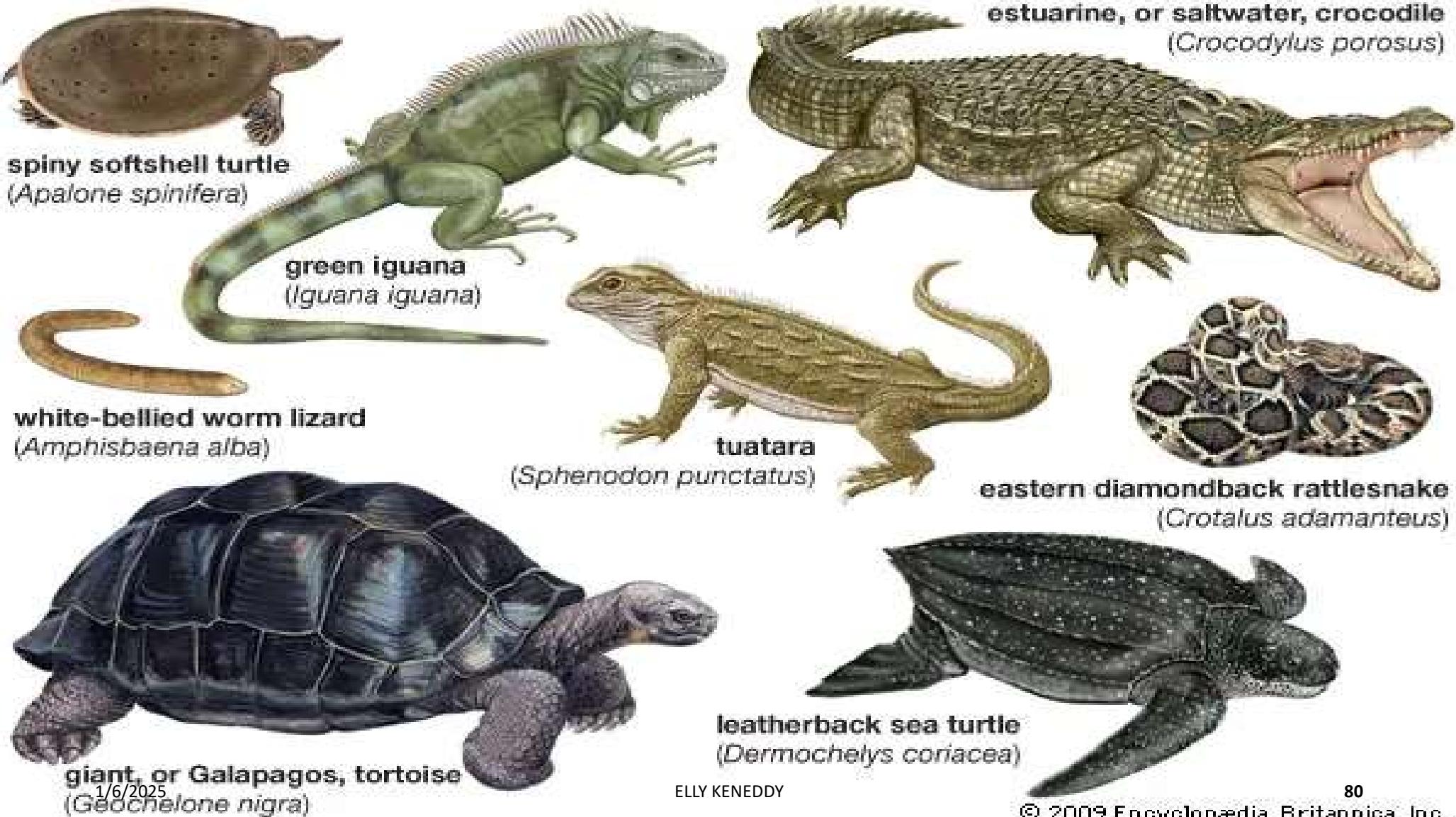
CLASS: REPTILIA

- Reptiles are mainly terrestrial with the exception of the turtle which lives in water. Examples of reptiles include the **lizard, snake, crocodile, tortoise and turtle.**

Distinguishing characteristics

- Reptiles have dry skin with horny scales
- Their skeleton is made up of bones
- Most reptiles have pentadactyl limbs
- Reptiles do not have an external ear.
- They use lungs for carrying out gaseous exchange
- Their eggs are fertilized internally and laid on land





CLASS: AVES



- Aves refer to birds. There exists a wide variety of birds.

Distinguishing characteristics

- The skin of birds is covered by feathers, except the legs which are covered by horny scales.
- Their skeleton is made of hollow bones. The hollow and light bones reduce weight and enable flight.
- The forelimbs modified into wings for flight while the hind are feet for walking or swimming.
- They have middle and inner ear but no external one.
- They use lungs for gaseous exchange.
- They have beak for feeding.
- They have internal fertilization. They lay eggs in calcareous shells.
- Their hearts have four chambers.
- They are ectothermic.





BIRD SPECIES CHART

| | | |
|--------------|--------------------|----------------|
| White Dove | Budgie | Electus Parrot |
| Seagull Bird | White-Eared Bulbul | Pigeon |
| Canary | Northern Cardinal | Emu |
| White Heron | Buzzard Eagle | Sparrow |
| Bald Eagle | Crow | White Stork |

Birds Names in English



Sparrow



Eagle



Robin



Pigeon



Owl



Peacock



Duck



Albatross



Falcon



Nightingale



Sparrowhawk



Woodpecker



Finch



Jay



Hummingbird



Swan



Puffin



Heron



Kingfisher



Magpie



Toucan



Cuckoo



Gull



Raven



Wren



Pheasant



Egret



Ostrich



Kookaburra



Vulture



Parrot



Seagull



Flamingo



Grosbeak



Barn Owl



Swift



Woodcock



Hawk



Starling



Cormorant



Lark



Bulbul



Seabird



Stork



Spoonbill

DICHOtOMOUS KEY.



Construct keys using the knowledge above.

ALWAYS AIM FOR EXCELLENCE



17/6/2023

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