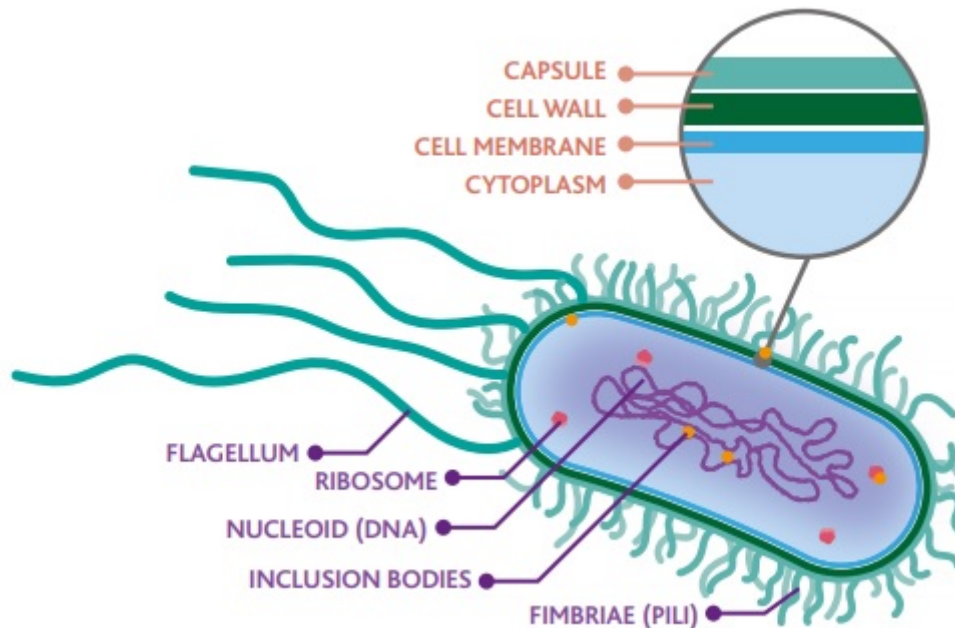


KINGDOM MONERA



- **Examples :** bacteria, blue-green algae (cyanobacteria)
- Very _____ in size (about 1 micrometre)
- Prokaryotic – The genetic material (DNA) is not enclosed in a distinct nuclear _____.
- Cell shapes can be round (“coccus” e.g. in streptococcal throat infection), rod-shaped (“_____” e.g. *Escherichia coli* which normally lives in the human gut), or spiral-shaped (“spirillus” e.g. in cholera)
- Some of the rod- or spiral-shaped bacteria may _____ by means of a whiplike flagellum (plural: _____)
- Many can survive unfavourable conditions such as extreme dryness or heat by producing an extra _____ coat.
- Most reproduce asexually by binary fission approximately every _____ minutes. The bacterium duplicates its genetic material (DNA) and then splits into 2 smaller _____.
- Some are autotrophic, i.e. produce their own nutrients from _____ (photosynthetic), from sulphur or iron (chemosynthetic).
- Some are heterotrophic, i.e. obtain their nutrients by absorbing them from other living organisms (e.g. pathogenic or _____ bacteria that produce toxins).
- Some require _____ to live (aerobic), and some do not (anaerobic).
- Some are harmful (e.g. disease-causing or _____ bacteria), and some are useful (e.g. _____ bacteria which rot dead matter to recycle nutrients into the soil).

KINGDOM PROTISTA

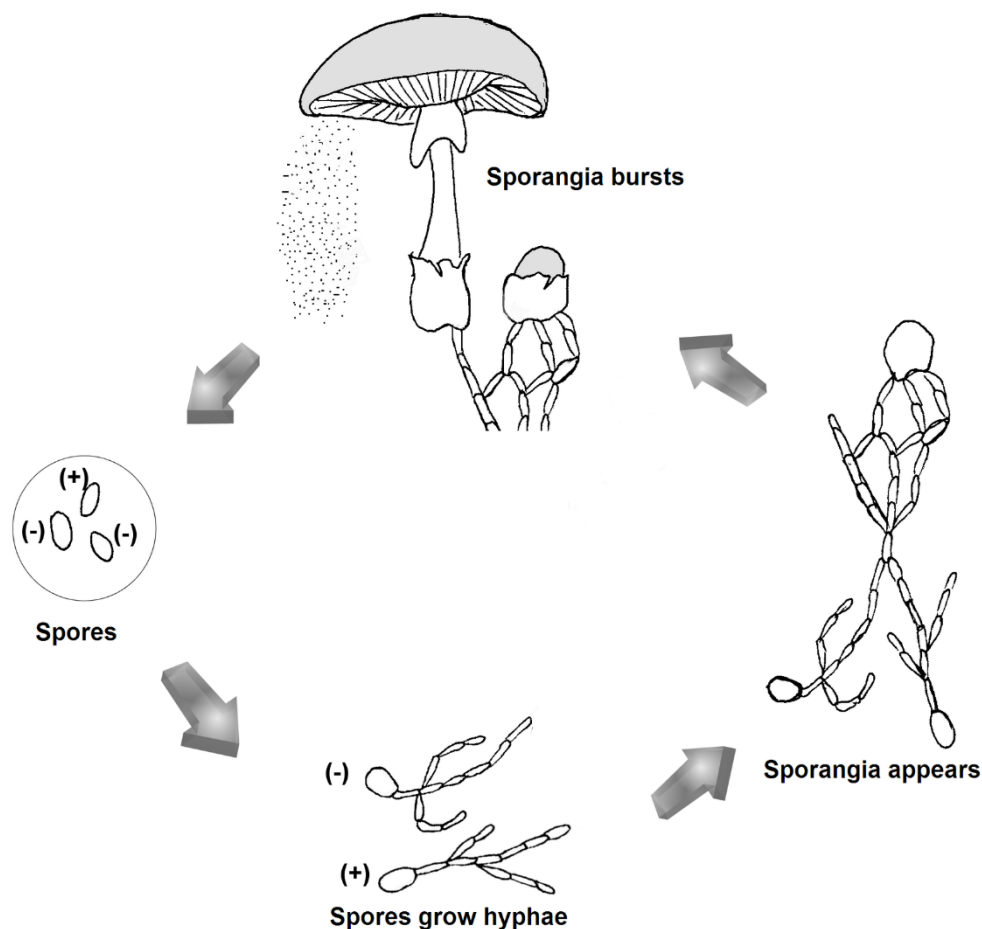


- **Examples:** *Amoeba*, *Paramecium*, *Euglena*, *Volvox*, protozoa, and some algae
- Microscopic but larger than Monerans
- Eukaryotic – Inside the cell, there are specialised structures called ____ which are surrounded by membranes, such as nucleus (containing _), chloroplasts (for __ _____), and mitochondria (for respiration).
- Most are single-celled or _____. This means that each protist cell exists as an individual with no cooperation with other cells. Unicellular cells, however, can live linked to other cells in filaments or colonies.
- Some move by whiplike _____, and others move by hairlike cilia.
- Some can photosynthesise like a plant, some ingest food like an animal, and some can absorb nutrients like fungi.



KINGDOM FUNGI

- **Examples:** mushrooms, yeast, tinea (Athlete's Foot)
- All are eukaryotic.
- All are heterotrophic, and therefore many are decomposers.
- Some are unicellular, and some are multicellular.
- Most are composed of threadlike _____ that grow by elongation and branching. A mass of hyphae is called a _____ such as in the "fruiting" structure of the mushroom.
- Most reproduce by _____.



KINGDOM PLANTAE

PHYLUM / DIVISION BRYOPHYTA

- **Examples :** moss, liverwort, hornwort
- Non-vascular
- Has no true roots, stems nor leaves
- Absorb _____ and nutrients directly from the surroundings
- Aquatic or moist terrestrial habitat
- Usually less than _____ cm in size

PHYLUM / DIVISION TRACHEOPHYTA

- Eukaryotic
- Multicellular
- Vascular – has vessels carrying nutrient-rich sap and water
- Has true, roots stems and leaves

CLASS FILICOPSIDA (FERNS)

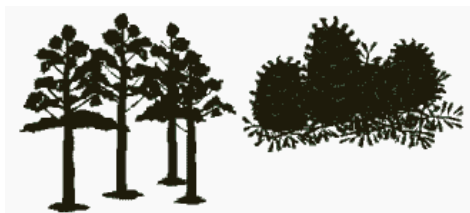
- Vascular, tracheophyte
- Has true roots, stems and leaves
- Damp, shady terrestrial habitat
- Leaves are situated on _____
- On the underside of the leaves are brown spots called sori, containing _____
- The underground stem is called the _____

CLASS CYCADOPSIDA (CYCADS)

- Vascular, tracheophyte
- Has true roots, stems and leaves
- Palm-like plant
- Reproduce by seed inside a _____
- Gymnosperm = “Naked Seed” (i.e. The seed is not enclosed in an ovary.)

CLASS GINKGOPSIDA (GINKGOS)

- **Example :** maiden-hair tree
- Vascular, tracheophyte
- Has true roots, stems and leaves
- Fan-shaped deciduous leaves
- Reproduce by _____
- Gymnosperm = “Naked Seed” (i.e. The seed is not enclosed in an ovary.)



CLASS CONIFEROPSIDA (CONIFERS)

- **Examples:** pine, oak, fir, cedar
- Vascular, tracheophyte
- Has true roots, stems and leaves
- Terrestrial
- Needle-like leaves
- Reproduce by _____ inside a _____
- Gymnosperm = “Naked Seed” (i.e. The seed is not enclosed in an ____)



CLASS ANGIOSPERMAE (FLOWERING PLANTS)

- **Examples :** rose, iris, carrot, grasses, eucalypt
- Vascular, tracheophyte
- Has true roots, stems and leaves
- Aquatic or terrestrial
- Often pollinated by _____
- Angiosperm = “Enclosed Seed” (i.e. The seed is enclosed in an ovary.)
- When the male pollen of a flower pollinates the female egg in the ovary of a flower, a seed forms. Then the ovary enlarges into a fruit that forms around the seed.
- There are 2 subclasses of Angiosperms – Monocotyledons and _____

	Seed	Leaf	Stem	Flower
Dicot	<p>Seed Coat, Two Cotyledons, Endosperm, First True Leaves</p>	<p>Network of Veins</p>	<p>Xylem, Phloem, Vascular Bundle</p>	<p>Stigma, Style, Stamen, Anther, Petal, Filament</p>
Monocot	<p>Seed Coat, Single Cotyledon, First True Leaves, Embryonic Roots, Endosperm</p>	<p>Parallel Veins</p>	<p>Vascular Bundle, Ground Tissue</p>	<p>Stigma, Style, Stamen, Anther, Petal, Filament</p>

KINGDOM ANIMALIA

INVERTEBRATE ANIMALS

PHYLUM PORIFERA

- **Examples :** sponges
- Invertebrate
- Multicellular
- Mostly marine, some freshwater
- A sponge consists of an outer layer of covering cells, an inner layer of flagellated cells, and some cells in between. Water moves in through many small _____, and out through one large pore. Nutrients and oxygen are absorbed directly from the _____ into the cells.



PHYLUM CNIDARIA / PHYLUM COELENTERATA

- **Examples:** jellyfish, coral, hydra, sea anemone
- Invertebrate
The name “Cnidaria refers to _____ cells (called cnidocytes) on the tentacles. The name “Coelenterata” refers to the _____ body
- Marine
- Some are fixed (e.g. coral), and some are free-swimming (e.g. jellyfish).
- Radial symmetry (e.g. Top view of jellyfish)
- A branched central cavity digests nutrients. There is no separate mouth and anus.
- Absorb _____ directly from the water into the cells

PHYLUM PLATYHELMINTHES (FLATWORMS)

- **Examples :** tapeworm, liver fluke, planarian
- Invertebrate
- Most are parasitic and live inside a _____ animal. However, planarians are free-living and live in marine, freshwater and moist terrestrial environments.
- Bilateral symmetry
- “Head” contains sensory organs for sight and hearing and a simple brain
- Digestive tract is sac-like with one opening, which has a _____ in most of the parasites

PHYLUM NEMATODA (ROUNDWORMS)

- **Examples :** threadworm (Ascaris), hookworm
- Invertebrate
- Bilateral _____
- Unsegmented
- Parasitic
- Terrestrial, freshwater or marine

PHYLUM NEMERTEA (RIBBON WORMS / PROBOSCIS WORMS)

- Invertebrate
- Bilateral symmetry
- Marine
- Can be 15 cm or more in length
- “Head” contains a simple brain, and an extendable _____ which is used to capture prey (often other worms)
- Digestive tract has two openings – a mouth and an _____

PHYLUM BRYOZOA (MOSS ANIMALS)

- Invertebrate
- Bilateral symmetry
- Marine, can be mistaken for seaweed
- Fixed vase-like body with a U – shaped digestive tract with separate mouth and anus at the top
- Mouth is surrounded by tentacles to trap _____
- Body is enclosed in calcium carbonate material for protection

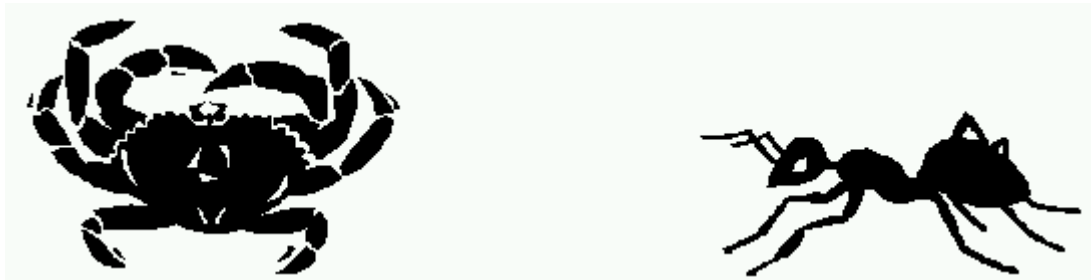


PHYLUM MOLLUSCA

- **Examples :** slug, snail, clam, oyster, chiton, squid, octopus
- Invertebrate
- Soft-bodied muscular “foot”, usually enclosed with a hard external shell made of calcium _____
- Breathe with gills
- Digestive system – Mouth with jaws and a tongue-like radula with teeth on it, also a stomach, intestine and anus

PHYLUM ANNELIDA (SEGMENTED WORMS)

- **Examples:** bristle worm, earthworm, leech
- Invertebrate
- Bilateral symmetry
- More advanced than the other worm phyla because of a _____, which is an internal fluid-filled body cavity
- Digestive tract is straight, with separate mouth and anus
- Head has simple brain, and may have simple eyes, feelers or tentacles
- Sexual reproduction, and Earthworms and Leeches are _____ but do not self-fertilise.



PHYLUM ARTHROPODA

- Largest phylum in the animal kingdom
- Invertebrate
- External skeleton (_____)
- Segmented body
- Jointed appendages
- Ventral nerve cord

CLASS CRUSTACEA

- **Examples:** crab, lobster (crayfish), shrimp (prawn) barnacle, water flea, slater
- Invertebrate, ventral nerve cord
- Mostly aquatic
- Body segments are cephalothorax and abdomen
- Each body segment has a pair of jointed limbs that may be used for swimming, crawling or _____
- Bilateral symmetry
- 2 pairs of antennae
- 1 pair of jaws
- Heart and blood vessels
- Gills for _____
- Straight digestive tract with separate mouth and anus
- Simple brain and sensory organs

CLASS MYRIAPODA

- **Examples : centipede, millipede**
- Invertebrate, ventral nerve cord
- Bilateral symmetry
- 1 pair of antennae
- Brain and sensory organs of eyes, feelers and skin
- Air tubes called tracheae for _____
- Heart and blood vessels
- Straight digestive tract with separate mouth and anus
- Sexual reproduction, with separate sexes
- This group is sometimes divided into two classes – Class Chilopoda (Centipedes) and Class Diplopoda (_____).

CLASS ARACHNIDA / CLASS CHELICERATA

- **Examples : spider, scorpion, tick, mite**
- Invertebrate, ventral nerve cord
- Usually terrestrial
- Bilateral symmetry
- 2 body segments – Prosoma (with sense organs, mouthparts and limbs, but no antennae) and abdomen
- Usually 4 pairs of _____
- Poison fangs are called _____
- Breathes with book lungs (similar to gills)
- Sexual reproduction

CLASS INSECTA

- **Examples: beetle, weevil, fly, mosquito, midge, cicada, aphid, bee, ant, termite, butterfly, praying mantis, dragonfly, grasshopper, locust, cricket, flea, silverfish, cockroach**
- Invertebrate, ventral nerve cord
- Largest class in the _____ kingdom
- Bilateral symmetry
- 3 body parts – head (with 1 pair of antennae, 1 pair of jaws and eyes), thorax (with 3 pairs of _____) and abdomen
- Breathe by tracheae
- Heart and blood vessels
- Straight digestive tract with separate mouth and anus
- Brain and specialised sensory organs
- Sexual reproduction – Some insects such as bees produce offspring by parthenogenesis also. Many insects produce chemicals called pheromones to attract mates.

PHYLUM ECHINODERMATA

- **Examples :** starfish, sea cucumber, sea urchin, sand dollar
- Invertebrate
- Radial symmetry
- Marine
- “Spiny skin”
- Mouth surrounded by 5 arms with tube feet that move by a _____ system
- Internal structure made of calcium _____
- Well-developed digestive system
- Simple nervous and circulatory system

VERTEBRATE ANIMALS

PHYLUM CHORDATA

- Vertebrate
- Internal skeleton of either cartilage or bone (_____)
- Dorsal nerve cord
- Complex nervous, digestive, circulatory skeletal, muscular and excretory systems



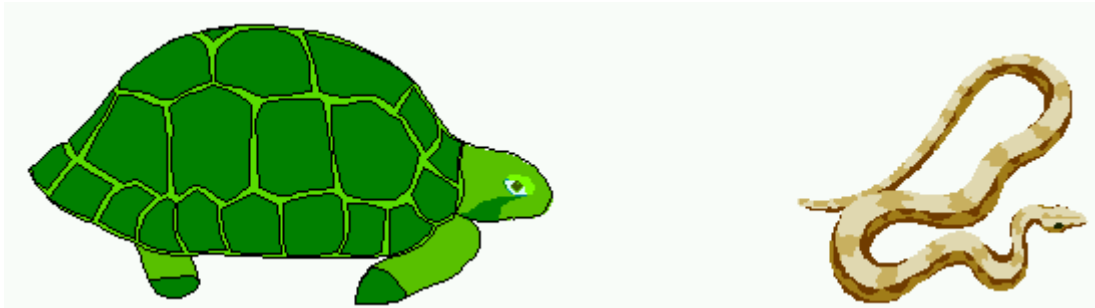
FISH

- **Examples:** Cartilaginous fish(shark, ray, lungfish) and Bony fish (barramundi, trout)
- Vertebrate, dorsal nerve cord
- Bilateral symmetry
- Marine or _____
- Changing body _____ (ectothermic)
- Stream-lined shape
- Skin covering is _____
- Fins
- Buoyancy control by means of a gas bladder
- Respiratory system - Breathe by _____
- Nervous system – Brain and spinal cord
- Digestive system – Mouth, pharynx, oesophagus, stomach, intestine, anus
- Circulatory system – 2 chambered _____ and blood vessels
- Sexual reproduction, Fertilisation (joining of sperm and _____) is mostly external.



CLASS AMPHIBIA

- **Examples: frog, toad, salamander, newt**
- Vertebrate, dorsal nerve cord
- Bilateral symmetry
- Metamorphosis – Egg → Larva (Tadpole) → _____
- Habitat is freshwater during egg and larval stages, and moist _____ areas during adult stage
- Changing body temperature (_____)
- Moist skin covering
- Respiratory system – Breathe through gills and moist skin during larval stage, and through lungs and moist skin during adult stage
- Nervous system – Brain and spinal cord
- Digestive system – similar to more complex chordates
- Circulatory system – similar to more complex chordates, but with a 3 chambered heart
- Sexual reproduction – Fertilisation is _____. Jelly-like eggs are laid in water.



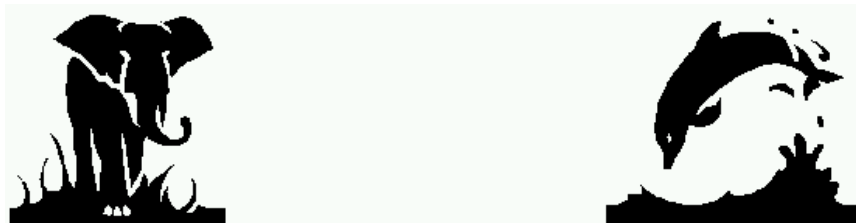
CLASS REPTILIA

- **Examples : snake, lizard, tortoise, turtle, crocodile**
- Vertebrate, dorsal nerve cord
- Bilateral symmetry
- Changing body temperature (ectothermic)
- Skin covering is scales that may be joined into plates
- Breathe with _____
- Nervous system – Brain and spinal cord
- Digestive system – similar to higher chordates
- Circulatory system – similar to higher chordates, but with a 3 chambered heart
- Excretory system – Urinary bladder present only in turtles, tortoises and lizards
- Sexual reproduction, most lay _____



CLASS AVES (BIRDS)

- **Examples:** kookaburra, eagle, pelican, cormorant, emu, penguin
- Vertebrate, dorsal nerve cord
- Bilateral symmetry
- Constant body temperature (_____)
- Skin covering is _____, but the feet are covered by scales
- Breathe with _____
- The nervous, digestive (toothless), circulatory (with 4 chambered heart), skeletal (light strong bones), muscular and excretory (no sweat _____) systems are similar to higher chordates.
- Sexual reproduction – Lay hard-shelled _____
- Most can fly



CLASS MAMMALIA

- **Examples:** Egg-laying Monotremes (platypus, echidna), Pouched Marsupials (bandicoot, koala, kangaroo, wombat), and Placentals with umbilical cord (human, dog, horse, whale)
- Vertebrate, dorsal nerve cord
- Bilateral symmetry
- Most are terrestrial
- Constant body _____ (homoiothermic, endothermic)
- Skin covering is hair or _____
- The young are nourished with milk from _____ glands of the mother.
- Complex nervous, digestive, circulatory, respiratory (lungs and muscular diaphragm) and excretory systems
- Most have 2 pairs of _____, usually legs, although some have modified appendages for swimming (e.g. seal) or flying (e.g. bat).
- Sexual reproduction, _____ fertilisation