

Kingdom Monera

- ◆ **Examples : bacteria, blue-green algae (cyanobacteria)**
- ◆ Very _____ in size (about 1 micrometer)
- ◆ 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)

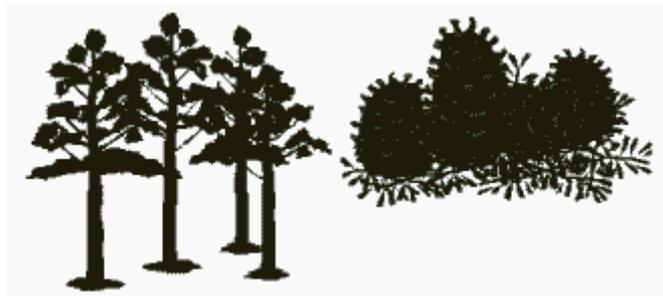
- ◆ Vascular, tracheophyte
- ◆ Has true roots, stems and leaves
- ◆ Damp, shady terrestrial habitat
- ◆ Leaves are situated on _____
- ◆ On the underside of the leaves are brown spots called sori, containing _____
- ◆ The underground stem is called the _____

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 _____

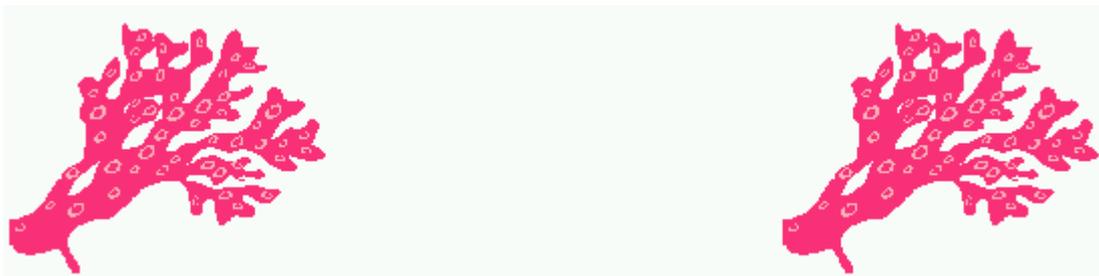
- ◆ Angiosperm = “Enclosed Seed” (i.e. The seed is enclosed in an ovary.)
- ◆ When the male pollen of a flower pollinates the female egg in the ovary of a flower, a seed forms. Then the ovary enlarges into a fruit that forms around the seed.
- ◆ There are 2 subclasses of Angiosperms – Monocotyledons and _____

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)

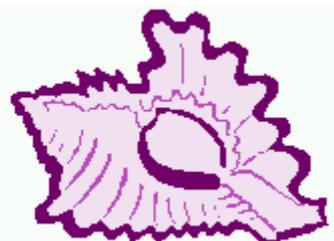
- ◆ **Examples** : threadworm (Ascaris), hookworm
- ◆ Invertebrate
- ◆ Bilateral _____
- ◆ Unsegmented
- ◆ Parasitic
- ◆ Terrestrial, freshwater or marine

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

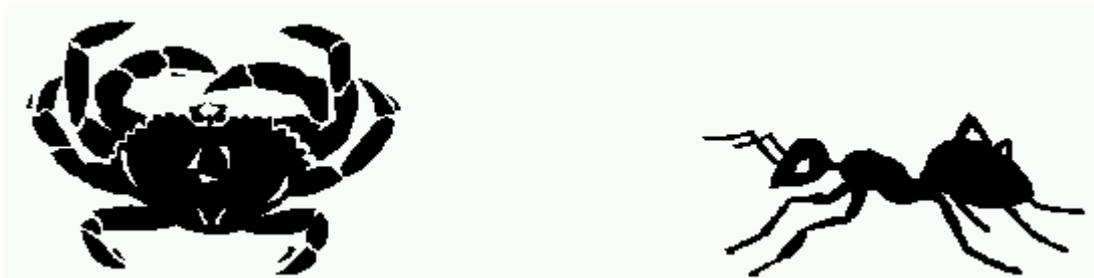


PHYLUM MOLLUSCA

- ◆ **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.

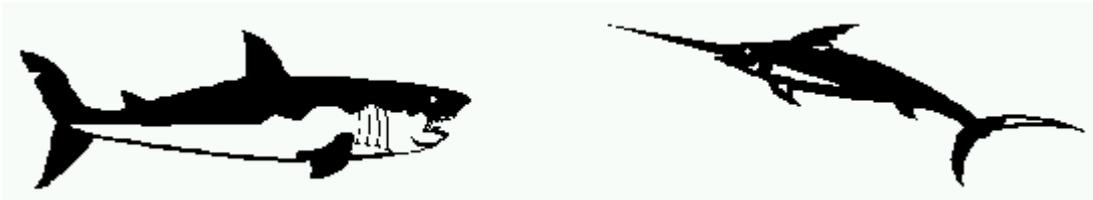
PHYLUM ECHINODERMATA

- ◆ **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



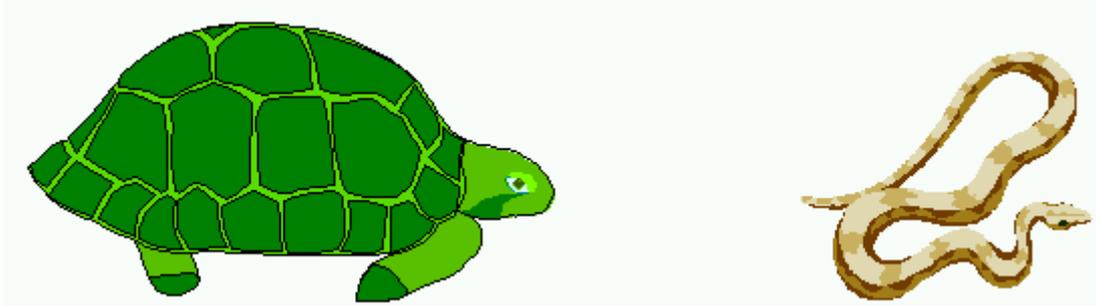
FISH

- ◆ **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.



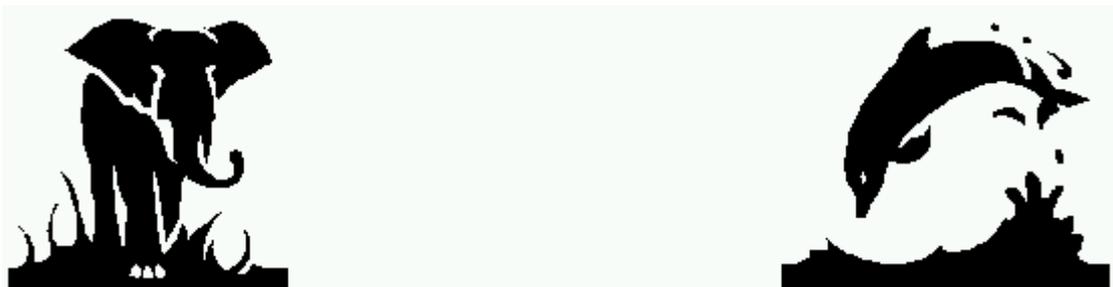
CLASS REPTILIA

- ◆ **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