PHYLUM CNIDARIA

1. General Information
   - Meaning 'nettle' / stinging cells
   - Examples: jellyfish, sea anemones, coral, Hydra, Aurelia, Obelia
   - Habitat: marine and fresh water

2. Characteristics
   - Radial symmetry
   - Some possess an exoskeleton (for protection) made up of $CaCO_2$ (eg corals)
   - Have 2 body forms
     a)polyp (sessile) eg hydra, coral, or sea anemone
     b)medusa (free swimming) eg jellyfish
   - When a cnidarian exhibits the 2 body forms in its life cycle, it is called polymorphism ('many shapes')
   - They have a nerve net (minimal coordinated movement)
   - They contain nematocysts found on tentacles used for capturing prey and for protection
   - They have 2 cell layers : ectoderm and endoderm
   - Mesoglea is sandwiched in between the ectoderm and the endoderm
   - An internal cavity called the gastrovascular cavity is where digestion and circulation of nutrients occurs.

HYDRA

1. Structure
   - Polyp body form

2. Locomotion
   - Sessile; however, some can somersault and glide along while secreting mucus

3. Ingestion, Digestion, Elimination
   - Food is captured by nematocysts in the tentacles by stinging or stunning prey
   - Tentacles push food through mouth into gastrovascular cavity
   - Flagella line the endoderm layer and create a current
   - The endoderm cells secrete enzymes to break down food
   - Food is taken into the cells and nutrients are circulated by amoeboid cells
   - Wastes are eliminated out through the mouth

4. Respiration
   - O_2 enters the cells by diffusion
   - CO_2 leaves the cells by diffusion

5. Nervous System
   - Have a nerve net within the mesoglea
   - When stimulated, the nerve net will respond by contracting / relaxing the muscles
   - Have sensory cells that are sensitive to touch, light, chemicals, and balance

6. Muscular System
   - Latitudinal and circular muscle fibers are found in the endo/ectoderm layers

7. Excretion
   - Nitrogenous wastes leave by diffusion

8. Reproductive System
   a) Asexual
      - Budding (bud breaks away)
      - Regeneration (re-growth of missing parts)
   b) Sexual
      - Some are hermaphrodites
      - Ovaries and testes grow on the side of adults
      - Ovary produces an egg and remains attached to the adult
      - Testes produce the sperm which swim to the egg where fertilization occurs resulting in a zygote
      - Zygote develops into a ball of cells called the blastula which develops into a ciliated larvae called a planula which can swim to another location, settle, and develop into a polyp adult.

9. Ecological/Economic Importance
   - Are extremely important in the ecology of tropical and temperate oceans in the form of coral (eg Great Barrier Reef)
   - Corals provide habitats and food for many species of fish and invertebrates
   - Reefs protect the land from ocean waves
   - Cnidarians form symbiotic relationships with other organisms living among the tentacles (clown fish and sea anemones)
   - Used in medical research for their chemicals (cancer therapy, bone grafts)
   - Corals can be used as water filters