

INVERTEBRATES

Classification of Animals

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for kids

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I. What is an Animal?

- A. **Animal: multicellular, eukaryotic heterotroph whose cells lack cell walls**
- B. **Invertebrate: no backbone or vertebral column**
- C. **Vertebrate: have a backbone**

II. Phylum Porifera

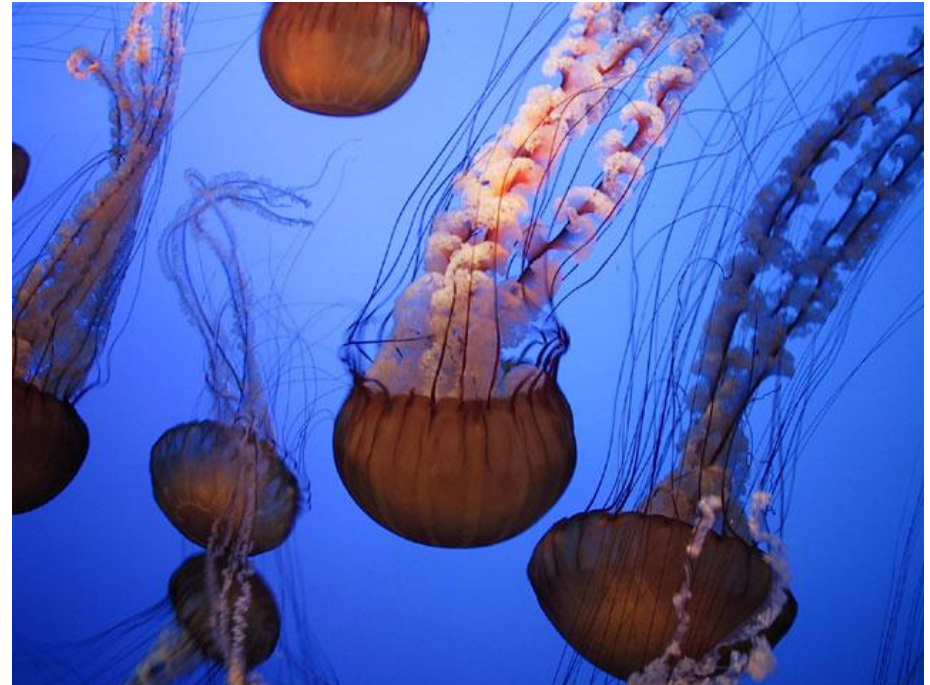
- A. **Example: sponges**
- B. **Word means “pore bearing”**
- C. **Asymmetry**
- D. **Natural sponges:
nonliving material that
remains after decay**



- E. Sessile: live attached to a surface**
- F. Do not have nerve cells or tissue**
- G. Filter feeders: pump water in and out and feed on the organic material in water**
- H. Many are hermaphrodites: able to produce male and female gametes – an advantage for sessile organisms**
- I. Can reassemble when fragmented**

III. Phylum Cnidaria

A. Examples: coral, jellyfish, sea anemone



- B. Cnidocytes: cells that contain stinging poisonous barbs with which they paralyze prey**
- C. Radial symmetry**
- D. Two body forms**
 - 1. polyp: sessile, tentacles up – coral, hydra**
 - 2. medusa: free swimming, tentacles down – jellyfish**

- E. Digestive body cavity surrounded by two layers of cells**
- F. Sexual or asexual reproduction – hydra reproduces by budding**
- G. Coral reefs build up and are important ocean habitats**



IV. Phylum Platyhelminthes

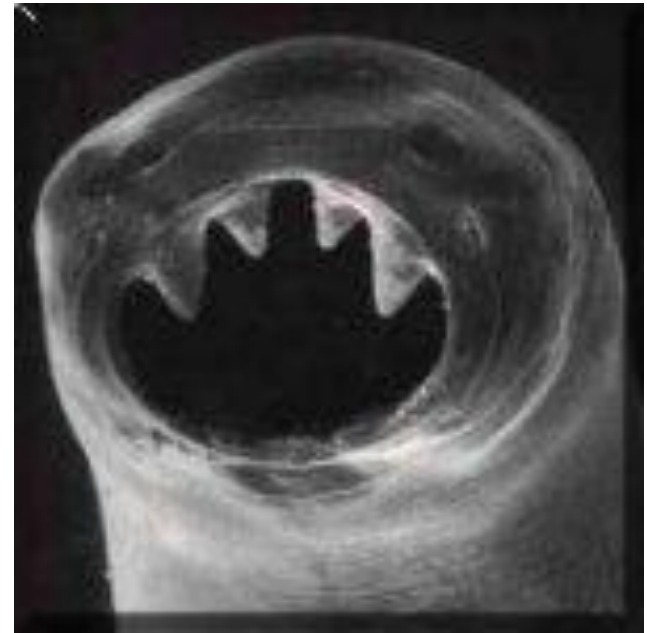
A. Examples: flatworms, tapeworms, flukes



- B. Many parasitic forms - cause many diseases of people and livestock**
- C. Bilateral symmetry and cephalization (concentration of sensory organs and nervous tissue in the head)**
- D. One digestive opening (pharynx) to take in food and release waste – most don't need complex digestive systems because food has already been digested by their host**
- E. Most are hermaphroditic, some can regenerate lost body parts**

V. Phylum Nematoda

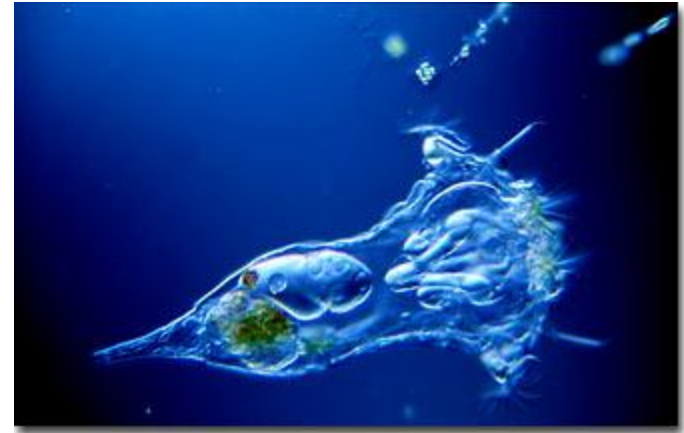
A. Examples: roundworms (pinworms, hookworms)



- B. Many are microscopic**
- C. Two digestive openings: mouth and anus – food moves only one way**
- D. Only sexual reproduction; usually separate sexes; no regeneration**
- E. Most are free-living, many are parasitic – you can be infected by consuming contaminated food/water or by being bitten by insects**

VI. Phylum Rotifera

- A. **Example: rotifers**
- B. **Less than 1mm long**
- C. **Free swimming,
most in fresh water**
- D. **Important food source
in aquatic food chains**



- E. Some can reproduce by parthenogenesis – females produce diploid eggs that develop into female organisms without being fertilized by sperm (males do not exist in these species)**

VII. Phylum Annelida

- A. **Examples: segmented worms, earthworms, leeches**



- B. Body divided into many segments**
- C. Complete digestive tract**
 - 1. pharynx**
 - 2. esophagus**
 - 3. crop**
 - 4. gizzard**
 - 5. intestine**
 - 6. anus**

- D. May have leg-like parapoda**
- E. Closed circulatory system: blood stays within vessels**
 - 1. main vein is dorsal (upper/back side)**
 - 2. 5 aortic arches: function as simple hearts**
- F. Earthworm is hermaphroditic; others have separate sexes**
- G. Earthworms are important in the soil ecosystem—provide passageways for plant roots and water**

VIII. Phylum Mollusca

A. **Examples: snails, clams, octopus, squid**



- B. Mollusks and annelids have a true coelom (body cavity)**
- C. Characteristics:**
 - 1. muscular foot: used for motion or attachment – the foot may be modified into tentacles**
 - 2. mantle: soft, outer layer of body**
 - 3. visceral mass: contains most of the internal organs**
 - 4. gills or lungs: located in the mantle cavity**

D. Main groups of mollusks

1. gastropods (“stomach-footed”)

a. univalves: one shell, breathe with lungs; example: snail

b. bivalves: two shells, breathe with gills; example: clam

2. cephalopods (“head-footed”)

- foot is modified into tentacles, breathe with gills; examples: octopus, squid**

- E. Sexual reproduction: most have separate sexes, some are hermaphrodites**
- F. Most have an open circulatory system (blood is contained within vessels that empty into sinus cavities). Cephalopods have a closed system (blood remains within vessels).**
- G. Most mollusks are marine, but some live in fresh water or on land**

IX. Phylum Arthropoda

- A. Largest phylum – found in almost all places on earth**
- B. Characteristics:**
 - 1. exoskeleton**
 - a. Outside the body**
 - b. Very good protection**
 - c. Does not grow, so it must be shed periodically (molting)**

- 2. paired, jointed appendages (body extensions)**
- 3. segmentation**
- 4. open circulatory system**
- 5. ventral (lower/belly side) nerve cord**

C. Classified based on number and structure of body segments and appendages



- D. Centipedes and Millipedes**
- 1. most primitive arthropods**
 - 2. obvious segmentation**
 - 3. Centipedes (Class Chilopoda)**
 - a. one pair of legs per segment**
 - b. poisonous fangs for killing prey**
 - c. long antennae**



4. Millipedes (Class Diplopoda)

- a. two pairs of legs per segment**
- b. one pair of short antennae**
- c. usually harmless vegetarians**



E. Crustaceans (Class Crustacea)

1. examples: lobster, crayfish, shrimp



- 2. most are marine**
- 3. two body regions:**
 - a. cephalothorax**
 - b. abdomen (divided into 7 segments)**
- 4. two pair of antennae (1 long, 1 short pair)**
- 5. swimmerets: appendages on the abdomen used for swimming**

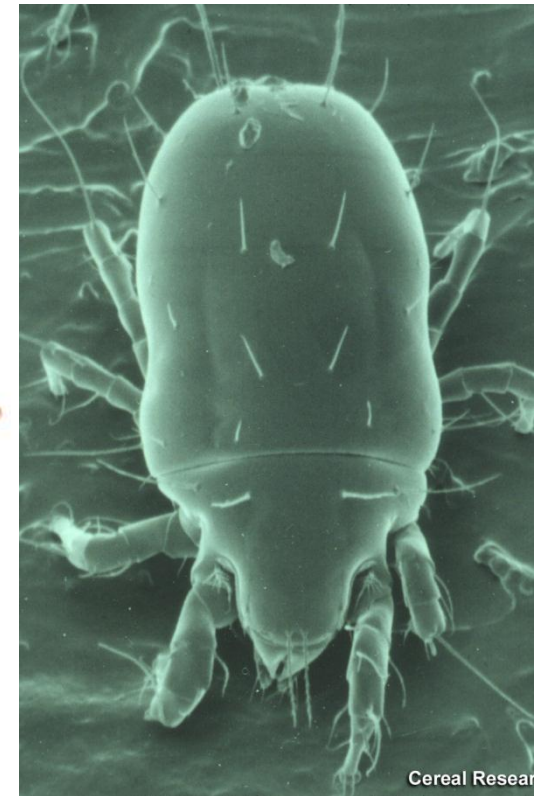
6. breathe by gills attached to the swimmerets
7. one pair of large claws
8. 4 pairs of walking legs



F. Arachnids (Class Arachnida)

1. examples: spiders, ticks, mites,

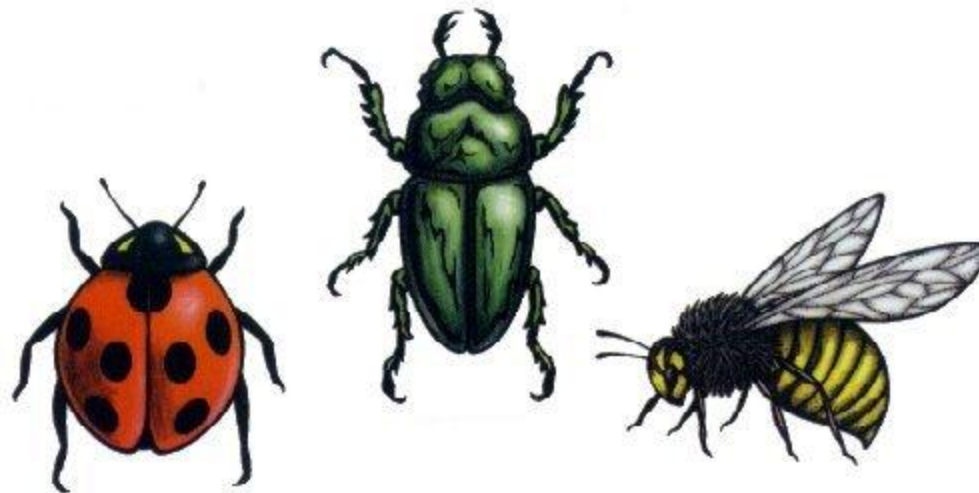
scorpions



- 2. two body regions:**
 - a. cephalothorax**
 - b. abdomen: no appendages on abdomen**
- 3. no antennae**
- 4. simple eyes**
- 5. 4 pairs of walking legs**
- 6. mouthparts modified as fangs (chelicerae) to stab prey and suck out body fluids**
- 7. book lungs (gills modified for breathing on land)**

G. Insects (Class Insecta)

- 1. over 75% of all animal species**
- 2. first animals to develop flight**



3. Characteristics:

- a. three body regions**
 - 1. head**
 - 2. thorax (with 3 pairs of legs)**
 - 3. abdomen**
- b. usually 1 or 2 pairs of wings**
- c. 1 pair of antennae**
- d. compound eyes**
- e. respiration through a system of tubes called tracheae**

4. metamorphosis: a series of changes during which young insects develop into adults

a. some insects do not carry on metamorphosis (silverfish)



**b. incomplete (gradual)
metamorphosis
(grasshopper)**

1. egg

**2. nymph (look like
adults, but smaller,
no wings or
reproductive
organs)**

3. adult

w



c. complete metamorphosis

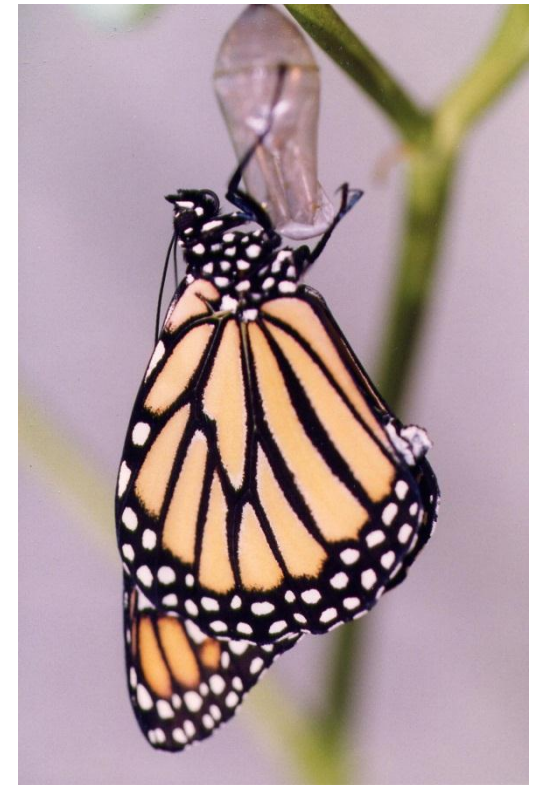
(butterflies, bees)

1. egg

2. larva (caterpillar)

3. pupa

4. adult



X. Phylum Echinodermata

- A. Name means “spiny skin”
- B. Marine environment
- C. Radial symmetry – body parts usually in multiples of 5
 - 1. larvae have bilateral symmetry
 - 2. deuterostomes - indicates a fairly close relationship to vertebrates

D. Water vascular system

1. system of internal tubes

2. carries out functions of circulation, respiration, and movement

E. Tube feet

1. act like living suction cups

2. help in movement and feeding

F. Examples: sea urchins, sand dollars, starfish



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