4.1

* Most animals are invertebrates
	+ Invertebrates are a diverse group of organisms
		- **Invertebrates** – animals that do not have backbones or bone tissue
			* **Sponges**
			* **Cnidarians**
			* **Worms**
			* **Mollusks**
			* **Echinoderms**
			* **Arthropods**
		- **Sponges** – simplest multicellular animals on earth
			* **Sessile** – they live attached to one spot and do not move from place to place
			* Sponges reproduce asexually (budding) and sexually through fertilization
				+ **Larva** – an immature form or early stage of an organism that is different from the parent
				+ Sponge larva can swim

4.2

* Cnidarians and worms have different body plans
	+ Cnidarians have simple body systems
		- Cnidarians are invertebrates found only in water
			* Jellyfish, corals, sea anemones, hydras
				+ Have **tentacles** – fingerlike extensions of their body that reach into the water
			* Reproduce sexually and asexually and use water for both
			* Mobile – can move their bodies from place to place
	+ Animals have different body plans
		- **Radial symmetry** – circular body shape, allows organisms to capture food from any direction
		- **Bilateral symmetry** – identical left and right sides
	+ Most worms have complex body systems
		- Segmented worms – sectioned bodies
		- Flatworms and round worms
			* Flatworms move with cilia not muscle
			* Round worms use muscles to move

4.3

* Most mollusks have shells, and echinoderms have spiny skeletons
	+ **Mollusks** are soft-bodied animals
		- **Bivalves** – hard shell made of two matching halves
			* Take in oxygen through **gills** – an organ that filters dissolved oxygen from water
		- **Gastropods** – diverse group, withdraws into shell for protection
			* Use **lungs** to take in oxygen
		- **Cephalopods** – live in saltwater environments, have brain and nerves, use gills
	+ Mollusks show a range of adaptations
	+ Echinoderms have unusual adaptations
		- **Echinoderms** – group of invertebrates that live in the ocean, show radial symmetry, have a skeleton made of stiff hard plates, not bone tissue

4.4

* Arthropods have exoskeletons and joints
	+ Most invertebrates are arthropods – has segmented body covered with a hard outer skeleton
		- **Exoskeleton** – a strong outer covering made of a material called chitin
		- **Molting** – the process of shedding an exoskeleton as an arthropod grows
	+ Insects are six-legged arthropods
		- **Metamorphosis** – appearance and body systems may change dramatically throughout the life cycle of an insect
	+ Crustaceans live in water and on land
	+ Arachnids are eight-legged arthropods
	+ Millipedes and centipedes are arthropods