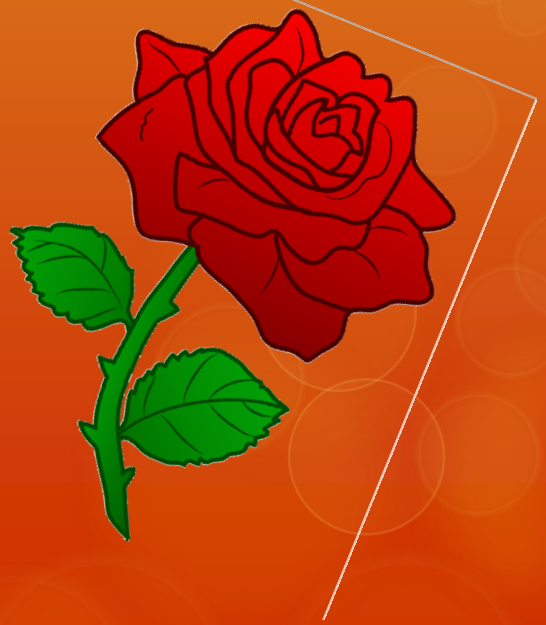
CLASSIFICATION

All living things are **classified** into groups based on the **traits** they share. **Taxonomy** is the study of classification. The largest groups into which the scientists divide the groups are called kingdoms. The **five kingdoms** are the **monerans** (bacteria & virus), **protists** (amoebas), **fungi, plants, and animals**.

most	MONERANS
people	PROTISTS
find	FUNGI
plants	PLANTS
attractive	ANIMALS



COMMON CHARACTERISTICS

- 35 phyla of animals
- These phyla can be classified into two groups (vertebrates or invertebrates) based on external and internal physical characteristics.
- All animals share several common characteristics:

1. Their bodies are **multi-cellular**
2. They are **heterotrophs**
3. Their major functions are to obtain food and oxygen **(breathe)** for energy, keep their internal conditions in balance, **move**, and **reproduce**.

VERTEBRATES

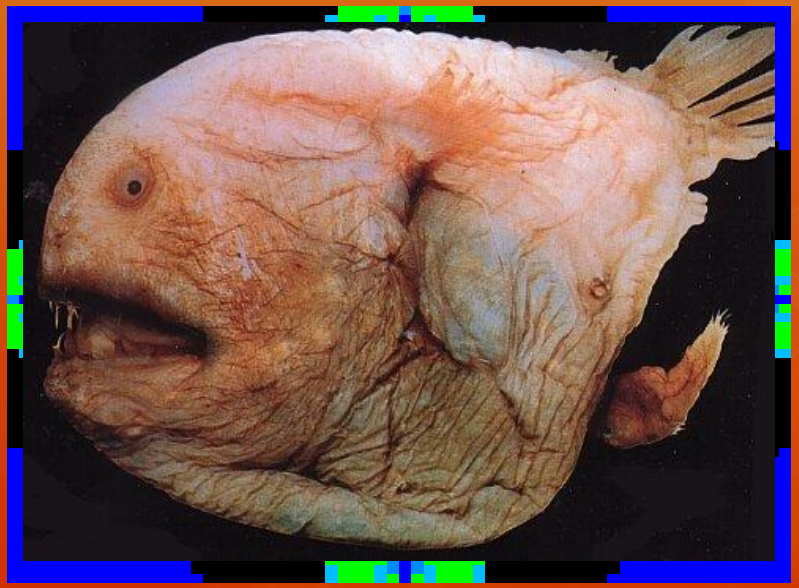
- Vertebrates comprise only one phylum of animals.
- Vertebrates share certain physical characteristics:
- They have **backbones**, an internal skeleton (**endoskeleton**), and **muscles**.
- They have **blood** that circulates through blood **vessels** and **lungs (or gills)** for breathing.
- They have a protective **skin** covering.
- Most have **legs, wings, or fins** for movement.
- They have a **nervous system with a brain** that processes information from their environment through sensory organs.

FISH

Examples of vertebrates include:

Fish

- **Are cold-blooded (ectothermic); obtain dissolved oxygen in water through gills; most lay eggs; have scales; have fins; and live in water.**



FISH

Lamprey – Jawless Fish

Sea Ray - Chondrichthyes

Catfish - Osteichthyes

Whale Shark - Chondrichthyes

FISH

AMPHIBIANS

- Are cold-blooded (ectothermic); most can breathe in water with gills as young, and breathe on land with lungs as adults; go through metamorphosis; lay jelly-like eggs.
- The major groups of amphibians are frogs, toads, and salamanders.
- Frogs and salamanders have smooth, moist skin, through which they can breathe and live part of their life in water and part on land.
- Toads have thicker, bumpy skin and live on land.

AMPHIBIANS


Spotted Salamander


Poison Dart Frog


Fire Bellied Toad

REPTILES

- Are cold-blooded (ectothermic); breathe with lungs; most lay eggs, although in some the eggs hatch inside the female; and have scales or plates.

REPTILES


Coral Snake


Sea Turtle


Galapagos Tortoise


Tuatara

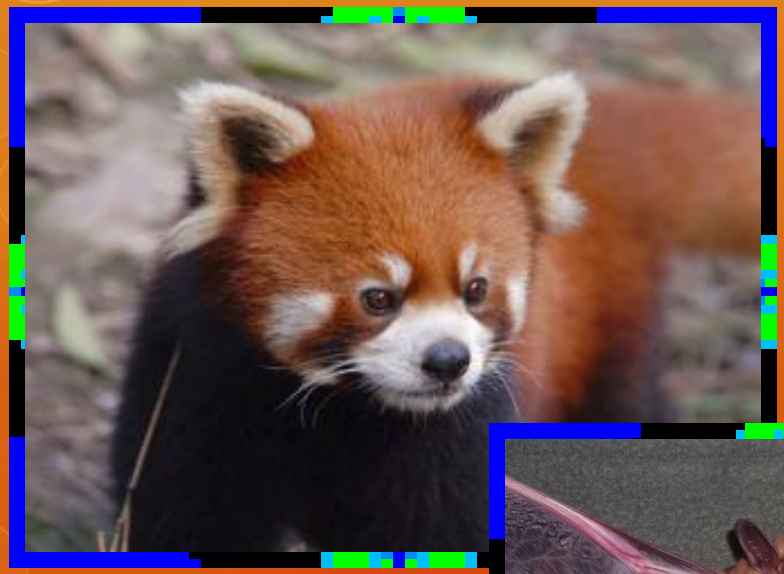
BIRDS

- Are warm-blooded (endothermic); breathe with lungs; lay eggs; have feathers; and have a beak, two wings, and two feet.

BIRDS

MAMMALS

- Are warm-blooded (endothermic); breathe with lungs; most have babies that are born live; have fur or hair; and produce milk to feed their young.



INVERTEBRATES

- They do not have backbones or internal skeletons.
- Some have external skeletons, called ***exoskeletons***.

Examples of invertebrates include:

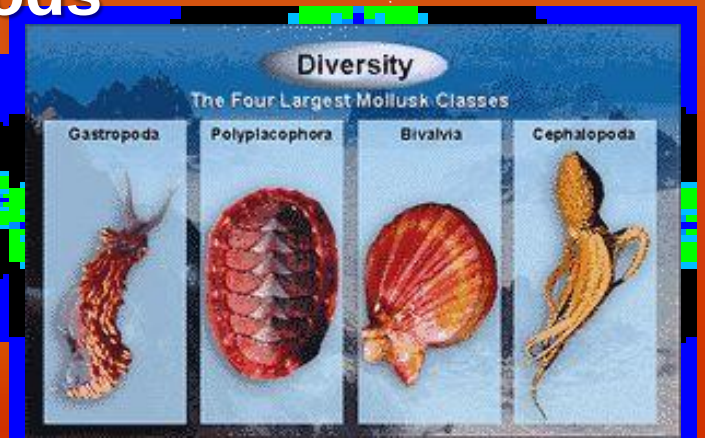
Sponges

Segmented Worms

Echinoderms

Mollusks

Arthropods



INVERTEBRATES

SPONGES

- **Very simple animals that have many *pores* (holes) through which water flows.**
- **Water moves into a central cavity and out through a hole in the top.**
- **Sponges obtain their food and eliminate wastes through this passage of water.**
- **They have specialized cells for obtaining food and oxygen from the water.**

INVERTEBRATES

SEGMENTED WORMS

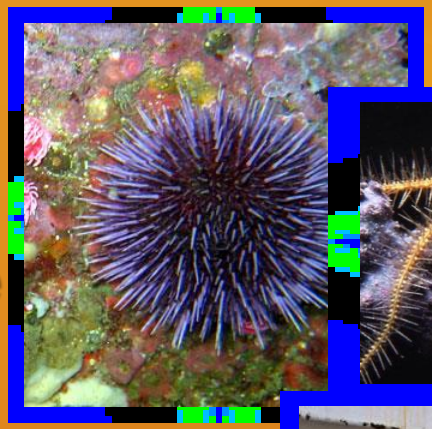
- Have long tube-like bodies that are divided into segments.
- They are the simplest organisms with a true nervous system and blood contained in vessels.

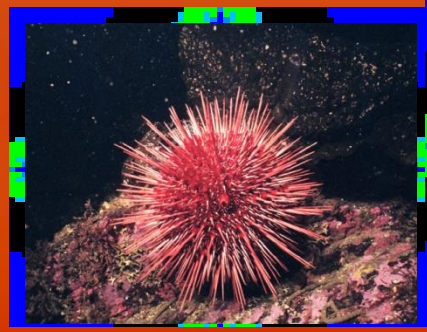
- A long digestive tube runs down the length of the worm's inner body.
- Worms take in dissolved oxygen from the water through their skin.
- Examples of segmented worms may be earthworms and leeches.

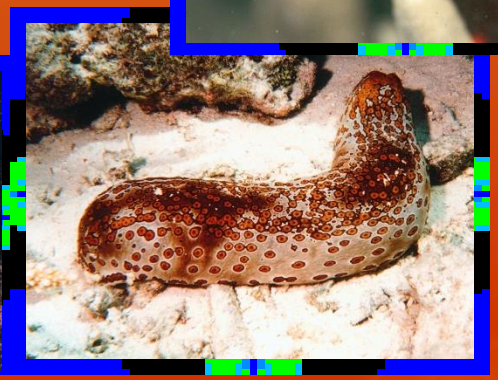
INVERTEBRATES

ECHINODERMS

- Have *arms* that extend from the middle body outwards.
- They have tube feet that take in oxygen from the water and spines.
- Examples may be sea stars, brittle stars, sea cucumbers, or sea urchins.







INVERTEBRATES

MOLLUSKS

- Have soft bodies; most have a thick muscular foot for movement or to open and close their shells.
- They have more developed body systems than sponges or worms.
- They take in oxygen through gills or lungs, and some have shells.
- Examples may be slugs, snails, clams, and octopuses.

INVERTEBRATES

ARTHROPODS

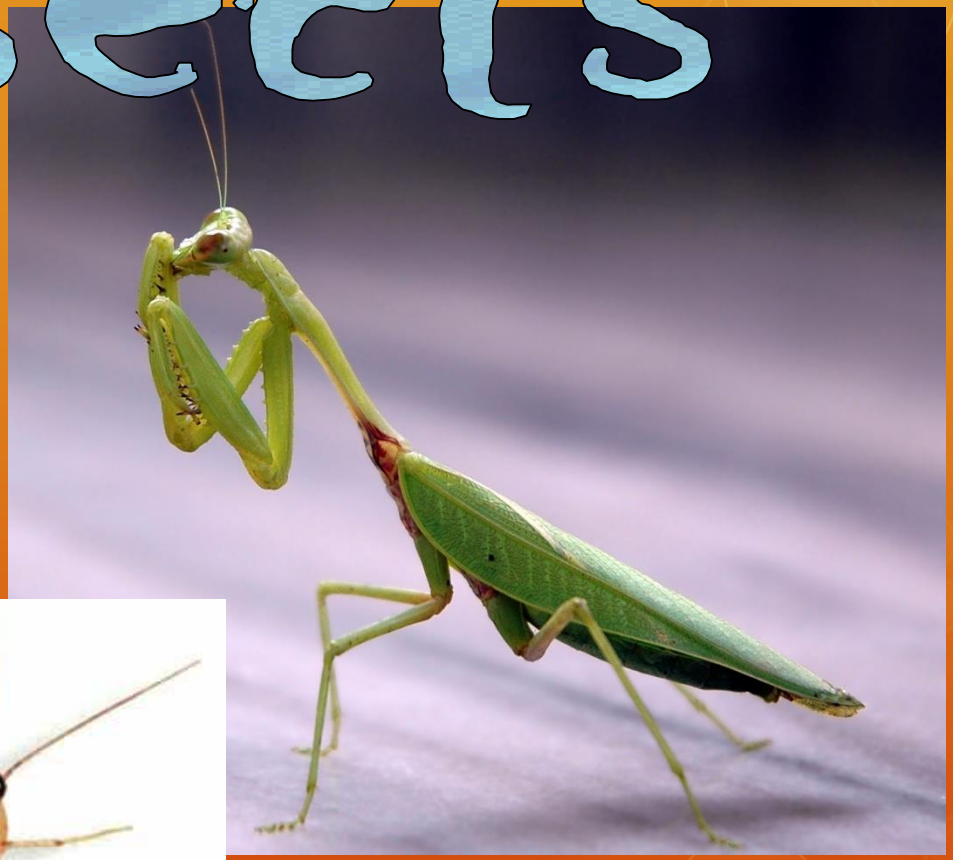
- Have jointed legs, segmented bodies, and some have wings.
- They have hard outer coverings called *exoskeletons.*
- They obtain oxygen from the air through gills or air tubes.
- Examples may be insects, arachnids, and crustaceans.

Arthropod Descriptions

Insects	Arachnids	Crustaceans
•3 body segments •3 pairs of legs •1 pair of antennae •Live on land	•2 body segments •4 pairs of legs •No antennae •Most live on land	•Most have 2 body segments •Most have 5 pairs of legs •2 pair of antennae •Most live in water
<u>Examples</u>: Beetles, bees, wasps, ants & butterflies	<u>Examples</u>: spiders, mites, scorpions, & ticks	<u>Examples</u>: Shrimp, crab, lobster, barnacles, pill bugs

Crustaceans

Insects

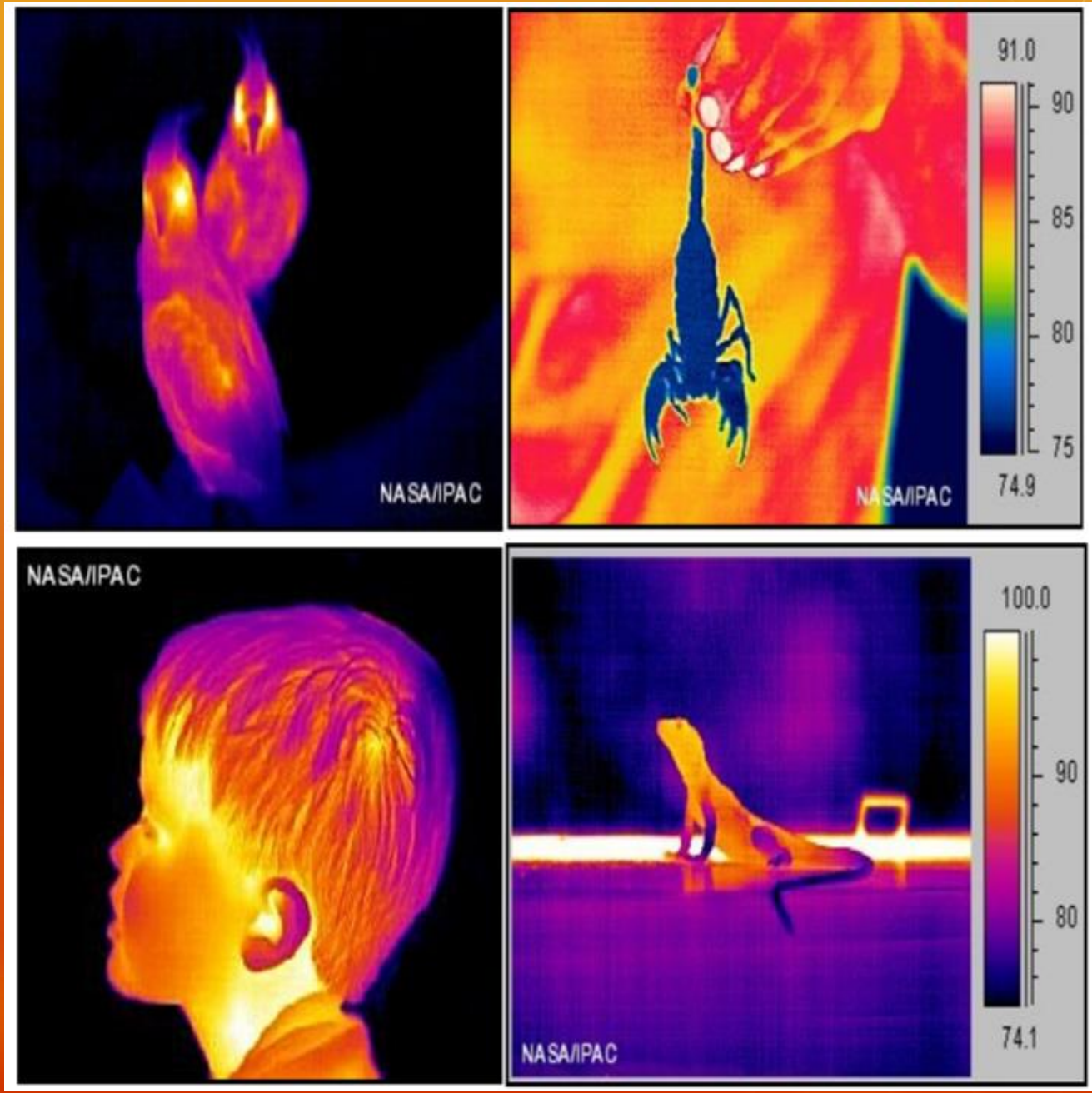


Arachnids

ENDOTHERMIC/ ECTOTHERMIC

- Vertebrates differ in the way that they control their body temperature.
- In some (fishes, amphibians, and reptiles), their body temperature is close to that of their environment. They are considered **cold-blooded, or ectothermic**.
- In others (birds and mammals), their body temperature stays constant regardless of the temperature of the environment. They are called **warm-blooded, or endothermic**.

Thermal Image Comparison



ENDOTHERMIC/ECTOTHERMIC

Warm-blooded **(endothermic) animals-**

- **birds and mammals maintain a nearly constant internal temperature in any environment.**
- **When hot outside an endothermic animal can cool off by sweating, panting, changing position, or changing location.**
- **Sweating/panting generate heat loss through evaporating water.**
- **Endothermic animals eat more often than ectothermic animals since it takes energy to maintain a constant body temperature.**
- **Example: lions eat its weight in food every 7-10 days**

ENDOTHERMIC/ECTOTHERMIC

Cold-blooded **(ectothermic) animals-**

- fish, amphibians, and reptiles have an internal body temperature that changes with environment.
- They must gain heat to perform activities like digestion.
- If it is cold outside, ectothermic animals move very slow. Some animals bask in the sun (lizards, snakes) or move to a warmer area (fish) before they can move about to hunt for food.
- If it is too hot outside, ectothermic animals will burrow in the ground to keep its body cool.
- Since cold blooded animals take on the temperature of their surroundings, they don't have to use food energy to keep warm. So, they don't have to eat as often.