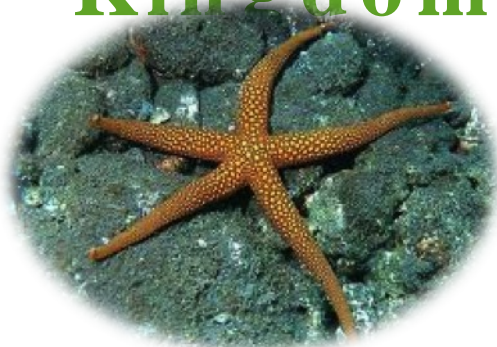



# UNIT 5: INVERTEBRATES



## The Animal Kingdom



# The main characteristics of animals

- Animals are the most complex living things.
  - They usually have **organs and systems**.
  - They can perform the three vital functions: nutrition, interaction and reproduction.
  - They can **move and interact** with other living things.
  - Animal reproduction can be:
    - **Asexual: Budding and fragmentation**
    - **Sexual.**
  - They can be:
    - **Viviparous** animals: develop the **embryo** inside the mother's body.
    - **Oviparous** animals: **lay eggs** outside the body.
    - **Ovoviviparous** animals: develop within eggs that remain inside the mother's body.
- 

# Are they viviparous, oviparous or ovoviviparous?



# CLASSIFICATION OF ANIMALS

Two groups:

- **Vertebrates:** which have an internal skeleton with a backbone.
- **Invertebrates:** which don't have an internal skeleton.



# IN VERTEBRATES



PORIFERA

CNIDARIA



WORMS

MOLLUSCS



ARTHROPODS

ECHINODERMS



# VERTEBRATES



FISH

AMPHIBIANS



REPTILES

BIRDS



MAMMALS

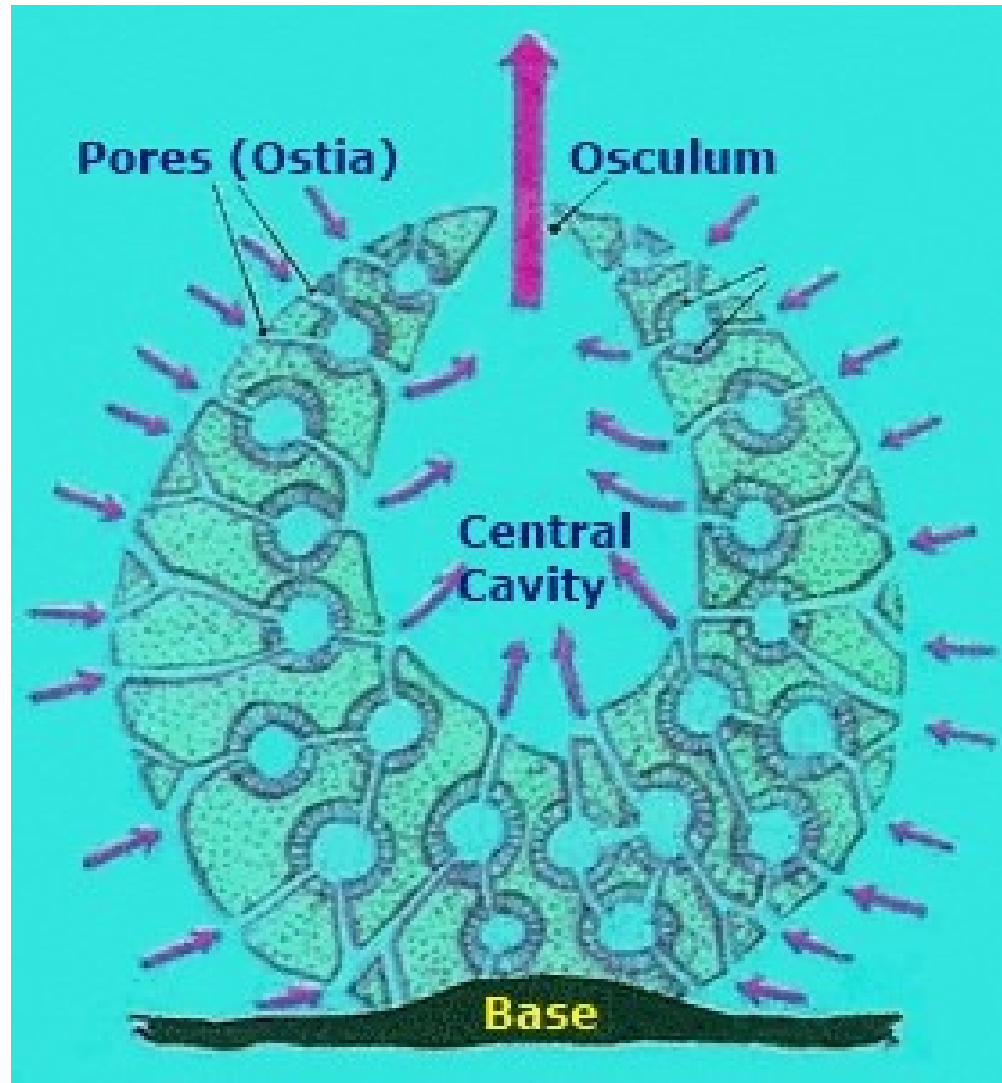


# 1. PORIFERA

- **Sponges** are aquatic animals. Most of them are marine.
- They live **attached** to sand or rocks.
- The body is perforated by **pores** and supported by small needles called **spicules**.
- They have an **internal cavity** with an upper hole called **osculum**.
- They are **filtering animals**. They feed filtering water and retaining food particles.
- They can reproduce **sexually or asexually** (fragmentation or budding).



# Water circulation in a sponge.



## 2. CNIDARIA

- **Cnidaria** are aquatic animals. Most of them are marine.
- Examples: **Corals, jellyfish, sea anemones, hydra.**
- Cnidaria have two body forms:
  - **Swimming medusae:** an umbrella shape floating freely.
  - **Sessile polyps:** a bag shape fixed to the ground.
- They have a mouth with tentacles with stinging cells called **cnidocytes** and a **gastrovascular cavity**.
- They can reproduce sexually or asexually



# ACTIVITIES

## **1. True or false?**

- a) Asexual reproduction happens through internal fecundation.
- b) Budding is a kind of asexual reproduction.
- c) In viviparous animals the embryo develops inside the mother's body.
- d) In oviparous animals the egg develops inside the mother's body.

## **2. What is the main difference between vertebrates and invertebrates?**



**3.Explain how porifera and cnidaria feed.**

**4.Copy and complete the following sentences in your notebook.**

- a) Polyps have the shape of a .....
- b) Medusae have the shape of an .....

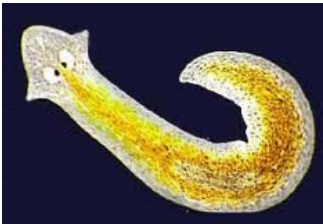
**5. True or false?**

- a) Porifera live freely, floating on sea water.
- b) Porifera can reproduce sexually or asexually.
- c) Corals are porifera with the shape of a polyp.
- d) Cnidaria can reproduce sexually from eggs.



# 3. WORMS

- Worm includes animals with a soft, elongated body.
- Three types: **platyhelminthes, nematodes, annelids.**
- **PLATYHELMINTHES:** are flat worms. They live in wet environments or can be parasites. Ex: **Planaria** and **Taenia**.




- **NEMATODES:** are cylindrical worms. They live in wet soil or as parasites. Ex: **Hookworms.**



- **ANNELIDS:** are worms with **segments**. The body is long and divided in rings. They live in wet soil or water. They have **specialised systems**.  
Ex: **earthworms, leeches.**



## 4. MOLLUSCS

- They are aquatic (**squids, mussels, clams**) and terrestrial animals (**snails, slugs**).
  - Organs highly developed.
  - Parts of the body:
    - The **head**: contains the sense organs.
    - The **visceral mass**: contains the internal organs.
    - The **muscular foot**: to move around, excavate or catch the prey.
  - They breath through **lungs** (terrestrial) or **gills** (aquatic).
  - They reproduce **sexually**.
  - Main groups: **Gastropods** (snail, slugs), **Bivalves** (mussels, oysters, clams), **Cephalopods** (squid, octopus, cuttlefish, nautilus)
- 

## gastropods



## bivalves



## cephalopods



# ACTIVITIES

**1. What is the main characteristic of nematodes?**

**2. Copy and complete this sentence in your notebook.**

Annelids' bodies are ..... And divided into .....  
or ..... They live in .....

**3. What will happen if a earthworm lie in the sun?**

**4. What is the main characteristic of platyhelminthes?**



- 5. Draw an snail, a mussel and an octopus.**
- 6. List the main body parts of a mollusc.**
- 7. Write two molluscs that breathe through gills and lungs.**



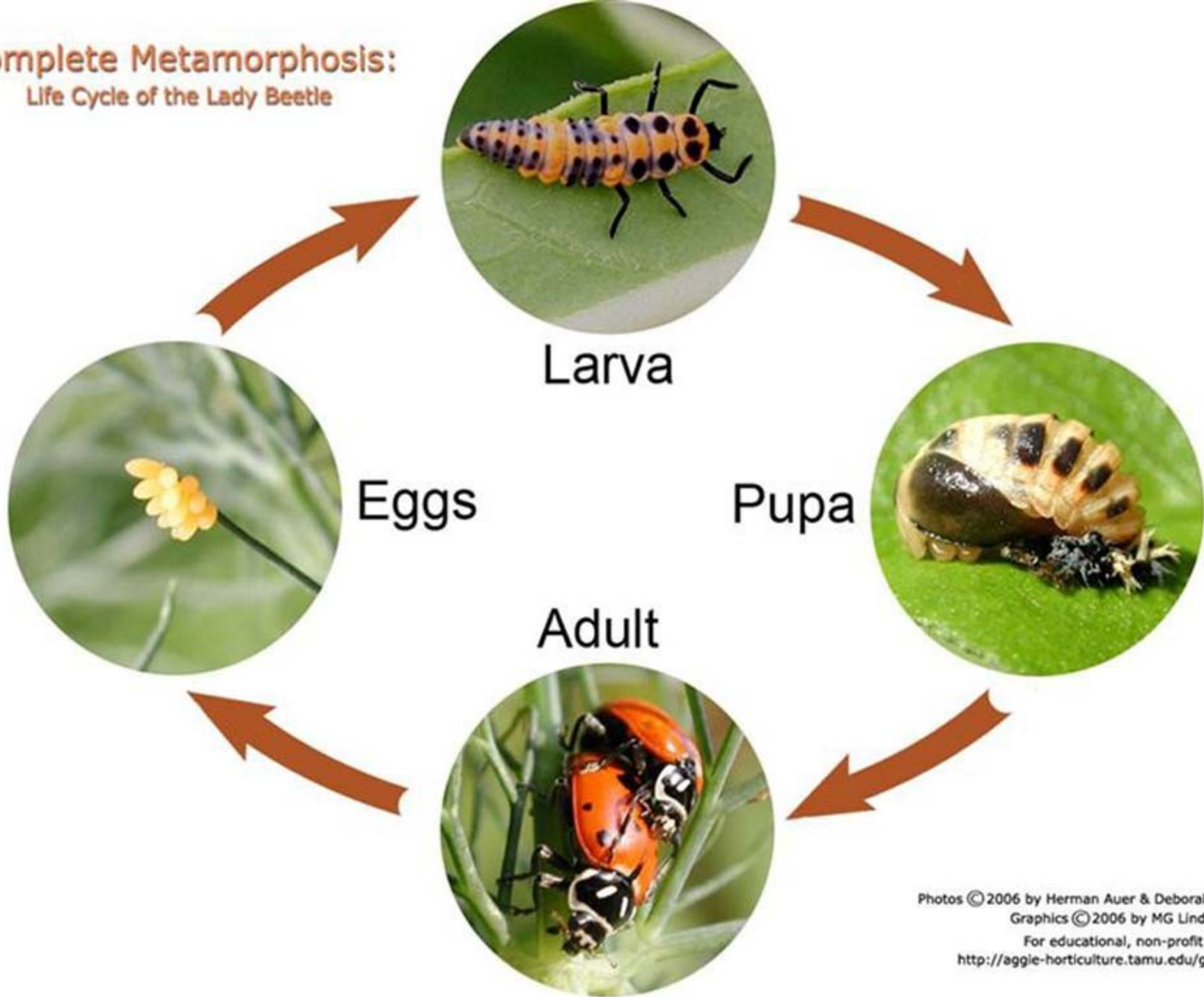
## 5. ARTHROPODS

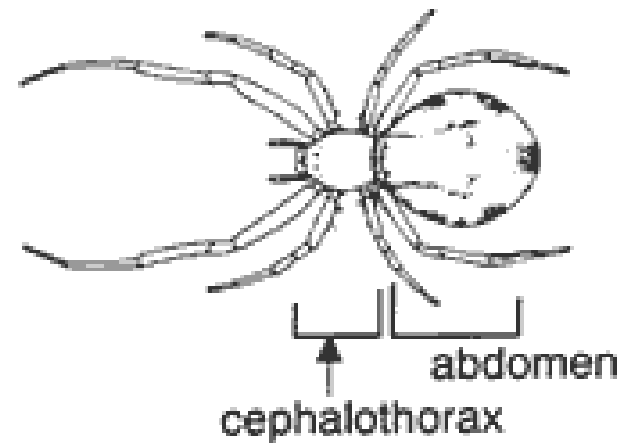
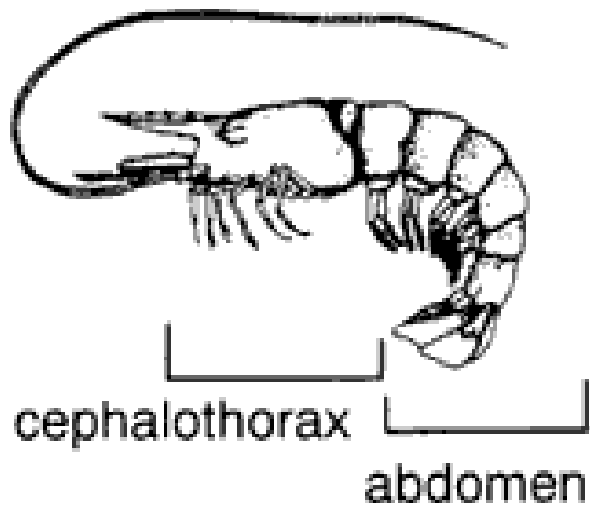
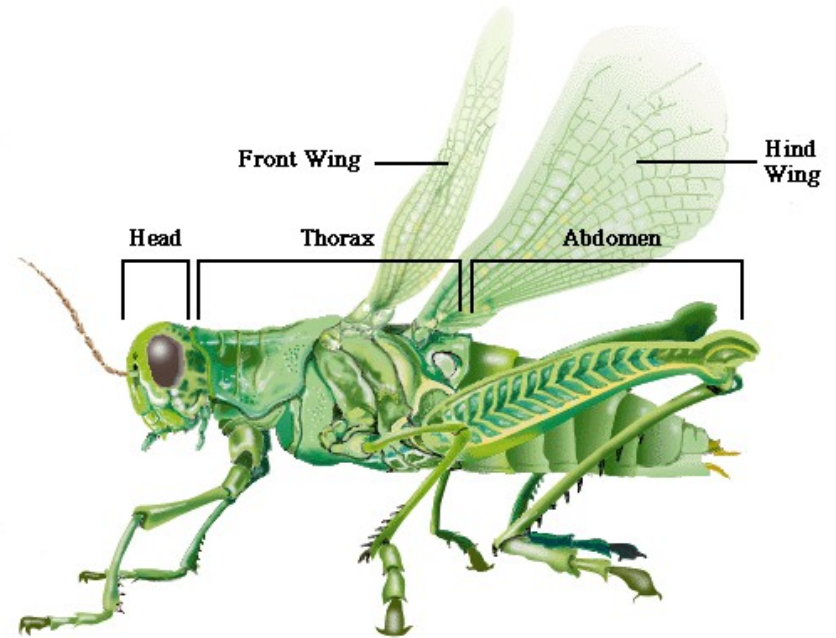
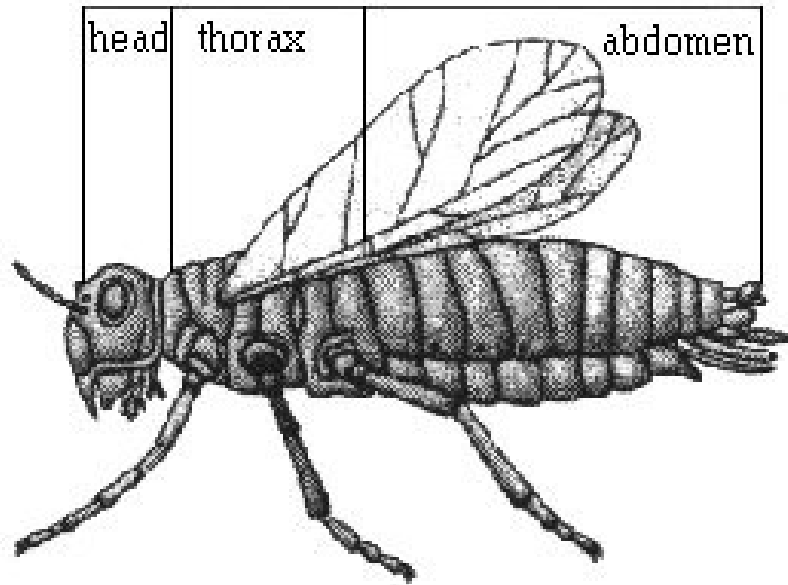
- They are **terrestrial** (spiders) or **aquatic** animals (crabs).
- The body is divided into segments (**head, thorax, cephalothorax, abdomen**)
- They have **hard appendages** (antennas, legs, palps)
- The body is covered by a rigid and **articulated exoskeleton**.
- They breathe by **gills (aquatic)** or by **tracheas (terrestrials)**.
- They reproduce sexually and some of them have complete or incomplete **metamorphosis**.

### Classification:

- **Chelicerates** (spiders, scorpions, mites)
- **Mandibulates**:
  - **Crustaceans** (Crabs, shrimps, lobsters)
  - **Millipede** (Millipede)

**Complete Metamorphosis:**  
Life Cycle of the Lady Beetle





## chelicerates



## mandibulates

### crustaceans



### myriapods



### insects



## 6. ECHINODERMS

- They are marine animals.
- They have hard skeleton, generally with **spines**.
- They have an **ambulacral system** to move around.
- They reproduce sexually or by fragmentation like starfish.
- Examples: **starfish**, **sea urchin**, **cucumber**, **brittle star**.



# ACTIVITIES

- 1. Make a list of 4 characteristics common to all arthropods.**
- 2. What is metamorphosis? How many kinds of metamorphosis are there?**
- 3. What is the main function of the exoskeleton?**
- 4. Write down two examples of Chelicerates and four examples of Mandibulates.**
- 5. Explain how Crustaceans breathe.**



**6. Which system is exclusive to echinoderms?  
What is it used for?**

**7. True or false?**

- a) The body of many echinoderms is covered by spines.
- b) Ambulacral system is used for reproduction.
- c) Echinoderms can reproduce sexually through eggs.

**8. State which group of invertebrates the following animals belong to:**

- |               |              |
|---------------|--------------|
| a) Earthworms | e) Jellyfish |
| b) Snail      | f) Mussel    |
| c) Fly        | g) Sponge    |



**9. Match each kind of invertebrate to its main characteristic.**

- |               |  |
|---------------|--|
| a) Molluscs   | 1.They have an ambulacral system.                  |
| b)Arthropods  | 2.They have pores.                                 |
| c)Porifera    | 3.They have exoskeleton.                           |
| d)Annelids    | 4.The mouth is surrounded by tentacles             |
| e)Echinoderms | 5.Its body is very long and divided into segments. |
| f)Cnidaria    | 6. Most of them have a shell.                      |

**10.Order the following animals from the most simple to the most complex: Fly, sponge, earthworm, mussel, jellyfish, taenia.**

**11. True or false?**

- a) Echinoderms have an internal shell.
- b)All terrestrial arthropods breathe by lungs.
- c)All invertebrates have an endoskeleton.
- d)An annelid's body is divided into rings.

