

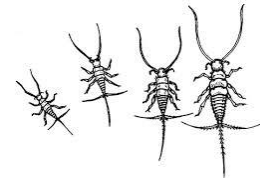
**UNIT 5**  **THE ANIMAL KINGDOM (II): ARTHROPODS**

 **INSECT METAMORPHOSIS**

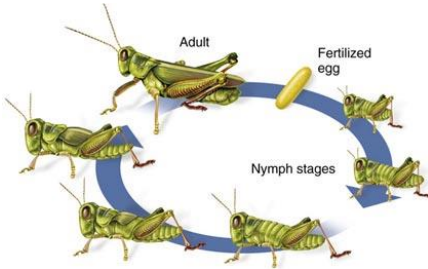
Insects are arthropods, so they have an exoskeleton made of chitin which is a strong and hard material. Insects must make new skeletons as they grow larger. To do this, they can grow and change as they go through different stages.

This is the main characteristic used to classify different orders of insects.

The most primitive insects have **NO METAMORPHOSIS** because there is little or no difference in appearance between the young stages and adults except for size. Insects with no metamorphosis all belong to wingless orders of insects as *silverfish* or *springtails*.

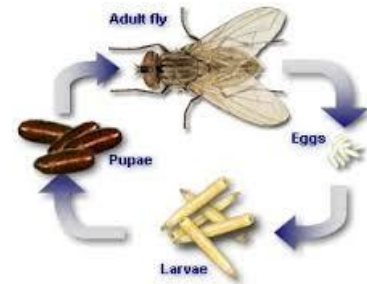


**INCOMPLETE METAMORPHOSIS:** eggs hatch into immature insects called **nymphs**. These nymphs usually have a thin exoskeleton and no wings. They grow by molting until the insect finally becomes an **adult** (with wings and sexually mature).

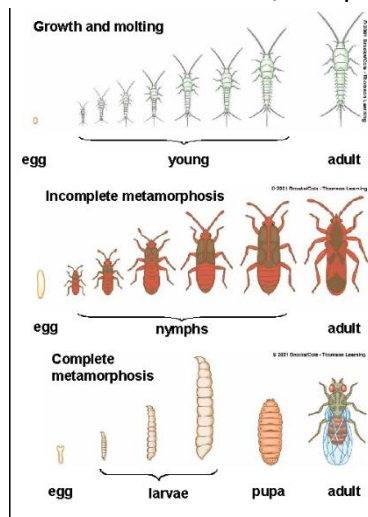


Insects as *true bugs*, *grasshoppers*, *crickets*, *cockroaches*, *termites*, *praying mantises* and *lice*, present this type of metamorphosis.

**COMPLETE METAMORPHOSIS:** insects hatch from an egg as a **larva** (a soft worm-like shape). Larvae have a very big appetite and can eat several times their own weight every day. Larvae grow by molting along several instars (larval stages). At the end of the last instar, the insect begins the **pupa** stage, without eating and moving. Inside the pupa, the larva's body will completely change into a fully grown **adult** (with wings and sexually mature).



This type of development is found in *beetles*, *wasps*, *bees*, *ants*, *butterflies*, *fleas* or *mosquitoes*.



**INSECT ORDERS**

**INCOMPLETE METAMORPHOSIS**  
(egg – nymph – adult)

**Dragonflies and Damselflies**  
Order Odonata



**Grasshoppers and Crickets**  
Order Orthoptera



**True Bugs**  
Order Hemiptera

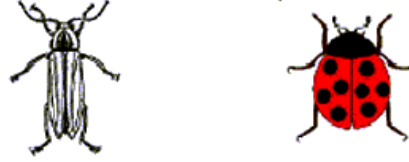


**Cicadas and Leafhoppers**  
Order Homoptera

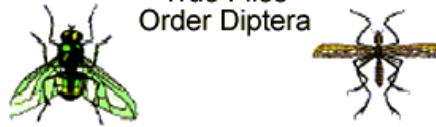


**COMPLETE METAMORPHOSIS**  
(egg – larva – pupa – adult)

**Beetles**  
Order Coleoptera



**True Flies**  
Order Diptera



**Butterflies and Moths**  
Order Lepidoptera



**Wasps, Bees, and Ants**  
Order Hymenoptera

