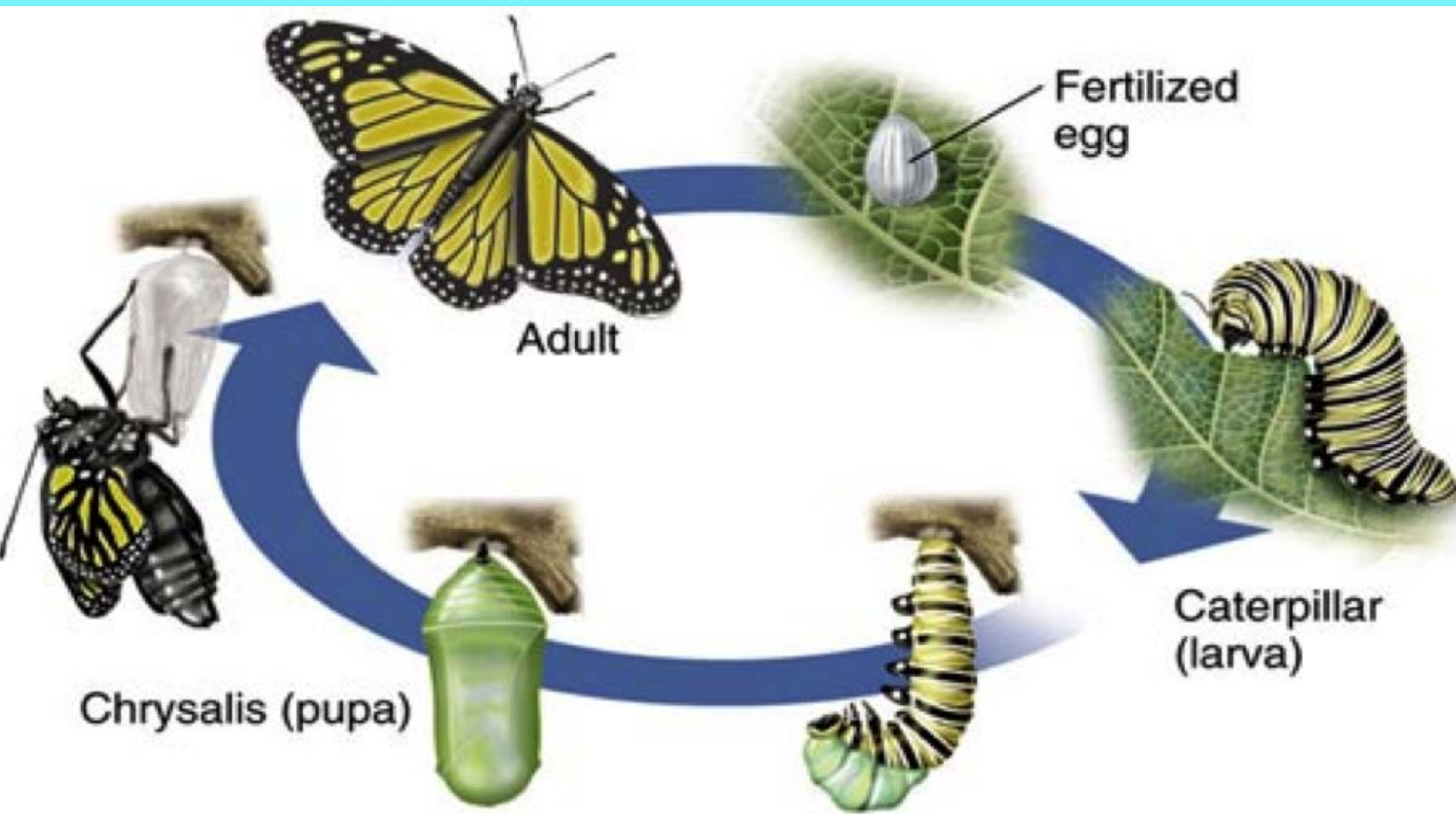
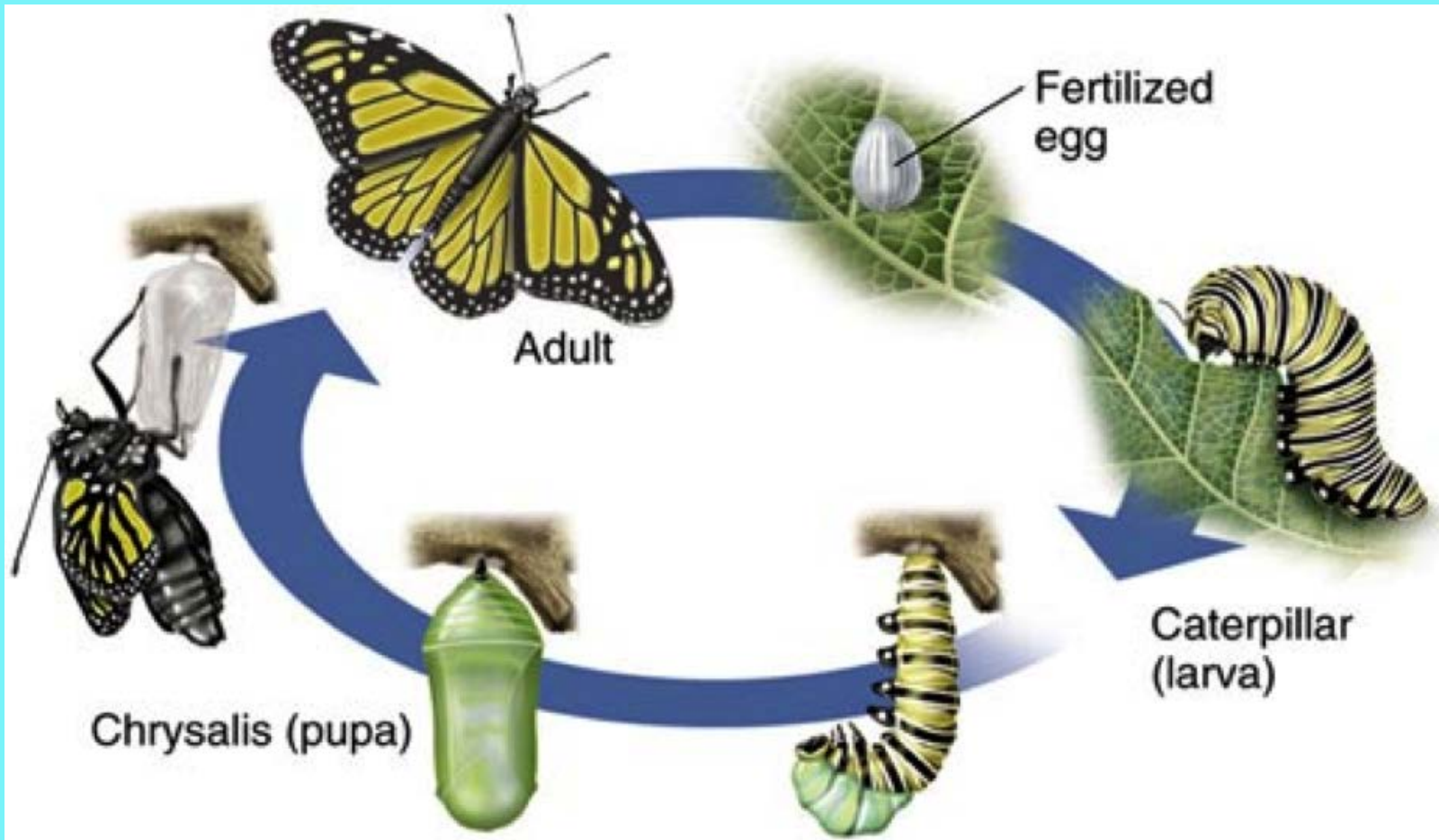


# 4. Review E5 Insects and Mites



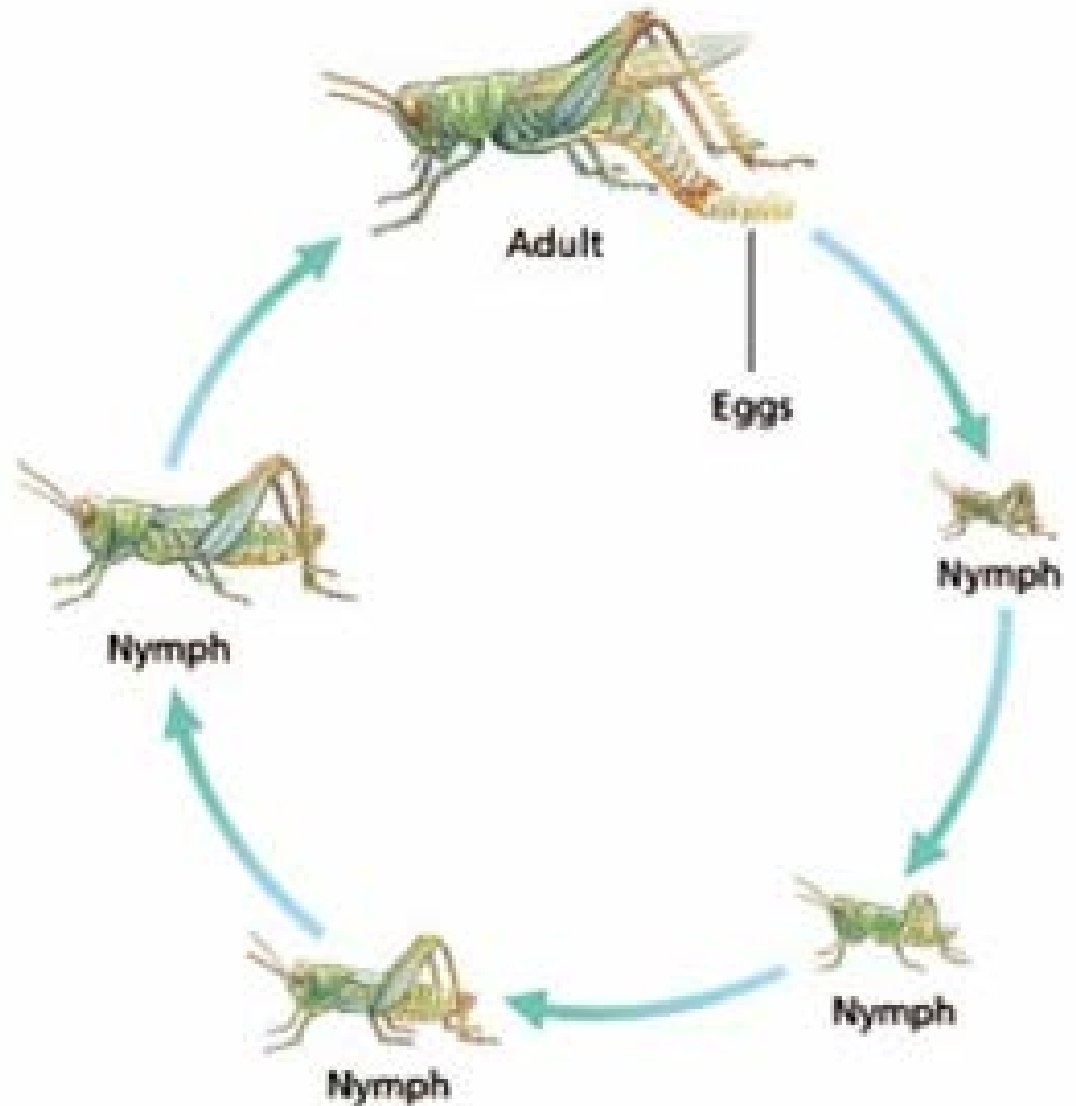
# Insect Development, 2 kinds

In complete metamorphosis there are 4 life stages; egg, larva, pupa, and adult. The larvae look different than adults.



# Insect development, 2 kinds

In incomplete metamorphosis the nymphs resembles the adult.



**INCOMPLETE METAMORPHOSIS**

# What defines Phylum Arthropoda?

**Phylum Arthropoda means jointed leg**

**Class Crustacea include sowbugs, lobsters.**

**Class Arachnida, spiders, mites**

**Arachnids have 4 pairs of legs, no wings.**

**Class Insecta, insects**

**Insects have three body parts divided into head, thorax, and abdomen, 3 pairs of legs and 4 wings.**

**Insects have different types of mouthparts and metamorphosis.**

**Insects with **chewing mouthparts**, include grasshoppers, beetles, and caterpillars and have complete metamorphosis.**

**Insects with **piercing-sucking mouthparts**, true bugs, aphids, scale insects, leafhoppers, and thrips and have incomplete metamorphosis.**

**Insect taxonomy is ranked, Phylum, Class, Order, Family, Genus, and species.**

**Below are orders of insects with incomplete metamorphosis found in landscapes.**

**Order Orthoptera**, means straight wings and include grasshoppers, crickets. They have chewing mouthparts and incomplete metamorphosis.

**Order Hemiptera**, means half solid and half membranous wing include plant bugs. They have piercing sucking mouthparts and incomplete metamorphosis.

**Insect taxonomy is ranked, Phylum, Class, Order, Family, Genus, and species**

**Below are orders of insects with incomplete metamorphosis found in landscapes.**

**Order Homoptera** have even sized wings and include aphids and scales, sucking, rasping mouthparts and incomplete metamorphosis.

**Order Thysanoptera**, means fringed wings are thrips and have fringed wings, sucking, rasping mouthparts and incomplete metamorphosis.

**Below are orders of insects with complete metamorphosis found in landscapes.**

**Order Lepidoptera**, moths and butterflies mean scale wings Differ from other orders by their large, scale-covered wings. Undergo complete metamorphosis.

**Order Hymenoptera**, means has a hymen or a groove that joins the first and second pair of wings sawflies, wasps, bees, ants; They defoliate deciduous, coniferous, and herbaceous plants.



**Below are orders of insects with complete metamorphosis found in landscapes.**

**Order Diptera**, means 2 wings and includes flies, mosquitoes, gnats and midges.

**Order Coleoptera**, means covered wings and include beetles

# Insects feed on plants in different ways

**Leaf-chewing insects** feed on leaves.

Some insect mouthparts are not strong, so they feed between veins and cause windowpane feeding. Include forest tent caterpillars, cankerworms, rose slug sawflies.

**Leafminers** feed inside leaves and include birch leafminersawdlies.

# Insects feed on plants in different ways

**Galls are** an abnormal growth of leaf, stem, twig, or flower tissue caused by a gall-making organism e.g., insect, mite, or fungus.

**Borers** feed inside the trunk, branch, or roots of a plant.

**Insects feed on plants in different ways**

**Pollinators**, bees, carry pollen from one plants to another, bees

**Predators** capture prey and include lady beetles, ground beetles, lacewings, and assassin bugs.

**Parasitoids** sometime lay their eggs on or in their host.



**Order Hemiptera, Lace bug**



**Lace bug damage**



**Class Arachnida, Order Acari, spindle galls on maple.**





**Order Hymenoptera, oak bullet gall**





**Order Lepidoptera, Forest tent larva or caterpillar**



**Order Coleoptera, Japanese beetle**