



# Entomology for Beginners

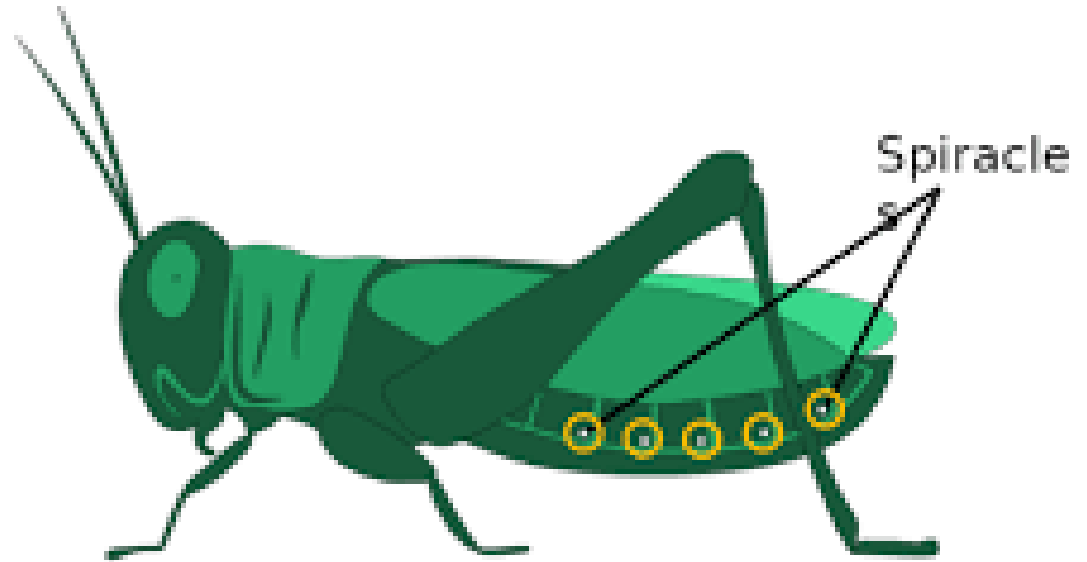
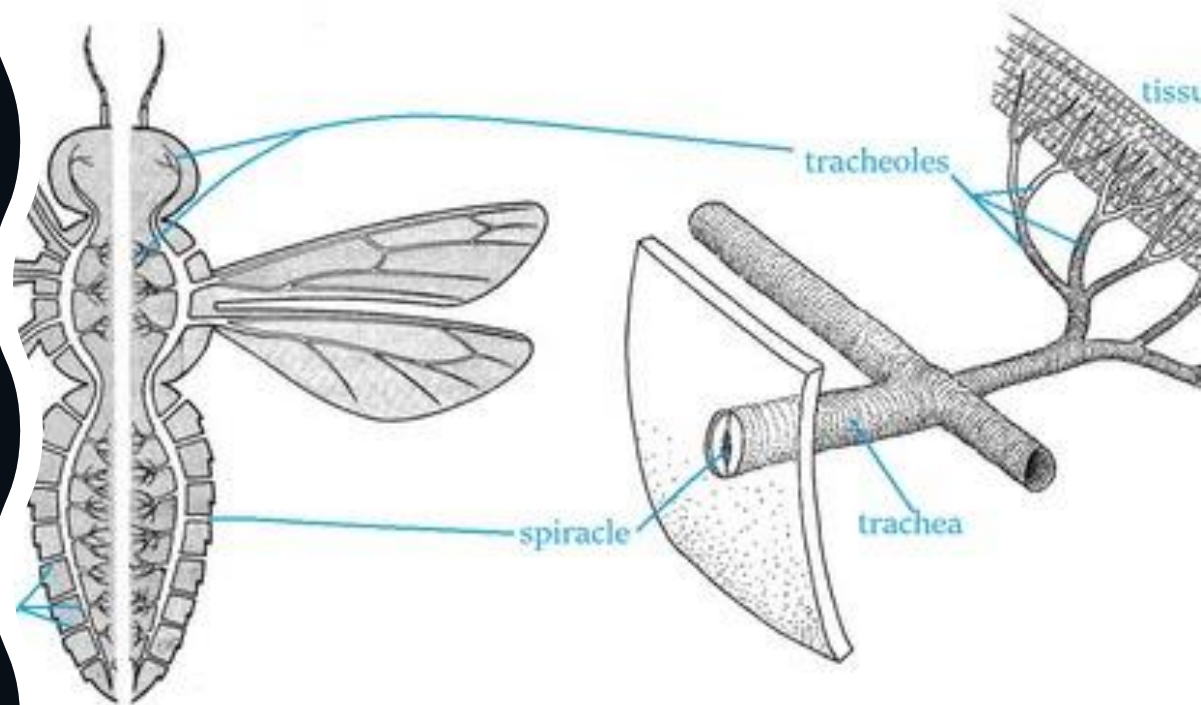
General Entomology ENT 100



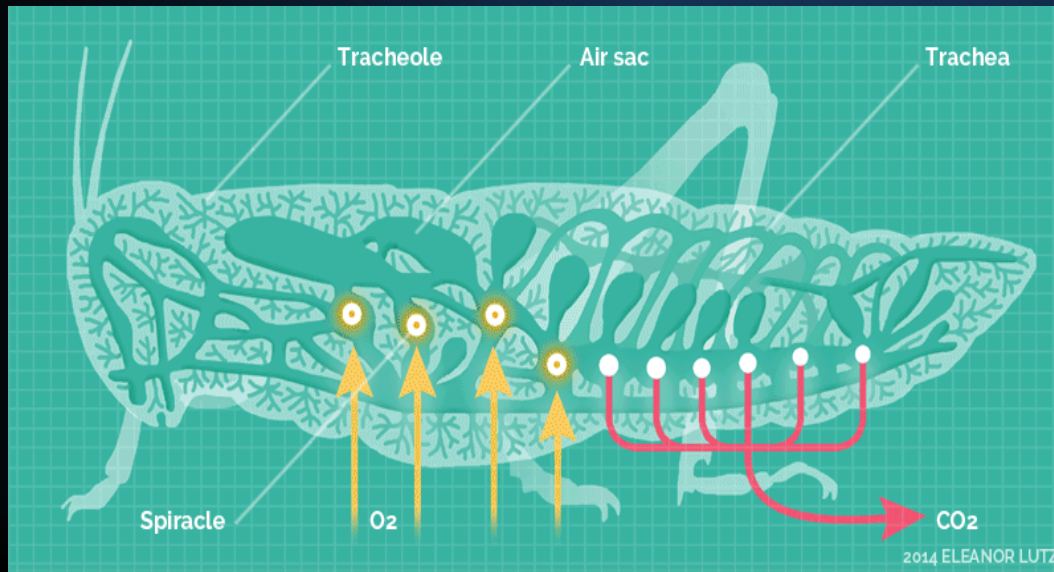
**How do Insects Breath?**

➤ Insects have no lungs.

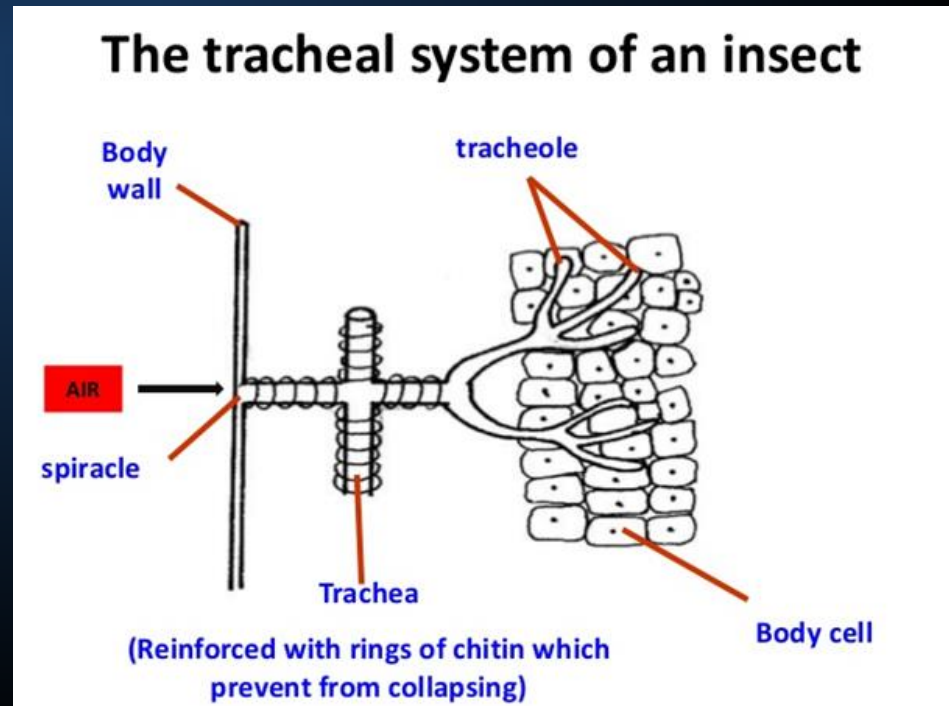
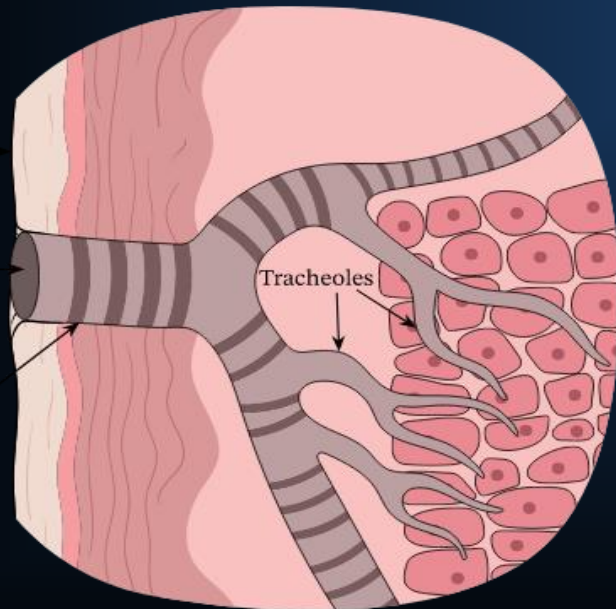
➤ The basic respiratory system is tracheas.



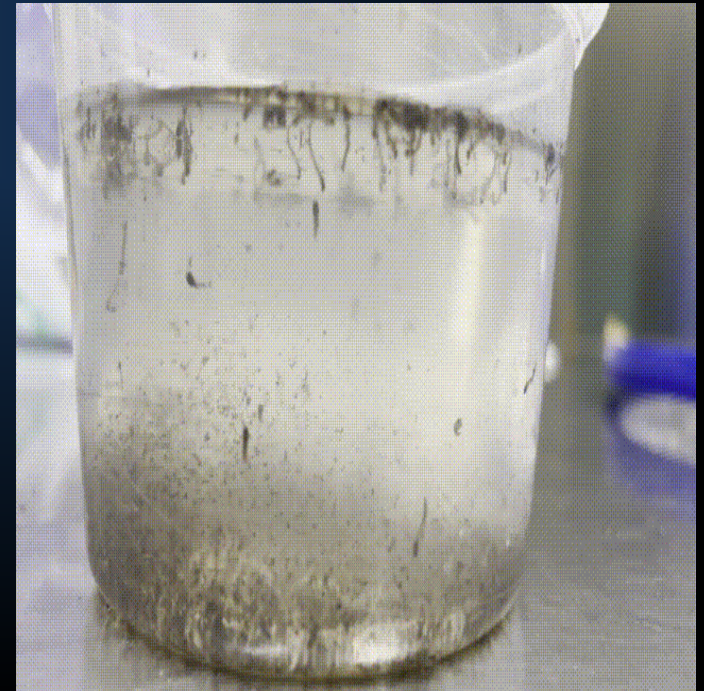
- Tracheas are tubes which end on both sides of the body as small breathing holes (spiracles).
- Tracheas are reinforced with chitin rings to prevent from collapsing.



- **Fine-branched parts of tracheae (tracheoles) penetrate the entire body, covering organs and even penetrating inside some cells.**
- **In insects, gas exchange takes place without a circulatory system.**



**Many insects living in water such as larvae and pupae of mosquitoes rise to the surface to take in air.**



**Water beetles take on an additional supply of air under their wing covers before they dive.**



**Some insects living in water, or tissues of plants, may breathe through the skin and gills.**





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**Insect Defenses against enemies**

The **quick escape** by **running** or **flying** is the primary mode of defense in many insects.



**Some insects simply **play dead** by falling to the ground motionless.**



# Spines and hairs may be effective mechanical deterrents against enemies



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Some insects have a "fracture line" that allows a leg to break off easily if it is caught.



- ✓ Many insects are equipped with **chemical weapons**.
- ✓ These chemicals may cause **repellency, pain, adhesion** or **irritation** to the enemies.



Many ants, bees, and wasps deliver **venom** to their enemies by means of a **stinger**.





**Some colors and patterns of insects assist a defensive function by offering a degree of protection from enemies. These patterns are known as **protective coloration****



# Protective coloration



# Protective coloration



# Protective coloration



We appreciated your presence during the study session, and we hope that we were able to benefit and interest you. We wish you all great success.



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