



JOHN DEERE

**4+**  
13252

JOHN DEERE SPECIAL EDITION

# Bug Jug

Live Insect Viewer

## What are bugs?

They're everywhere — in your house, in your garden, in the air, and under the ground. They've been here for hundreds of millions of years. There are millions of different kinds. Dinosaurs stepped on roaches, were bitten by spiders, and watched butterflies fly by.

In this booklet, we are mainly talking about insects, which are animals that have three main body segments, plus antennae, six legs and, very often, a set of wings. An entomologist (EN-TO-MOL-O-JIST) is a scientist who observes and studies insects. As you observe your bugs, you will be just like a real entomologist!

Insects can do a lot of things people wish they could do — like become invisible, fly, or walk on walls and ceilings. Entomologists have identified millions of kinds of bugs, and there are probably far more that have yet to be discovered. Starting on the back are pictures of just a few of the ones we know about.

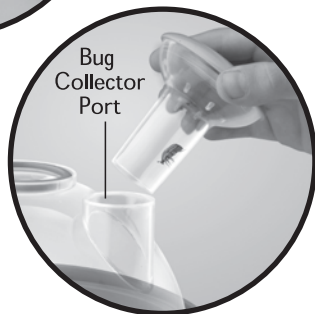
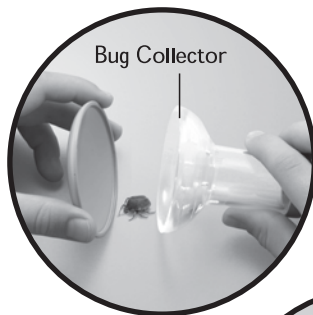
**NEVER** place Bug Jug in direct sun, or near any source of heat, such as an oven, heater vent or fireplace. This is especially important if your Bug Jug has an occupant, namely, a bug! Put Bug Jug on a stable surface that will not get shaken or bumped.

## Bug catching

Interesting bugs can be found almost anywhere — a field, a forest, a pond, your backyard. Some bugs are easy to see and some are a little harder. When catching a bug, move very slowly so you don't frighten it. Remember that you are much bigger — and scarier — to it than it is to you! This little booklet gives you information about some bugs that you may be able to find. Make sure to avoid the bugs shown below!

Use the Bug Collector to collect a bug and carry it back to Bug Jug. Find one bug at a time. When you've finished observing the bug in Bug Jug, return it to where you found it and then you can look for another.

- 1 Gently allow the bug to crawl into the Bug Collector from either the wide opening or the small opening. (Close the opening you are not using.) Sometimes it is helpful to use a twig or a leaf to gently help the bug in. When you have the bug inside, close the Bug Collector. (Remember to always treat bugs — and all other animals — gently and with respect.)
- 2 Make sure the Dome is snapped securely in place to the base. Now remove the Bug Collector Port Cap from the Dome and carefully remove the Cap from the Bug Collector. Slowly put the smaller end of the Bug Collector into the open hole of the Dome. You can also collect some leaves, twigs or grass from the area to put in Bug Jug.
- 3 When the bug has entered, remove the Bug Collector and replace the Bug Collector Port Cap.



## Amazing bug facts

A firefly is not really a fly. It is a beetle.

The digger wasp paralyzes a caterpillar, then lays an egg on top of it and buries them both in a hole. When the baby wasp hatches, it doesn't have to go out looking for a caterpillar to eat. (Yummy!)

Dragonflies can fly as fast as 60 miles per hour. (This makes them a little difficult to study, since in many states an entomologist can only go 55!)

Many insects mimic or copy other insects! For instance, a fly might be yellow and black like a hornet. This way its enemies leave it alone.

A spider is not really an insect. It is an arachnid.

Insects protect themselves by smelling bad, looking scary, rolling into a ball, fighting, running, jumping, flying away, hiding, or disguising themselves!

There are more kinds of beetles on earth than any other kind of animal.

Insects never close their eyes.

Cicadas live almost their entire 17-year lives underground (the longest lifespan of any known insect). Then these orange-winged, red-eyed flying insects emerge all at once for a wild month of breeding and egg-laying.

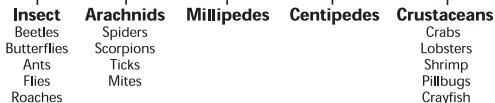
There are more kinds of insects than all other kinds of animals put together.

Insects were here before there were any dinosaurs.

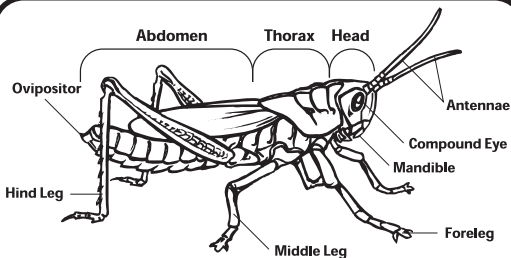
Some butterflies can fly hundreds of miles without resting.

# Bug family tree

## Arthropods



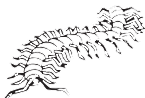
## Bug parts



## Danger! Please avoid us! We bite or sting!



**Black Widow**



**Centipede**



**Stink Bug**



**Wasp**



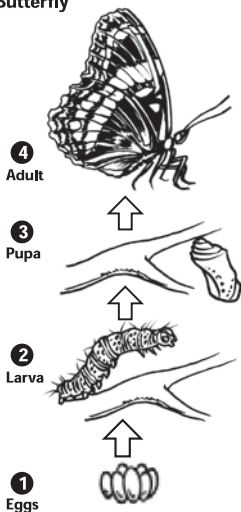
**Bee**



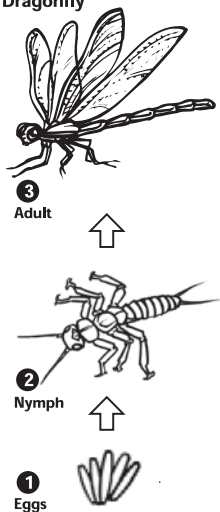
**Scorpion**

## Stages of life — How a bug grows

### Butterfly



### Dragonfly



Every insect starts life as an egg and then goes through three or four different stages. At each stage, its shape changes completely. Insects in different stages of life might live in places different from where their parents live, and eat different food from what their parents or children eat. When an animal's body goes through drastic changes like this, it is called metamorphosis (MET-A-MOR-FO-SIS). Usually, when we discuss the way a particular insect looks or acts, we are referring to its adult stage.

## Fascinating bugs to discover

**Grasshoppers** are long, thin and green. They can't run. Instead, they use their huge back legs for jumping. The males "sing" by rubbing their wings and legs together. Their ears are not on their heads, but on their front legs.



**Crickets** are "musical" too. In Japan, people keep them in cages, like birds, so they can hear them sing. The males often get into fights. Crickets barely know how to fly, so they either have to fight or escape their enemies by hiding. The field cricket sings all day and all night. As the weather gets colder, its singing gets slower. The mole cricket lives underground. It uses its front legs as digging tools. It goes so far underground that most people never see it. Camel crickets have no wings. They have arched bodies that make them look like camels. Usually they are not found in the open, like the field cricket, but rather under old logs or in caves. The **katydid** has a loud voice, especially on hot summer nights. Its song sounds a lot like "Katie-did-Katie-didn't." Katydid's grow large (up to 3 inches) with very long antennae, and are often bright green.



**Treehoppers** are strange-shaped insects that eat the sap of trees. Usually, they are the same color as the trees. Some of them are shaped like thorns, so they aren't noticed by enemies. They give out a sweet liquid called honeydew which is collected and eaten by ants.

It's not hard to see a **walking stick**. What's hard is to realize that you're actually looking at one! Walking Sticks look just like a part of a tree — a twig or a leaf — and that's how they hide from enemies. They have no wings, are very slender and can be as long as 12 inches.



The **mantis** is just like a walking stick except its front legs are longer and stronger so it can grab other insects for food. It looks a lot like it's praying.



**Fireflies** are a kind of beetle with lights that blink on and off to attract a mate. In some species the females have no wings and their bodies are long, like worms — so they're called glow worms. Fireflies make their rear ends light up by using something called bioluminescence (BI-O-LU-MI-NES-ENTS). They actually make a chemical in their bodies that glows.

**Dragonflies** and **damselflies** are very long (up to 5 inches) with two identical pairs of long, narrow wings. You can see through the wings. Dragonflies are often seen near water. When they are resting, they keep their wings straight out, like airplane wings. Damselflies have weaker wings and don't fly as fast. When resting, they hold their wings back or straight up. Dragonflies and damselflies don't use their long legs for walking, but for holding other insects they're trying to eat. Because they eat other insects, they have sharp mandibles, or jaws, instead of the sucking kind like houseflies have.



**Caterpillars** move slowly on their short legs, so they need to protect themselves by hiding all day. They hide in the ground or tie leaves together and wrap them all around their bodies. One kind of caterpillar moves by arching its back and then stretching out its body, moving about an inch at a time. This is why they are called inchworms. Caterpillars turn into moths or butterflies by metamorphosis.



**Butterflies** have large wings so they can move them very slowly and still fly. They alternate flapping and gliding, so they can fly a hundred miles without resting! Their wings are covered with a kind of dust that comes off on your fingers. But the “dust” is actually a lot of tiny scales that cover their bodies and wings. Butterflies don’t walk. They use their legs for holding onto surfaces. They hold their wings straight up when they are resting.



**Moths** can run — unlike butterflies. They also can fold back their wings against their bodies. The sphinx moth is large with narrow wings and is one of the fastest insects known. Its wings move so fast it can hover like a helicopter in front of a flower while sipping its nectar. Early in life, when it’s still a caterpillar, it raises up the front part of its body when it’s upset. That’s when it looks something like a sphinx — a half-human, half-lion creature of mythology.

Butterflies and moths both have very delicate wings. If touched, their wings can be greatly damaged. So please don’t try to catch a butterfly or moth for viewing in your Bug Jug.

**Beetles** live in out-of-the-way places like under rocks or bark. There must be lots of out-of-the-way places in the world, because there are more kinds of beetles than any other kind of animal. Throughout history, many people have enjoyed collecting different kinds of beetles. When you look at a beetle walking around, it’s easy to forget that it can fly, because its wings are folded against its body. If you put a click beetle on its back, it pretends to be dead, then suddenly flips over onto its feet, like a gymnast. The ladybird beetle or ladybug is considered a good friend to humans because it eats some of the insects that destroy our fruits, vegetables and flowers. Ladybugs are small and round, bright red or yellow, with black spots on their backs.



The **cockroach** is a close relative of the grasshopper and cricket, but it isn’t nearly as popular. Why? Because some cockroaches like to live indoors, including people’s houses. They can easily slip their flat bodies into cracks in the walls and floor where they sleep during the day, waiting for nighttime when they slip back out in search of food. Cockroaches run very fast. They have been around for more than 350 million years. The species has survived longer than most other animals we know about.

**Spiders** are found in most of the places where you find other bugs. Many people think they are insects, but they are actually arachnids. They are different from insects in many ways. They have eight legs instead of six. They have two body sections instead of three. And they don’t have wings or antennae. Some weave elaborate webs that can trap small insects for food. The wolf spider got its name because it hunts for insects instead of trapping them in a web.





## **Want to learn more?**

Speaking of web, if you want to learn more about the fascinating world of bugs, try the internet. It's got some very cool web sites about insects, spiders, and other animals. Your school or public library also has some great books about bugs!

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**WARNING:**  
**CHOKING HAZARD - Small parts.**  
**Not for children under 3 years.**

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**KEEP THESE INSTRUCTIONS  
FOR FUTURE REFERENCE — DO NOT DISCARD**

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