

Surprising Science for Kids:



Interesting Insects

KIT-555

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Welcome to Surprising Science for Kids: Interesting Insects Grades 2-5

Your **Surprising Science for Kids: Interesting Insects** kit includes almost everything you need to perform nine hands-on experiments and dynamic demonstrations related to insects. The perfect starting point for aspiring entomologists!



Included in this kit:

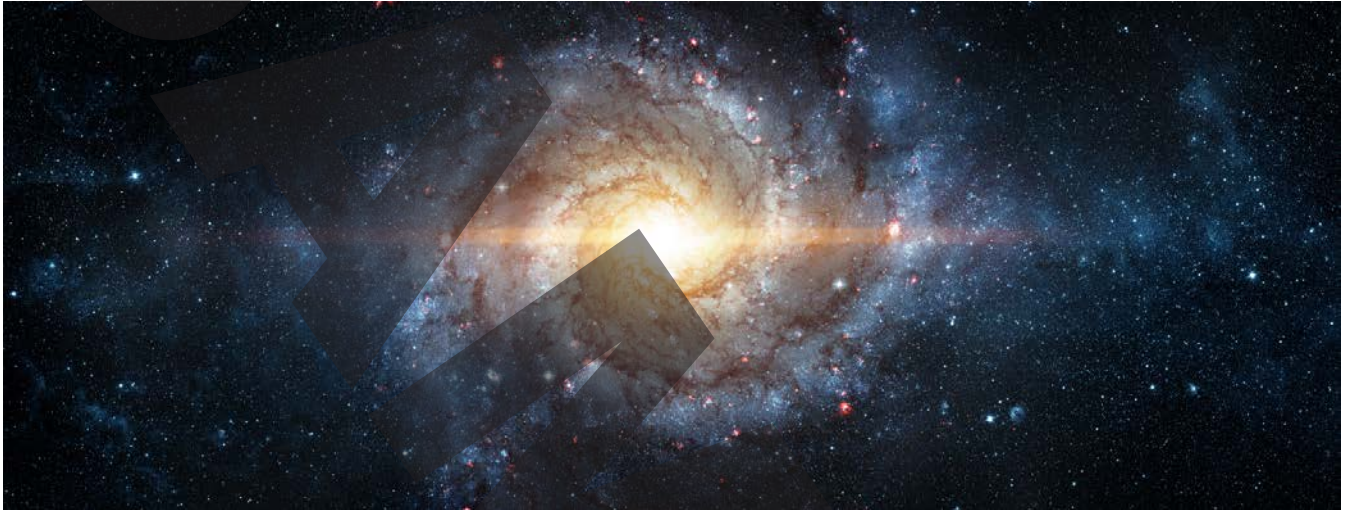
- 8 Creepy Crawlers
- 4 Types of Pasta
- Balloon
- Binder Clip
- Newspaper
- Plastic Spoon
- Flour
- Bowl
- Green Card Stock
- Wooden Skewer
- Colored Pipe Cleaner
- Colored Pom-Pom
- 2 Googly Eyes
- Butterfly Template (white)
- 1 Thin Plastic Straw
- 1 Wide Plastic Straw
- Glue
- Edible Insects
- Hand Lens
- Forceps
- Sugar Packet
- Bug Viewer
- Gloves
- Hexagon Template (yellow)
- Beeswax Sheet
- Wick

You will also need:

- Water
- Scissors
- Clear Tape
- Colored Pencils or Markers
- Hole Punch

Creepy Critters

For centuries, scientists have been studying our universe to name and classify everything in it. For example, all the things in the universe can be divided into **living** (or having once lived) and **nonliving** (never having lived). The universe is a really big place. So far, except for Earth, most of the things that have been discovered fall into the category of nonliving.



In the living things category here on Earth, we have many organisms like fish, dinosaurs, trees, mushrooms, and even germs. In the nonliving things category, we have plenty of examples such as rocks, dirt, water, air, and sunshine.

To identify living things, scientists group them based on their **characteristics** or traits. These categories start out very large, having a lot of organisms pooled together, and then the groups become smaller and smaller as the characteristics of the organisms get more and more specific.

When we look at living things, scientists break them into categories called **kingdoms**. There are five different kingdoms. One of them is plants and another is animals.

Which kingdom do you think a daisy would be in?

How about humans?

Creepy Critters

continued

Can you name three other living things that might belong in the plant kingdom?

1. _____
2. _____
3. _____

There are so many, but some correct answers could include poison ivy, oak trees, grass, and carrots.

Can you name three other living things that might belong in the animal kingdom?

1. _____
2. _____
3. _____

Again, there are more animals than we could count in a day, but correct answers could include cows, snakes, crabs, and moths.

Obviously cows, snakes, crabs, and moths have some big differences. That's why the living things in the animal kingdom are divided up even more. Each and every type of animal eventually winds up with its own specific name, so one animal is not confused with another. After all, a dog and a wolf are pretty similar, but they are considered separate species because of their differences.

Since this kit is all about creepy crawlers, we are going to be learning specifically about animals that fall into the category called **arthropods**. Arthropod means "jointed feet." These animals can be found in almost every environment—from the depths of the oceans to the sandy deserts and every place in between. As a matter of fact, arthropods make up the largest group of animals on Earth. Three out of every four (75%) animals on Earth are arthropods!

The arthropod family contains animals with very specific traits. Unlike humans, where our skeletal system (our bones) is inside our bodies, all arthropods have an **exoskeleton**. This means their structure and protection are on the outside of their bodies. The exoskeleton acts like a suit of armor. This makes sense because they tend to live in rough environments and have plenty of natural enemies. Because they have firm exoskeletons, arthropods have to shed their exoskeleton in order to grow. This process is called **molting**.

Lobsters and crabs fall into the category of arthropods, but so do many other animals like ants, centipedes, spiders, and scorpions. Arthropods also have **segmented bodies** which means they have different distinct body parts and are not one big blob. Arthropods also have **jointed appendages** or legs that bend like hinges.



Activity 1: Identify the Insects

Materials:

- 8 Creepy Crawlers

You have eight plastic crawlers. Six of them are insects. Two are arthropods but not insects. Your job is to identify which is which.

Insects		Non-Insects	
1.		1.	
2.		2.	
3.			
4.			
5.			
6.			

INSECTS

NON-INSECTS

Activity 2: The Circle of Life

All living things go through a life cycle. They are all born, grow, reproduce, and eventually they die. Unlike most animals you see from day to day, most insects go through a process called **metamorphosis** as they grow and develop. Metamorphosis means change.

Insects that undergo a **complete metamorphosis** pass through four distinct phases: egg, larva, pupa, and adult. During each stage, the insect looks nothing like it did in an earlier stage of its development. For example, the adult stage of a butterfly does not resemble the larval stage (caterpillar) at all.

Most of the world's insect species go through a complete metamorphosis including ladybugs, fleas, butterflies, bees, and ants.

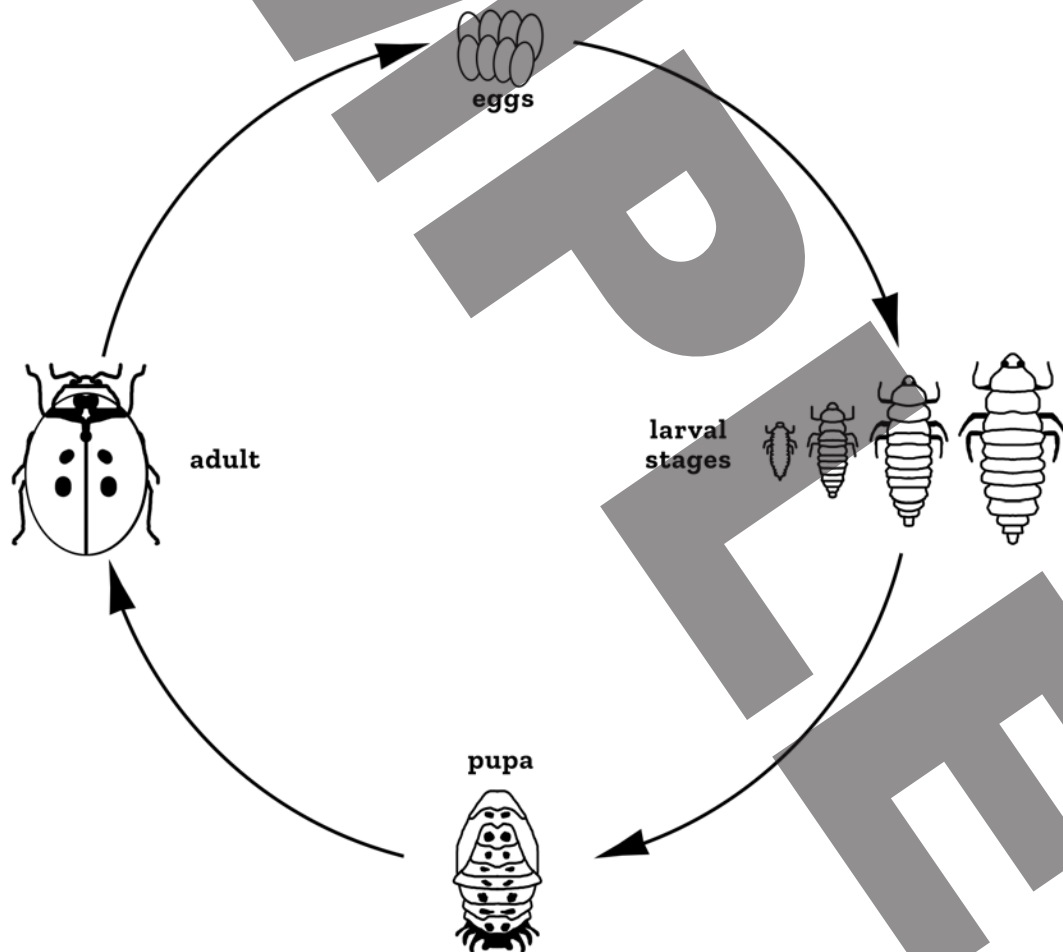
Egg stage – develop until it hatches

Larval stage – eat, molt, grow, eat, molt, grow, eat, molt, grow!!!

Pupal stage – inactive or transitional stage

Adult stage – reproductive stage

The Complete Metamorphosis of a Ladybug

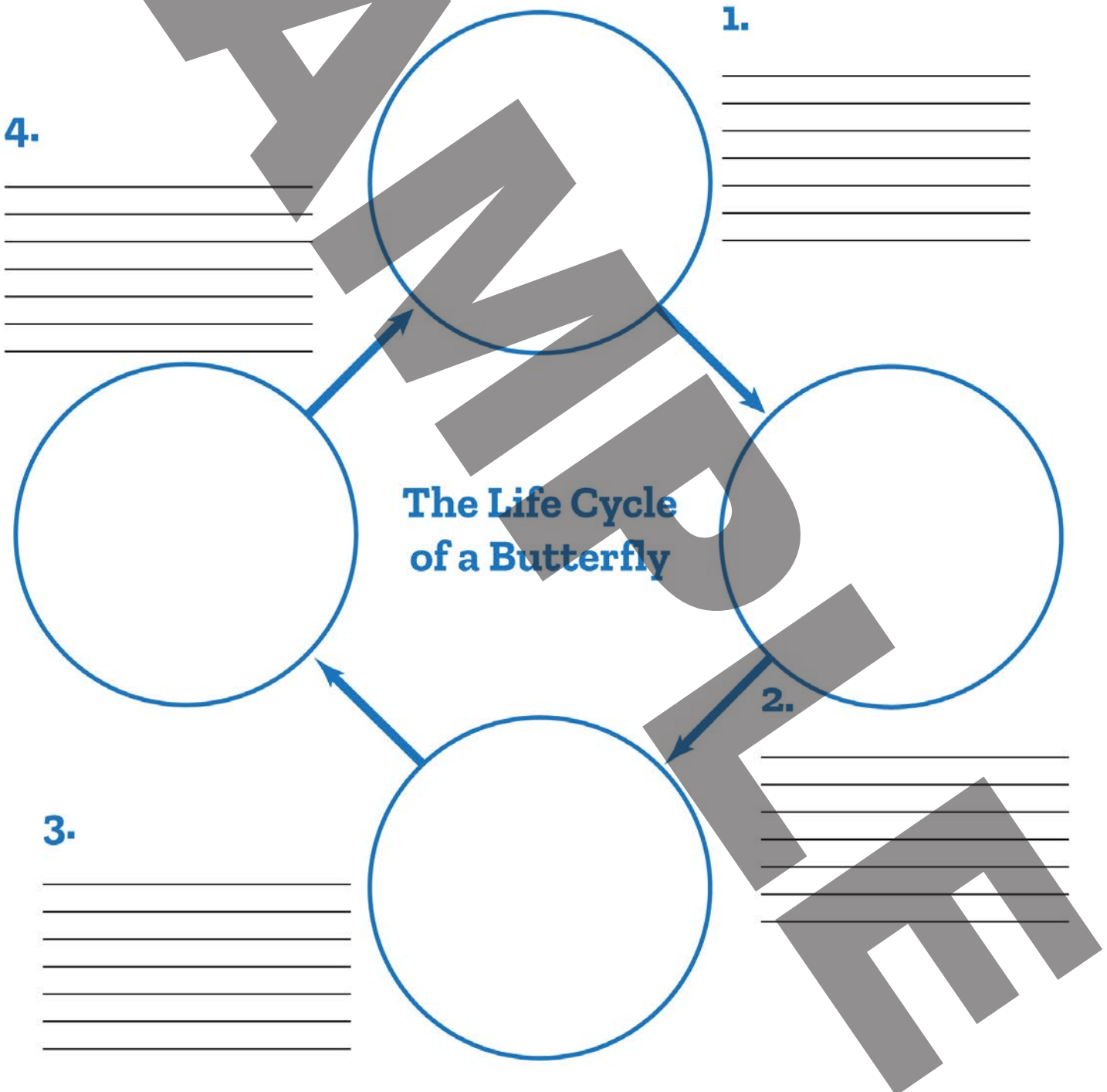


Activity 2: The Circle of Life

continued

Make your own life cycle poster!

Identify which pasta shape represents each stage in a butterfly's life cycle and glue it where it belongs. Include information about each stage in the space provided below.



Activity 3: Tight Fit

As an immature insect continues to grow, it forms a new, flexible skeleton beneath the existing exoskeleton. Once it's ready to molt, the insect expands its body until the existing skin splits. Then it simply walks out of its old exoskeleton.

Materials:

- Balloon
- Binder Clip
- Flour
- Bowl
- Newspaper Strips
- Plastic Spoon
- Water (not included)

In this activity you are going to simulate an insect's molting process.

1. Start by mixing the flour with $\frac{1}{2}$ cup of water in a bowl, and stir with spoon until all the lumps are out of the mixture and it has a pasty consistency. If it's too thick, add more water a little at a time.
2. Tear your newspaper into 1 inch x 6 inch strips.
3. Inflate the balloon about halfway, and use the binder clip to keep the air from escaping from the balloon's opening. Set your balloon aside for a few minutes.
4. Taking one strip at a time, submerge your newspaper in the paste you made, and once the newspaper strip is fully coated, lift it from the bowl. Using your thumb and pointer finger from your other hand, slide it down the newspaper strip, removing the excess paste. Staying away from the balloon's opening, smooth the strip onto the balloon.
5. Continue until the entire balloon (except the opening) has one layer of paper covering it. You can rip the strips into smaller pieces to cover smaller spots.
6. Set the balloon aside until the strips are fully dry.
7. Remove the clip from the mouth of the balloon. Let a little air out of the balloon, just so the balloon separates from the paper shell or old exoskeleton.
8. Blow into the balloon nice and hard so it strains against the papier-mâché shell you just made until the shell splits.
9. Imagine how it feels when you put on a pair of pants that you wore when you were much younger. By expanding your belly, you could rip the waistband if the material isn't too thick. If your pants were an exoskeleton, you could shed them each time you grow!



Activity 4: Helpful vs. Harmful Critters

Some insects are considered pests while others can be helpful. It's not unusual for insects to be both, depending upon which stage of their life cycle they are in. For example, the larva of the butterfly (caterpillar) can destroy plants, but the adult butterfly will pollinate flowers.

Other insects can be considered helpful or harmful depending upon where they live. For example, carpenter ants are good when they live in the forest and eat the dead wood, which cleans up the fallen trees, but they are harmful if they are eating moist wood in your home!

In what ways can insects be helpful? Harmful?

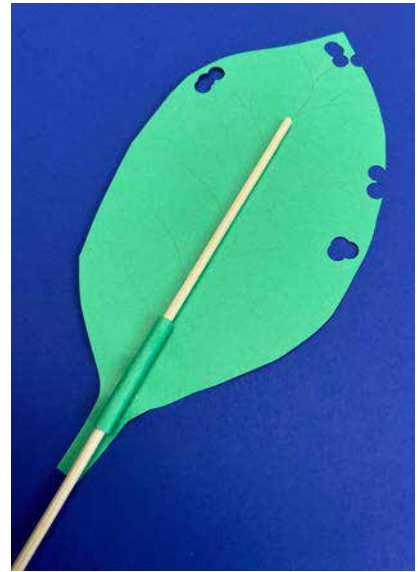
Read about the insects on the next pages and decide if they are HELPFUL or HARMFUL... or both! Write your answer on the chart below. If an insect is BOTH, add it to both columns.

HELPFUL	HARMFUL
<ul style="list-style-type: none"> ● Pollinates flowers ● Eat other harmful insects ● Clean up wastes (decomposers) ● Aerate the soil <p>These insects are HELPFUL:</p> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/>	<ul style="list-style-type: none"> ● Spread disease ● Destroy crops ● Destroy property ● Sting or bite humans <p>These insects are HARMFUL:</p> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/>

Activity 5: Make Your Own Leaf Crawler

continued

- 8.** Once your tube is sealed, add another thin line of glue down the center, and press it onto the base of your leaf as shown.
 - 9.** Now add a spot of glue to the top of your wooden skewer. Glue one edge of the pipe cleaner to the top of your skewer.
 - 10.** Put the other end of the skewer into the tube you created. Then glue the other edge of the pipe cleaner to the part of the tube where the skewer was inserted. Your pipe cleaner should now be curved (like the letter C).
 - 11.** On the top area of the pipe cleaner (nearest to the top of your leaf), glue a colored pom-pom, for the head, and two googly eyes.
 - 12.** Now you're ready to go! Simply slide the wooden skewer up and down. Your caterpillar will crawl along the leaf.
- OPTIONAL:** If you like, you can use a hole punch to show areas of the leaf where your caterpillar has been munching!



Activity 6: Butterfly Symmetry

When you think of butterflies, you probably think of beautiful, colorful creatures that flutter here and there during the warmer months. Adult butterflies are very helpful in pollinating flowers, which is important to the plants' survival.

It may be hard to imagine, but a butterfly's colors are actually significant. Some butterflies have certain colored wings as a way to **camouflage**, which means to blend in with their surroundings. Others are colored in a specific way to warn predators that they don't taste good. Still others actually **mimic**, or copy, those colors that warn predators that they don't taste good, even though they do!

Butterflies' wings are covered with tiny, overlapping scales, and each scale is colored. Butterflies and moths are in the category called *Lepidoptera* which means "scaled wings."

Butterflies and moths are great examples of insects that show **bilateral symmetry**. This means the patterns on their wings are the same on both sides—as if they were face-to-face or seen in a mirror. They have a single line of symmetry down the middle of their body.



Do you see the symmetry in this Monarch butterfly?



Activity 7: You Want Me to Eat WHAT?!

Materials:

- Edible Insects

Most Americans think of eating insects as rather unappealing, but in many parts of the world, insects are a major source of food. As it turns out, around 80% of the world's population include insects as a main part of their diet. By weight, termites, grasshoppers, caterpillars, weevils, and house flies are better sources of protein than beef, chicken, pork, or lamb—and they are low in cholesterol and fat!



Another reason many cultures include insects in their diet is that it's good for the environment. When we consider insect farming versus livestock farming, it's clear that insects are much better. Unlike animals like cows and pigs, insects don't need much room to grow, and they certainly don't need nearly as much food or water. In addition, they only release a fraction of the greenhouse gasses (the gasses produced by animals that damage the ozone layer of our atmosphere) that pigs, cows, and chickens do.

Of course, just like you would never go out and eat a live chicken that you found wandering around, you wouldn't want to eat an insect that you found outside in nature. These days however, plenty of food-grade insects are available to eat. Included in your kit is a package of edible insects. Yes, these are real and can be consumed if you're brave enough! These insects are flavored. As you can imagine, because insects have an exoskeleton, they are crunchy like popcorn or Rice Krispies!

Offer one to your parents or a sibling! Bring them to school and see if your teacher is willing to try one.



Activity 9: Busy as a Bee

Honey bees are fascinating insects. They are social insects that work together and live in hives. The bees in each hive are divided into three types.

The queen is in charge of the hive. Her job is to lay eggs to keep the hive going. A queen bee can lay upwards of 2,000 eggs each day!

The worker bees are all female. It's their job to find the food for the hive. They are also responsible for building, repairing, and protecting the hive. They also feed and care for the larvae. The worker bees live for only five or six weeks and are sisters with every other worker in the hive.

The queen bee can live up to five years. Once she dies, the worker bees will make a new queen by feeding a special food called "royal jelly" to a newly-hatched larva. This special food allows the larva to develop into a fertile (able to reproduce) queen bee.

The remaining bees in the hive are called drones. They are males, and their only job is to mate with a queen bee from another colony. The queen is able to decide which of her eggs will turn into drones and which will turn into worker bees. Drones develop from unfertilized eggs. The queen produces drones in the spring, summer, and fall. During the winter, because they are no longer useful, the drones are kicked out of the hive. Without food or the protection of the hive, they die.

The queen lays her eggs in a wax cell that is hexagonal (six-sided) in shape. The cells are built right next to one another, and form a honeycomb. Once the egg hatches, the workers feed the larvae a diet of honey, pollen, and royal jelly until they are ready to spin a cocoon and enter the pupa stage. Once they emerge from their cell, they are ready to begin their adult life, which is committed to continuing the species by their varied jobs.

Here is a neat video that will give you more information about honey bees:

<https://www.youtube.com/watch?v=9ePic3dtykk>

