

# THE VIVARIUM

## Supplemental Lesson Plan

**Vivarium:** n. an enclosure, container, or structure adapted or prepared for keeping animals under seminatural conditions for observation or study.



The Vivarium is the story of a young person coping with the loss of a close friend by turning to a hobby of collecting and researching insects. However, these complex creatures can't flourish in the captivity of a glass jar and the young Bug Collector struggles to accept that keeping them isn't the same as keeping them safe.

## MAIN CHARACTERS



The Bug Collector



The Bug Collector's Friend



The Mantis

# DISCUSSION QUESTIONS

- 1) Were you able to understand the story even though no dialogue was used?
- 2) What were other methods that helped you understand the story? What things were confusing?
- 3) What happened to the Praying Mantis? Was it a good idea to keep it inside a jar?
- 4) What do you think happened to the Bug Collector's friend? Did she move away? Did she die? Did she turn into the Praying Mantis?
- 5) Does the Bug Collector's experience with the Mantis change how you would interact with creatures in the wild?

# PRAYING MANTS

**Scientific Name:** Mantis Religiosa

**Class:** Insecta

**Diet:** Carnivorous- Mantids will eat moths, crickets, grasshoppers, flies, and other insects. They have also been known to eat their own kind. Some larger mantids can even catch and eat lizards, frogs, and birds!

**Average Lifespan in the Wild:** 1 year

**Size:** 5 to 6 inches long

**Habitat:** The Praying Mantis can thrive in almost every habitat, but they prefer tropical homes over temperate (so the Pacific Northwest would not be their favorite habitat). They do not live in tundra and boreal (climate zone in the far north) regions.

**Reproduction:** The female will deposit her eggs on a twig or stem in the fall and protect them with a Styro-foam-like substance she produces. This protective case is called an ootheca. The offspring will develop over the winter and hatch when warm weather returns.



**Fun Fact:** Mantids can turn their heads 180 degrees (that's a full half-turn!) to survey their surroundings. Humans only have a range of about 90 degrees.

# MONARCH

# BUTTERFLIES

**Scientific Name:** Danaus Plexippus

**Class:** Insecta

**Diet:** Herbivore- Monarchs primarily eat milkweed. The plant itself is toxic, but Monarchs have evolved to tolerate it. They store the toxins in their bodies to make themselves poisonous to predators. As with many animals in the wild, their colorful patterning warns predators that they are poisonous.

**Average Lifespan in the Wild:** 2 to 6 weeks, except for the generation born at the end of summer. These will live up to 8 months in order to return to their wintering grounds.

**Size:** Wingspan of 3 to 4 inches long

**Habitat:** Monarchs are native to North and South America, but they have spread to other warm places where milkweed grows. Monarchs migrate seasonally, ranging from central Mexico to the northern U.S. and Canada. Some migrate up to 3,000 miles!



**Fun Fact:** Monarchs make their long journey by using the sun to stay their course, but they also have a magnetic compass to help them navigate on cloudy days.

**Reproduction:** The female lays each of her eggs individually on the leaf of a milkweed plant. Typically, she will lay 300 to 500 eggs over the 2- to 5-week period. After a few days the eggs hatch into larvae (also known as the caterpillar). The caterpillars eat heavily for about 2 weeks and then spin a protective case around themselves before entering the pupa stage, or chrysalis\*. About 2 weeks later they will emerge as a fully formed, black and orange, adult butterfly.

\*Note: Moth caterpillars spin a cocoon, which is an external structure that protects them during the pupa stage. A chrysalis is a hard exoskeleton that protects a developing butterfly.



# RHINOCEROS BEETLES



**Scientific Name:** Dynastinae

**Class:** Insecta

**Diet:** Herbivorous- Rhinoceros Beetle larvae eat decaying plant matter. Adults eat fruit, nectar, and sap.

**Average Lifespan in the Wild:** 3 to 6 months

**Size:** Up to 6 inches

**Habitat:** Found on every continent except Antarctica. In the United States they live in Arizona to Nebraska and eastward.

**Reproduction:** The horns of the male Rhinoceros Beetle are used to drive other males away from the female during mating rituals. Females lay about 50 eggs, which hatch into larvae. After several molts, they eventually reach their adult form.

**Fun Fact:** Adults of some species can lift objects 850 times their weight. That would be like a human lifting 9 fully grown male elephants!



# SCORPIONS

**Scientific Name:** Scorpiones

**Class:** Arachnida

**Diet:** Carnivorous- Scorpions typically eat insects, but their diet can be extremely variable. When food is scarce, they can slow their metabolism, enabling them to use less oxygen and live off as little as 1 insect a year.

**Average Lifespan in the Wild:** 3 to 8 years

**Size:** 2 to 8 inches

**Habitat:** Scorpions are commonly thought of as desert dwellers, but they can also live in Brazilian forests, British Columbia, North Carolina, and even the Himalayas. They are burrowing animals, so they prefer areas with loose soil.



**Reproduction:** Unlike insects, which lay eggs, scorpions give live birth. The female will give birth to between 2 and 100 babies. These babies have a soft exoskeleton. For protection, the babies will crawl onto their mother's back for several weeks until their exoskeleton hardens enough to protect them.

**Fun Fact:** All scorpions fluoresce (glow) under ultraviolet light, such as an electric blacklight or natural moonlight. Scientists are still not entirely sure what purpose this serves.



# JUMPING SPIDERS



**Class:** Arachnida

**Diet:** Carnivorous- Jumping Spiders eat insects such as crickets, moths, flies, grasshoppers, etc. They do not catch their prey using webs like most spiders. Instead they ambush their prey by leaping on top of them.

**Average Lifespan in the**

**Wild:** 1 year

**Size:** 4 to 18 millimeters

**Habitat:** There are many types of Jumping Spider and they live all over. Most often they can be found in tropical forests or dense vegetation areas with a temperate climate.

**Reproduction:** Male Jumping Spiders enact an elaborate dance in order to attract the female. He will display the colored or iridescent parts of his body and perform a series of sliding, vibrational, or zigzag movements. If the female is receptive to his dance, the two will mate. When the female Jumping Spider is ready to lay her eggs, she will build a nest. The nest is about 1.5 inches long and contains 2 envelopes. The inner one contains the eggs and the second houses the adult spider, where she will stay to guard her eggs until she dies.

**Fun Fact:** Jumping Spiders can jump 50 times their body length.



# MINIS



**Scientific Name:** Lampyridae

**Class:** Insecta

**Diet:** Omnivorous- Larvae eat snails, worms, and slugs, which they inject with a numbing chemical to disable. Adults eat other fireflies, nectar, and pollen. Though their adult lifespan is so short some do not eat anything.

**Average Lifespan in the Wild:** Adults live only a couple of weeks, but from egg to adult they live for about 1 year.

**Size:** 5 millimeters to 1 inch

**Habitat:** Found in temperate and tropical regions on every continent except Antarctica. In the United States they live in parks, meadows, gardens, and woodland edges.

**Reproduction:** Adult Fireflies only live long enough to reproduce. The male will use his glow or pheromones (a chemical substance that influences behavior) to attract the female. The female will lay her eggs in moist soil, dead logs, or moss. After about 2 weeks the eggs will hatch and larvae emerge. They will remain as larvae for up to 3 years, but generally will remain in this state for a few months. They pupate in late spring underground and emerge a few weeks later as adults.



**Fun Fact:** The bioluminescent glow of Fireflies is almost 100 percent efficient, meaning little energy is wasted to produce their light. By contrast, an incandescent lightbulb is only 10 percent efficient, losing 90 percent of its energy as heat.

# FACT SHEET QUESTIONS

- 1) What is the difference between a carnivore, omnivore, and herbivore?
- 2) What is the case that protects the Praying Mantis's eggs called?
- 3) Why are Monarch Butterflies such bright colors?
- 4) What does fluoresce mean? Was there another word used in this packet that had a similar meaning?
- 5) What was something new you learned about bugs?
- 6) If you had a garden, which animal would you be most excited to find in it? Why?

# OBSERVATION ACTIVITY

As we learned from the Bug Collector's experience in The Vivarium, many creatures don't do well in captivity. You can also learn a lot more about an animal's behavior by observing how it acts in its natural environment. Here is an activity you can do to learn about the creatures who live in the world around you.



## INSTRUCTIONS

Find or create a journal that can serve as your Observer's Journal. Choose a spot near your home. It can be your backyard, a nearby park, the sidewalk outside, or any natural area. Visit this spot once a day for one week straight. Time yourself for ten minutes. In those ten minutes write down everything you notice about animals you see or hear. Do you see a worm crawling across the sidewalk? A slug munching on some lettuce? How many different bird calls can you hear?

After your week is over, look through your notes and see how many different animals you observed. Did you notice any patterns about how animals interact? Were you able to catch any of these creatures finding food? Did you see any of them building homes?



# REFERENCES AND RESOURCES

<https://www.nationalgeographic.com/animals/invertebrates/p/praying-mantis/>

<https://www.nationalgeographic.com/science/phenomena/2014/09/09/rhino-beetle-weapons-match-their-fighting-styles/>

<https://www.nationalgeographic.com/animals/invertebrates/m/monarch-butterfly/>

<https://www.nationalgeographic.com/animals/invertebrates/group/fireflies/>

<https://www.nationalgeographic.com/animals/invertebrates/group/scorpions/>

<https://www.worldwildlife.org/species/monarch-butterfly>

<https://www.popsi.com/jumping-spiders-dance-moves/>

[http://bioweb.uwlax.edu/bio203/2011/smith\\_ash2/reproduction.htm](http://bioweb.uwlax.edu/bio203/2011/smith_ash2/reproduction.htm)

<https://www.nwf.org/Educational-Resources/Wildlife-Guide/Invertebrates/Fireflies>

<https://www.nwf.org/Educational-Resources/Wildlife-Guide/Invertebrates/Monarch-Butterfly>

<https://www.nwf.org/Educational-Resources/Wildlife-Guide/Invertebrates/Rhinoceros-Beetles>

<https://www.kidsdiscover.com/quick-reads/makes-scorpions-glow-ultraviolet-light/>