

Monarchs

For

Students & Teachers

Educational Resource Packet



Woodlands Nature Station
Land Between the Lakes
Golden Pond, KY 42211

Monarch Fun Facts check text boxes

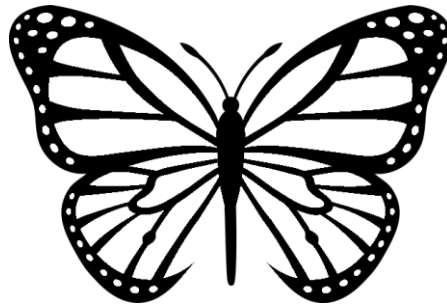
Female Monarch Butterflies
lay 100 to 300 eggs!

Monarchs cannot fly in the
rain. The water makes
their wings too heavy.

Monarch Butterflies live
throughout southern Canada
all the way to northern South
America!

To track butterflies'
movements, people place
stickers on their wings to
identify them!

Their orange and black
color warns animals that
they don't taste good
and could make them
sick!



It takes about a month for a
Monarch Butterfly to go from
egg to full grown adult butterfly.

Monarch Butterflies are poisonous
to eat because they eat milkweed
plants which contain toxic
chemicals.

Monarchs born in the late
summer/early fall go on an
amazing migration to Mexico.
Over 2,000 miles total!

Monarchs can flap their wings
about 400 times a minute, which is
actually quite slow for a butterfly.



Migrating Monarchs can fly up to
200 miles a day!



Butterflies taste with their feet
and hear with their antennae.



As a caterpillar, the Monarch will
gain over 2,000 times its original
weight!



A Monarch caterpillar **can** devour
an entire milkweed leaf in 4
minutes!



When Monarchs migrate they use
hot rising air to glide, much like
migrating birds do.

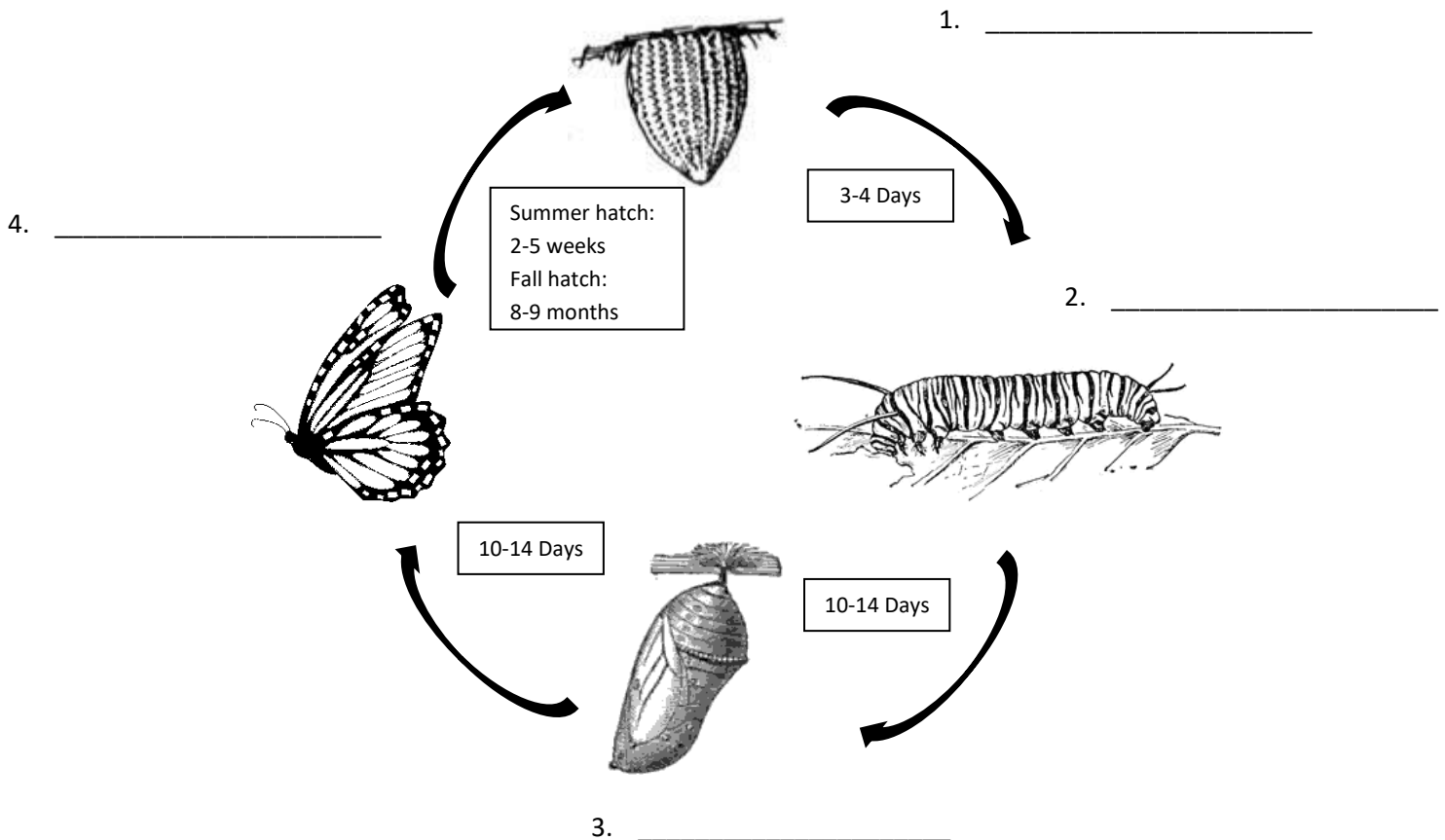


Monarchs have a copycat called a
Viceroy. The Viceroy benefits from
looking like a Monarch because its
predators will think it's poisonous.

Monarch Life Cycle

Monarch Butterflies go through a special change during their lives. This change is called **metamorphosis**. All insects go through **metamorphosis**, but not all go through the same type. There are two types of **metamorphosis** that insects go through: **complete** and **incomplete**. Monarch Butterflies go through **complete metamorphosis**. In **complete metamorphosis** the young insect looks completely different than the adult insect. They also go through four distinct stages: **egg**, **larva**, **pupa**, and **adult**. In Monarchs they go through a drastic change from caterpillar to butterfly in their **chrysalis**.

Below is a diagram of the life cycle of the Monarch Butterfly. Use the word bank to fill in the blanks to label the part of the life cycle that is being depicted.



Word Bank

Chrysalis (Pupa) Butterfly (Adult) Caterpillar (Larva) Egg

Metamorphosis Game

Here's a fun game to play that will help you learn about the Monarch's life cycle. You'll need at least three people to play the game, but it works best with 4 or more.

Explain to the students the four life cycle stages of the Monarch Butterfly. Each stage will be represented by the following movements:

Egg: crouched down near the ground holding knees

Caterpillar (Larva): crouched near the ground with hands out with fingers wiggling like a caterpillar's legs.

Chrysalis (Pupa): crouched near the ground with hands held over head with palms together.

Butterfly: flap arms like wings while standing up.

1. Make sure students are familiar with the movements associated with each stage of the life cycle.
2. Review the rules of rock-paper-scissors with students.
3. Students start the game as eggs.
4. Students partner up and challenge one another to one round of rock-paper-scissors. The winner will advance into the next stage and search for a new partner in the same new life stage as them. Eggs challenge eggs, larva challenge larva, etc.
5. The loser stays in the same life stage and has to challenge another partner in the same life stage as them until they win and advance to the next life stage.
6. Play continues until most of the students have reached the butterfly stage.

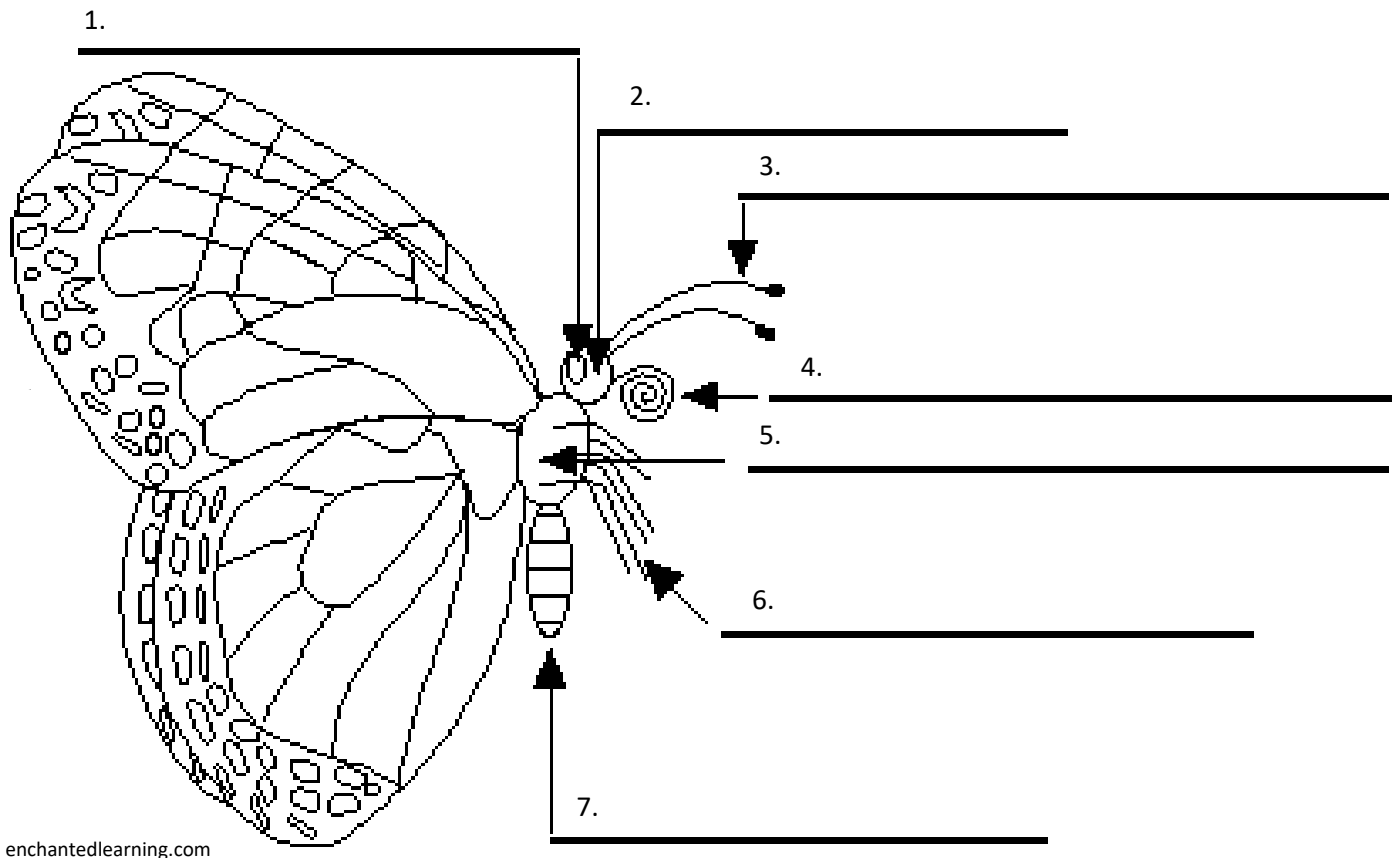
Activity Discussion Questions:

1. Did all of the students make it to the next life stage on the first try? Why not?
 - a. How does this relate to real life?
 - b. What are some threats that a butterfly faces in each stage in the real world?
2. What would happen if every egg made it to a butterfly?
 - a. Positive and negative effects?



Breaking Down the Butterfly

The Monarch Butterfly is a member of the **insect** class. Because it is classified as an **insect** the Monarch has certain **characteristics** that other insects have as well. All **insects** have **six legs**, **two antennae**, **compound eyes**, and three body segments: **head**, **thorax**, and **abdomen**. Look at the diagram of the butterfly below and label the different parts of the Monarch using the words from the word bank.



Word Bank

Abdomen

Proboscis

Compound Eye

Antennae

Thorax

Head

Legs

Monarch Menu

Monarch caterpillars and butterflies have very specific dietary needs. In other words, they're picky eaters! Their picky eating, however, is also a way to protect them from predators. As caterpillars, Monarchs will only eat the leaves of a **milkweed** plant. These are special plants because they contain **poisonous** substances. Most animals cannot eat these plants without becoming really sick and sometimes if they eat enough milkweed they will die. Monarch Butterflies have evolved to be able to eat these toxins. These **toxins** end up accumulating in the butterfly's body so that when eaten they make their **predators** sick. This teaches the predators to stay away from Monarchs and other animals that look like Monarchs.

Monarch Butterflies depend very much on milkweeds. Scientists are concerned with the population of Monarch Butterflies found east of the Rocky Mountains because a lot of the milkweed habitat has been converted to farm land. With fewer milkweeds, the number of Monarchs has declined.

Luckily, there is a way you can help by planting your very own butterfly garden! Milkweed and other plants are not only a lovely addition to your garden, but will also attract Monarchs, other butterflies, and even hummingbirds!

Here are some websites to help get you started:

<http://www.flightofthebutterflies.com/get-involved/>

<http://butterflywebsite.com/butterflygardening.cfm>

[http://www.nababutterfly.com/How to Start a Butterfly Garden.html](http://www.nababutterfly.com/How_to_Start_a_Butterfly_Garden.html)

<http://www.monarchwatch.org/garden/>



Operation Observation

The best way to learn about Monarchs and their life cycle is to raise your own!

Finding a Monarch Caterpillar: The best place to find a Monarch caterpillar is on a milkweed plant. Milkweed is a medium sized flowering plant with alternating leaves. There are many different species of milkweed. Use this website to help identify species near you: <http://www.monarchwatch.org/milkweed/guide/index.htm>. Monarch caterpillars are usually pretty easy to identify because they have bright black and yellow stripes. If you don't have milkweed in your neighborhood or can't find a Monarch caterpillar you can order butterfly kits that include a Monarch caterpillar. Insectlore.com is a good place to find kits.

Creating a Caterpillar Home: Your caterpillar will need a safe place to live after you've captured it. A container that is easy to see through is best so you can observe your caterpillar's transformation easily. This container will be the caterpillar's home for the next few weeks so it's important to make it as comfortable as possible! Fill the bottom of the container with some dirt and add some twigs. The cover of the container should be flat, fit snugly, and also be ventilated. Caterpillars still need air! Be sure to clean the container every one or two days. When cleaning or weighing your caterpillar try to handle your caterpillar as little as possible to help increase its chance of survival. It is especially important not to handle caterpillars that are molting. Your caterpillar will become very still and be found on the top and sides of your container before a molt.

Feeding Your Caterpillar: Caterpillars end up gaining over 2,000 times their own weight by eating leaves! Not just any leaves will do for a Monarch though, it must be milkweed leaves. You can keep leaves for a longer time by wrapping the stem in a moist paper towel covered with tin foil or plastic wrap. If you do not have a milkweed plant near you it is best to use this technique to save the milkweed.

Caterpillar Chrysalis: After about 5 molts (depending on how old your caterpillar was when you captured it), the caterpillar will get ready to pupate and form a chrysalis. When they are ready to pupate they will crawl to the top of your container. The caterpillar will attach itself to the top of your container forming a 'J' shape with its body. The caterpillar will go limp right before it does its last shed. It is a neat thing to watch the caterpillar do its last shed, but it is very quick. The caterpillar will start to shake and the whole process only lasts 15-20 minutes. The caterpillar will remain in its chrysalis for about 10-14 days. Then, if you're lucky you will be able to observe the Monarch Butterfly emerging from its chrysalis. Releasing your butterfly is simple. Be sure it's wings have dried and that the temperature is above 60 degrees. Take your butterfly outside preferably near some flowers and let it free!

Observation Sheets

Use these sheets to record your caterpillar's transformation into a butterfly.

Name of Observer: _____

Date	Observations (life stage, color, signs of molting, active?)	Sketch
	<p>Weight _____</p> <p>Length _____</p>	
	<p>Weight _____</p> <p>Length _____</p>	

Look a Likes

Camouflage is a common **adaptation** that animals use to help protect themselves from predators. There are several different types of camouflage. One type is **mimicry**. Mimicry is when an animal looks, acts, or sounds like another animal. One animal that uses mimicry is the Viceroy Butterfly. The Viceroy looks very similar to the Monarch; however, it does not possess the same toxins as the Monarch. By mimicking the Monarch the Viceroy is less likely to be eaten by predators.



VICEROY



MONARCH

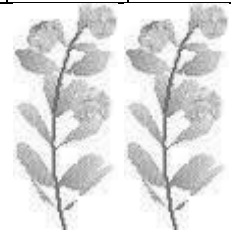
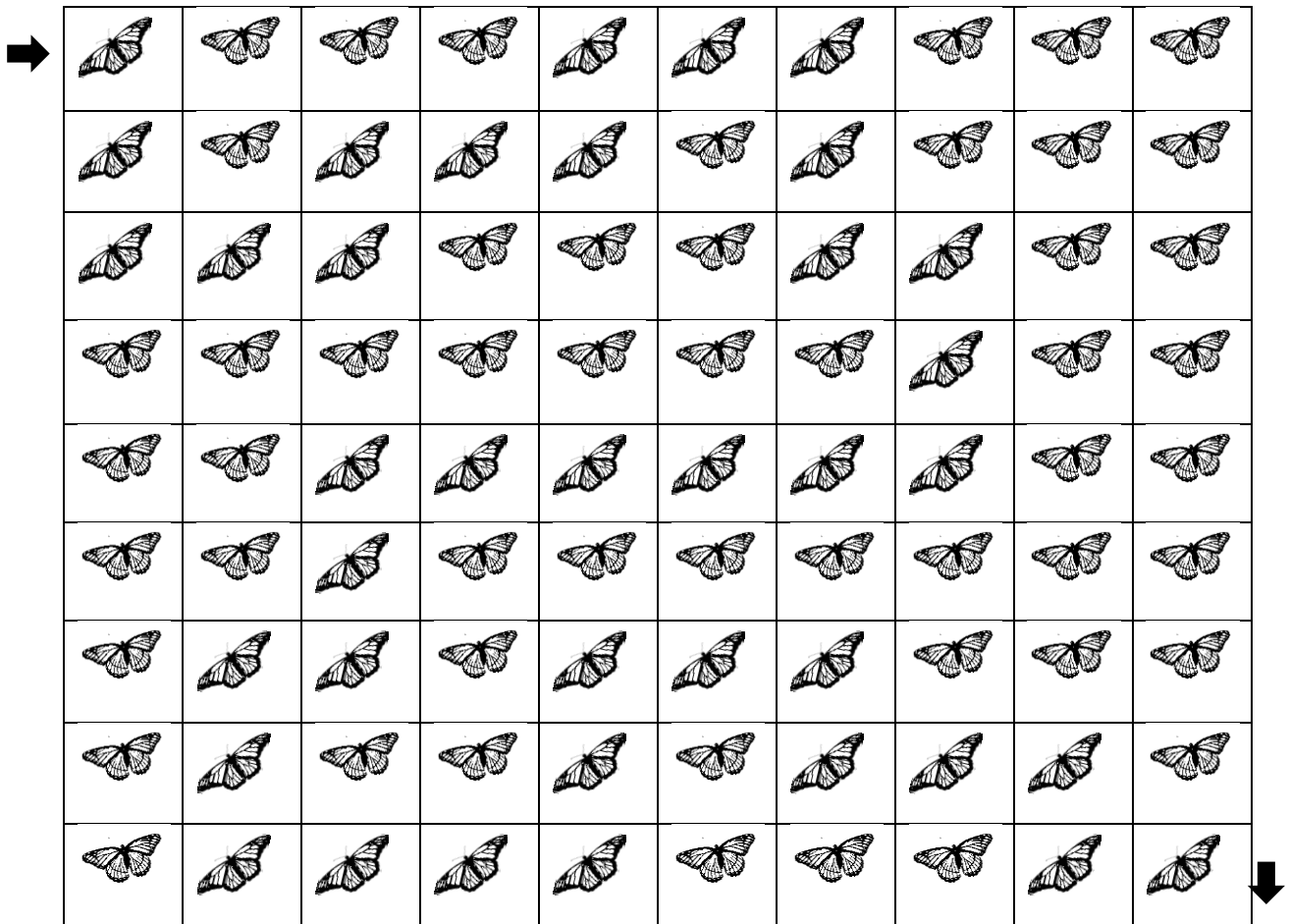
Look at the two butterflies. How many differences can you spot?

Can you name an animal, besides the Viceroy, that uses a type of camouflage to survive?

Fun Fact!
The Viceroy Butterfly is the state insect of Kentucky!

Look a Likes

Get the Monarch to the milkweed by coloring in the boxes with Monarchs in them. Use the pictures on the previous page to identify the Monarchs. Don't get fooled by the Viceroys!



Monarch Survivor

The fourth generation of Monarch Butterflies hatched in late summer live longer than the other generations hatched earlier in the summer. These are the special individuals that make the long journey to Mexico. Do the activity below to learn how long one fourth-generation Monarch lived:

A Monarch Butterfly emerged as an adult on August 25, 2012. It was then found alive on April 25, 2013. Without using the chart below (yet), make an estimate of how many days, weeks, and months the Monarch had been alive. Write your estimates below. Then fill in the chart below to find out how long the Monarch lived so far:

Estimate:

Number of Days: ____ Number of Weeks: ____ Number of Months: ____

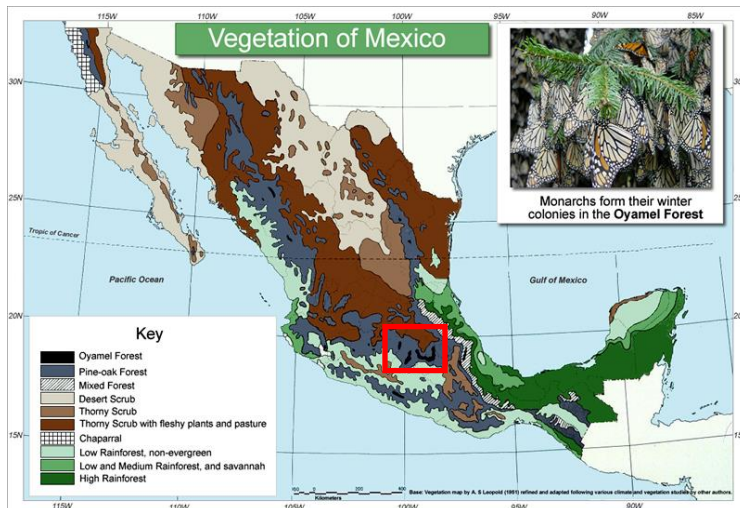


	Number of Days	Number of Weeks	Number of Months
August 25, 2012 (Emerged)			
September			
October			
November			
December			
January			
February			
March			
April 25, 2013 (Still Alive)			
Totals:			

Amazing Migration

Monarch Generations: Monarchs are as well known for their striking colors as they are for their long **migrations**. During the summer there are four **generations** of Monarchs that are born. The first three live between 2 and 5 weeks and die after laying the next generation. The fourth generation is very different from the first three. This generation is born at the end of the summer when it is starting to get cooler. Butterflies and most other insects cannot survive in cold weather because they are **ectotherms**. Ectotherms cannot create their own heat and get it from their **environment**. When fall comes around in the northern parts of the Monarch's range this fourth generation must migrate to escape the cold.

The Perfect Place: Not just any place will do for the Monarchs though. They fly all the way to a special place in the mountains outside of Mexico City, Mexico. That's over 2,000 miles for most



of the Monarchs! Why do they fly so far away? Monarchs fly to this specific place in Mexico because of the **Oyamel fir** trees. The location of the trees in the mountains is the perfect temperature, and it has the perfect amount of moisture for the Monarchs to survive. The map to the left shows in the red box where the Monarchs go for the winter. You can tell by the map that there is not a whole lot of **Oyamel Forest** for the

Monarchs to use. While the Monarchs are here they rest and eat and get ready to fly back north.

Why Migrate?: Why don't the Monarchs lay their eggs in Mexico? Monarchs lay their eggs on **milkweed** plants. Milkweed is not found in the wintering areas of the monarch. The monarchs fly north where there is plenty of milkweed to lay their eggs on, starting the cycle all over again. The most amazing thing about the Monarch's migration is not only the length, but the fact that all the Monarchs that make the migration have never made it before. There are three generations of non-migratory Monarchs in between the Monarchs that make the migration. Scientists believe that the route is **inherited** somehow, and that the Monarchs also use the earth's magnetic field and land marks to get to their destination year after year. On the next page is a map of different flight paths the Monarch Butterfly uses to get to Mexico for the winter. Use the map to answer the questions.

Amazing Migration



1. How many states do the Monarchs go through in each route?

1. ____ 2. ____ 3. ____ 4. ____

2. Name the states that each route passes through:

1. _____

2. _____

3. _____

4. _____

Monarch Vocabulary

Match the correct definition to the correct word by drawing a line from the definition to the word:

- | | |
|-----------------|--|
| Thorax ● | ● The newly hatched stage of a Monarch. Before pupa and after egg. |
| Migration ● | ● Long sensory organs on the head of an insect. |
| Chrysalis ● | ● The stage of the butterfly life cycle when they form a chrysalis. |
| Cocoon ● | ● The part of an insect located in between the head and abdomen. |
| Larva ● | ● A thin tube-like mouth part that butterflies use to drink nectar. |
| Antennae ● | ● A protective case made of silk spun by caterpillars of moths, not butterflies, to undergo metamorphosis. |
| Mimicry ● | ● The part of the insect located the furthest away from the head. |
| Proboscis ● | ● The seasonal movement of an animal from one place to another. |
| Pupa ● | ● When one animal acts or looks like another animal in order to increase its chance of survival. |
| Metamorphosis ● | ● Butterfly food. |
| Abdomen ● | ● The protective layer of the pupa where the butterfly goes through metamorphosis. |
| Nectar ● | ● The process a caterpillar goes through to become a butterfly. |

Butterfly Stories

Create a story about Monarchs using as many vocabulary words from the previous page as you can.

This image shows a full page of blank white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page, providing a guide for handwriting or typing. There are no margins, text, or other markings on the page.

More Resources

Explore these sites for more information on Monarchs and more fun activities to do!

<http://www.wildcenter.org/dig-in/all-about-monarchs?gclid=CO2SzYKt4LsCFcpDMgodECQAXA>

<http://www.monarch-butterfly.com/>

<http://www.monarchwatch.org/>

<http://www.enchantedlearning.com/subjects/butterfly/species/Monarch.shtml>

<http://www.learner.org/jnorth/monarch/>

http://earthjustice.org/irreplaceable/monarch_butterfly?gclid=CO7xueet4LsCFfBDMgodskwAKg

Great Videos:

Monarch Lifecycle:

<http://www.youtube.com/watch?v=7AUeM8Mbalk>

Monarch Migration:

<http://www.youtube.com/watch?v=vD9wP5vKdKg>

Monarchs and Milkweed:

<http://www.youtube.com/watch?v=zwb50jDI6r0>

ANSWERS

Page 3:

1. Egg
2. Caterpillar (Larva)
3. Chrysalis (Pupa)
4. Butterfly (Adult)

Page 5:

1. Compound Eye
2. Head
3. Antenna
4. Proboscis
5. Thorax
6. Legs
7. Abdomen

Page 10:

	# of Days	# of Weeks	# of Months
August 25, 2012	6	1	0
September	30	4	1
October	31	4	1
November	30	4	1
December	31	4	1
January	31	4	1
February	28	4	1
March	31	4	1
April 25, 2013	25	3	0
Totals:	243	32	7

Page 12:

1. 1) 6 2) 6 3) 4 4) 8
2. 1) North Dakota, South Dakota, Nebraska, Kansas, Oklahoma, Texas
2) Minnesota, Iowa, Missouri, Kansas, Oklahoma, Texas
3) Kentucky, Tennessee, Mississippi, Louisiana
4) Pennsylvania, Maryland, Virginia, North Carolina, South Carolina, Georgia, Alabama, Florida

Page 13:

Thorax- The part of an insect located in between the head and abdomen.

Migration- The seasonal movement of an animal from one place to another.

Chrysalis- The protective layer of the pupa where the butterfly goes through metamorphosis.

Cocoon- A protective case made of silk spun by caterpillars of moths, not butterflies, to undergo metamorphosis.

Larva-The newly hatched stage of a butterfly. Before pupa and after egg.

Antennae- Long sensory organs on the head of an insect.

Mimicry- When one animal acts or looks like another animal in order to increase its chance of survival.

Proboscis- A thin tube-like mouth part that butterflies use to drink nectar.

Pupa- The stage of the butterfly lifecycle when they form a chrysalis.

Metamorphosis- The process a caterpillar goes through to become a butterfly.

Abdomen- The part of the insect located the furthest away from the head.

Nectar- Butterfly food.