



Cockrell Butterfly Center & Brown Hall of Entomology

Knowledge Hunt

Dear Educator,

Thank you for downloading the free, online curriculum available at HMNS! We're thrilled to see that you are including the world-renowned Houston Museum of Natural Science in your educational toolkit.

Here at HMNS our mission has always been to provide exemplary educational opportunities for the community. Providing educators like you with free, fully editable curriculum is just one of many ways we are fulfilling that mission.

Thank you again, and we hope you enjoy your field trip to HMNS!

Best,
The HMNS Staff

How to use this guide:

1. Feel free to edit the questions as needed to suit your student group.
2. This Knowledge Hunt is structured by grade level, using appropriate TEKS from each level.
3. Visitor services and security staff are posted around the Museum and will be happy to assist you in finding any of the locations mentioned.
4. Please ensure that one chaperone is with every group of ten students at all times as they complete these activities.
5. Don't forget to download our extension activities for use in the classroom when you return from your trip!

Please direct any and all questions to curriculum@hmns.org



Kindergarten Curriculum

Metamorphosis Sculpture

Before entering the Hall of Entomology, ask the students to look up at the display above the entrance to the Butterfly Center. The sculpture shows the metamorphosis of a butterfly. Ask them if they can point to the first stage. Help them find the egg. See if someone can find the second stage, the caterpillar. Next, look for the chrysalis. Finally, ask the students if they can find the final stage.



Poison Dart Frog

Point out the poison dart frogs in the display case as the students enter the Hall. Allow the students to find the brightly colored frogs amidst the foliage in the case. Ask students where they think poison dart frogs live.

Insect Video

Allow students an opportunity to watch the video narrated by the butterfly to learn more information about insects. Ask them to name three insects they saw in the video. See if they can name the creature that is not an insect.



Insect Body Parts

Point out the three parts of an insect. Be sure that the students see where the antennae, eyes, and mouthparts are located on the head. Show students that the legs and wings are attached to the thorax.

How Insects Grow

Point out to students how insects grow from an egg to the adult stage. Tell the students that the word for the stages of growth an insect goes through is called metamorphosis. This is the life cycle of an insect. Ask them to recall the sculpture above the entrance of the Butterfly Center.



Insect Mouthparts

Explain to the students that insects have different kinds of mouths because they eat different things. Allow students to interact with the display to make connections between common objects that are shaped like the mouths of insects. Students may need some help in identifying the objects and/or the insects.

Insect Eyes

Allow the students an opportunity to view the world from an insect's point of view using the touch screen. The students might need some explanation of what they are seeing. Explain that some insect eyes are shaped in such a way that they see many images or bright colors. Some insects have underdeveloped eyes that see just shadows. When looking at the image that a butterfly sees, ask the students why they think butterflies are attracted to bright colors.



Antennae

Tell the students that some insects use antennae to smell. Ask them to look at the display of antennae and see if they can match the correct antennae with the insects in the display.



Winging It

Show the variety of shape, size, and membrane of an insect's wing. Ask students to name a kind of insect and see if they can guess what wing matches the insect. Allow them to find out more information about wings in the interactive display.

Good Vibrations

Students will enjoy learning how insects hear. Read the labels on the green buttons and then push them one at a time, allowing the students an opportunity to experience the vibrations insects feel. Once they have experienced them all, ask the students to close their eyes and try to guess what the “sound” is when the button is pushed.

Now You See Us, Now You Don't

Allow students time to look in the cases to see if they can find the camouflaged insects. Ask the students to tell the ways in which the insects are camouflaged (color, shape, detail).



Beetlemania

While standing in front of the case filled with beetles, tell the students that there are more beetles than any other insect because they are tough. They have a hard exoskeleton, they can live anywhere, and they eat almost anything. Allow students time to look in the cases at the live beetles. Ask the students to point out their favorite beetle and tell why they like it.

More Than Six Legs

Tell students that if a creature has more than six legs, it is not an insect. Point out the tarantula and ask them to count its legs. If a creature has eight legs, it is a spider. Show the students the variety of spider webs. Watch the video of a spider spinning a web.



Butterflies and Moths

Show the students the cases where butterflies are emerging from their chrysalis. Ask the students if they remember what it is called when an insect changes from an egg to a butterfly. Show the students the cases of pinned butterflies and moths. Point out the differences in a butterfly and a moth. Ask the students to identify any of the patterns or designs they see on them.

Rainforest

Take the students into the rainforest to see the butterflies. As they walk through, ask the students to describe what they see, feel, and hear in the rainforest.

Insect Identification

After exiting the rainforest, pull out one of the display drawers on the left. Allow the students an opportunity to look at the variety of insects mounted in the drawers. Talk about their antennae, wings, and colors. Point out as many insect parts as can be seen.



Pollination-Why Plants Need Insects

Show how insects fly from flower to flower to pollinate them. Explain to the students the importance of pollination.

The Buzz About Bees

Allow students to watch the video of the beekeeper talking about the importance of bees. Explain that we would not have fruit and vegetables to eat if bees and insects did not pollinate flowers. Show the equipment that beekeepers wear to the students and explain the use of each item. Ask the students why it is important that people who work with bees wear this equipment.



The Bee Hive

There is a worker bee chore list on the wall to the left as you enter the area with the bee hive. Explain the jobs of the worker bees to the students. Allow them to play in the bee hive. Encourage them to act out the jobs of the worker bees.



1st Grade Curriculum

Life Cycle Sculpture

Before entering the Hall, point out the sculpture of the Fritillary Butterfly on its host plant, the passion flower, above the entrance. Have the students find the egg, caterpillar, chrysalis, and the butterfly in the sculpture. Tell the students that this cycle is called metamorphosis.

Poison Dart Frog

Stop at the large case as the students enter the hall and allow students time to look at the poison dart frogs. Tell them that frogs in captivity are not as poisonous as those that live in the rainforest because they can no longer eat what makes them poisonous. Ask the students to predict whether the frogs in the display are poisonous or not.

Stairwell

Ask students to point to and name as many insects as possible on the mural going up the stairs. Ask students if they see one that is not an insect. Point to the spider at the top of the stairs. Ask students to count the spider's legs. Tell them it is an arachnid, not an insect, because it has eight legs. Ask them if they know how many legs an insect has.

Video

Watch the video to learn more about insects.

Insect Parts

To the left of the video screen, look at the parts of a grasshopper. Show the students the head and point out the antennae, eyes, and mouth parts. Point to the thorax and show where the legs and wings are attached. Talk about where the abdomen is located.

How Insects Grow

Use the diagrams on the text to explain the three ways insects grow. Explain that some insects change very little except in size. Show the silverfish. Point out that simple metamorphosis takes place when an insect like the grasshopper and cockroach looks just like the adult version except that it does not have wings. Complete metamorphosis has four stages: egg, larva, pupa, and adult. Remind students that this is what they saw in the sculpture when they first entered the hall.

Insect Mouthparts

Explain that insects have different kinds of mouths because they eat different things. Show the pictures of the insect mouths and identify their uses. Explain how some are used to suck juice or nectar, some stick into food sources like a needle, some are for chewing, and some lap up a liquid. Allow students to use the interactive display to discover how these mouths are similar to common objects.

Eyes

Show the simple and compound eye examples in the display case. Allow the students an opportunity to view the world from an insect's point of view using the touch screen. Ask which insect sees the greatest amount of color? How does this ability help them find food? Which insect sees the least amount of color?

Antennae

Ask students how insects smell. Show them the variety of insect antennae. Allow students an opportunity to match insects and their antennae in the exhibit.

Winging It

Show the variety of shapes, sizes, and membranes in the text panel. Allow students time to match the type of wing with the insect in the interactive display.

Good Vibrations

Allow students an opportunity to experience the vibrations an insect feels as "sounds". By pressing the green buttons, students can feel what common sounds feel like to an insect. Ask the students which one is the "loudest" and which one is the "softest" sound insects hear.

Insect Achievements

Read all of the “records” associated with insects. Be sure to point out the longest insect, the Malaysian walking stick, which is 22 inches long. Can the students think of some common objects that are the same size? Show the white witch moth which has an 11 inch wingspan. Ask the students to show with their hands how long that would be. What do they know of that is about that size? The adult spittle bug can jump over two feet in the air. Ask the students to show with their hands how far off the floor that would be.

Beatlemania

Using the length between the first and second joint of the bent middle finger to measure an inch (see diagram), show the students how to measure the largest Scarab beetle from wing tip to wing tip. Allow the students a few minutes to use their own hand to measure some of the other beetles. How long is the smallest scarab beetle?



Butterfly Display

What are some of the patterns on the butterfly and moth wings? Point out some of the designs and color patterns on the wings. Show the students how the butterfly wings are divided at the top and bottom and the moth wings are connected. Explain that this is one of the characteristics used by entomologists to determine whether a specimen is a moth or a butterfly.

Rainforest

While walking in the rainforest, ask the students to share some of the characteristics they see. Talk about the colors, canopy of trees, temperature, plants, waterfall, etc.

Bug Display Drawers

Upon exiting the rainforest, stop to look in the display drawers to the left. Allow one student at a time to pull out a drawer and find their favorite insect. Tell them to use the finger joint measurement to figure the length of an insect's body or wingspan. Ask them what attributes they like best about their insect.

Pollination: Why Plants Need Insects

Explain to students how pollination works by using the information on the text panel. Allow students time to look at the flowers and the insects and hummingbirds that pollinate them. Ask the students why they think that certain creatures are attracted to a specific flower.

The Buzz About Bees

Talk to the students about how important bees are to the production of food. Go over some of the foods we would have to do without if there were no bees.

Bee Hive and Worker Bee Chore List

Stop at the Worker Bee Chore List and read the jobs of the Nurse Bee, House Bee, and Field Bee to the students. Tell the students to decide which bee they would like to be. Divide them into the three groups and review their jobs. Allow students time to play in the beehive and role play their jobs as bees.



2nd Grade Curriculum

Life Cycle by Brian Zievert

Before entering the Butterfly Center, ask the students to look up at the sculpture. Point out the four stages in the life cycle of the Gulf Fritillary butterfly. Make sure that the students see the egg, caterpillar, chrysalis, and butterfly on the passion flower.



Poison Dart Frogs

Read all four of the text panels above the poison dart frog display case while the students look for the colorful frogs. Look at the “Wow-look at these frogs!” panel. In what two ways are poison dart frogs different from most frogs?

- 1.
- 2.

The “You Are What You Eat” text panel explains how poison dart frogs in the wild get their skin toxins. What are two things they eat that create the toxins?

- 1.
- 2.

Read where poison dart frogs lay their eggs and the role of the mother and father frogs in “Life History”. Why is the rain forest an important part of the poison dart frog’s life cycle?

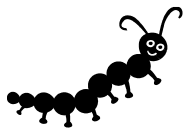
Give two reasons why the poison dart frog population is declining.

- 1.
- 2.

Mural

Ask the students to look at all of the insects depicted in the mural by Tony Upton on the wall going up the stairs. What are five bugs that you see in the picture?

- 1.
- 2.
- 3.
- 4.
- 5.



Meet the Arthropods

Read the information about arthropods to the students. Make sure they understand that 90% of the Earth's creatures are arthropods by saying that if you had 100 animals set out on a table, 90 of them would be arthropods.

Arthropods are Ancient

Point out the fossils and models in the case. Have the students find two arthropods that have remained unchanged for millions of years.

- 1.
- 2.

Point out the prehistoric dragonfly. Explain to the students that since there was more oxygen in the air, insects were larger in prehistoric times.



Video “The Good, the Bad, and the Ugly”

Ask the students to listen closely to the video to hear how insects help humans. Ask them to name two things humans would have to do without if there were no honeybees.

- 1.
- 2.

Beetle, Butterfly, or Bed Bug?

Ask the students to look at the large graph to the left of the video screen. Ask them to tell you what kind of graph it is.

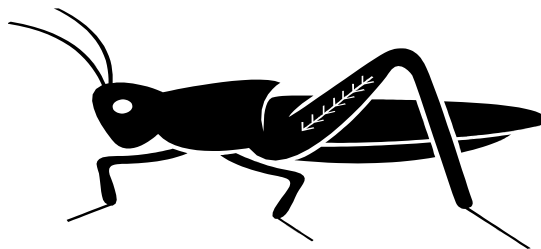
Did you know?

Show the students the three different parts of an insect. Read the text panels that explain the importance of each segment. What two parts of the head help it perceive and react to its environment?

- 1.
- 2.

Can an insect live without its middle section? Why or why not?

Label the grasshopper’s body parts.





All Arthropods Have an Exoskeleton

Tell students that the exoskeleton is on the outside of the insect's body while our skeleton is on the inside. Have the students read aloud the advantages and disadvantages of having an exoskeleton.

Advantages	Disadvantages
1.	1.
2.	2.
3.	

Because they are small, what two things can insects do that humans can not?

- 1.
- 2.

How Insects Grow

What does the word "molt" mean?

There are three types of metamorphosis; no metamorphosis, simple metamorphosis, and complete metamorphosis. Draw a picture of each type and give at least two examples of insects that undergo each type.

No Metamorphosis

Simple Metamorphosis

Complete Metamorphosis



Insect Mouthparts

Read the text panel that explains the four different ways insects use their mouths. Allow the students time to try to match the mouth parts with the tools. What four ways do insects use their mouths?

- 1.
- 2.
- 3.
- 4.

How Insects See: Through Kaleidoscope Eyes

Insects have either compound or simple eyes. Compound eyes have thousands of lenses that allow insects such as flies to see many images more clearly. Insects with simple eyes can only see light and dark and can not focus. Allow the students to “experience” how insects see using the interactive screen and explain how their eyesight is better than that of an insect.



Antennae-Not Just on Your TV

Why are the antennae so important to an insect? Ask the students which insect antennae is their favorite and why.

Quiz Station #2

Allow the students to take turns being entomologists by answering questions on the touch screen about the information they have already learned about insects.



Find the Hidden Insects

Ask the students to look in the display case and see how many insects they can find hidden in the foliage. They can check their answers on the touch screen.

Insect Serenade

Read the information on the text panel to the students. Be sure that the students know that an insect's ears are located on its front legs, thorax, or abdomen.

Allow the students time to experience all of the vibrations. Ask them which one is the strongest.



Now You See Us, Now You Don't

Allow the students time to look in all of the cases to find the insects that are camouflaged in their environment. Ask them to explain how the Tropical Walking Sticks and the Orchid Mantis are easily camouflaged.

Quiz Station #4

Allow the students time to complete the entomology quiz to test their knowledge of facts learned in the exhibit so far.



Beatlemania

Tell the students to look at all of the beetles in the case. Write down their suggestions for why they think there are so many beetles in the world.

More Than 6 Legs

Ask the students how they would know that a bug they had found is an arachnid?

After they have determined that an arachnid has 8 legs, read the rest of the text panel to learn how to identify a myriopod and a crustacean.

A myriopod is _____.

A crustacean is _____.



The Rainforest

While in the rainforest, ask the students what they think makes this environment a rainforest. Make notes of their suggestions as they enjoy the experience and see the butterflies. Be sure to point out the waterfall, the plants, and the canopy of trees if they do not suggest these elements for the list.

Insect Display Drawers

As the students exit the rainforest, stop at the cabinet with drawers on your left. Open the drawers to allow students an opportunity to see butterflies, moths, and beetles up close. Let them find their favorite and talk about what is special about it.



If You Plant It, They Will Come

Watch the video to see how butterflies get nectar and the kind of flowers they are attracted to. Butterflies are indicators of a healthy habitat. Ask the students why they think that is.

A butterfly garden needs what two kinds of plants to keep caterpillars and butterflies happy?

Ask the students if they wanted to plant a butterfly garden, what kind of plants would they need to include?

Nectar Plants	Host Plants

Pollination-Why Plants Need Insects

Flowers have evolved their amazing shapes, colors, and scents to attract the right pollinator. Read the text panel to explain to students how pollination works. Ask them to explain what they have learned and draw a sketch before leaving the exhibit



The Buzz About Bees

Explain that American agriculture depends on honey bees to pollinate most of the fruits and vegetables we eat. Ask the students to name 5 fruits or vegetables that they enjoy.

- 1.
- 2.
- 3.
- 4.
- 5.

Allow students to complete Quiz Station 11 to check what they have learned about bees and pollination.

Allow the students an opportunity to look at all of the equipment used by a beekeeper. Talk about why they think each piece is important.

“Yuck?”

Look at the bar graph. Explain to the students that the bar graph tells them how humans can get their food calories, protein, iron, carbohydrates, iron, and calcium from animals, as well as insects.

Use the bar graph key to answer this question. Each animal = _____ calories.



Vending Machine

Allow each student an opportunity to pick something from the vending machine they are interested in. Challenge them by asking if they were going to pick two items, how much money they would need

Worker Bee Daily Chore List

Climb the stairs to exit the Hall of Entomology. Before leaving, enter the room with the beehive. Read the list of jobs performed by the worker bees. Make a list of their chores.

Nurse Bee	House Bee	Field Bee

Tell the students that they are residents of the Museum’s beehive. Assign the students a role. Make sure they know what their job is. Allow the students a chance to act out the chores of the worker bees in the honeycomb theater.



3rd Grade Curriculum



Poison Dart Frog Display

As you enter the Cockrell Butterfly Center, look at the large case in front of you. Can you find the brightly colored frogs in the case? Look at the environment in which they live. Write three facts about the frogs and three facts about the environment.

Frogs	Environment
1.	1.
2.	2.
3.	3.

Meet the Arthropods

What makes up the largest group of arthropods?

Why isn't a snail an arthropod?



3 Insect Parts

What are the three parts of an insect?

- 1.
- 2.
- 3.

How Insects Grow

How does every insect begin?

How are they able to increase in size 2,000 times?

What is the word that means an insect is changing from an egg to an adult?



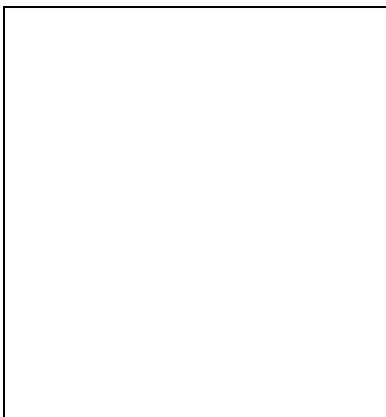
Camouflage

Try to find the insects in the display. Is it easy to see them or difficult? Pick one of the insects and describe how it is able to camouflage itself in the environment.

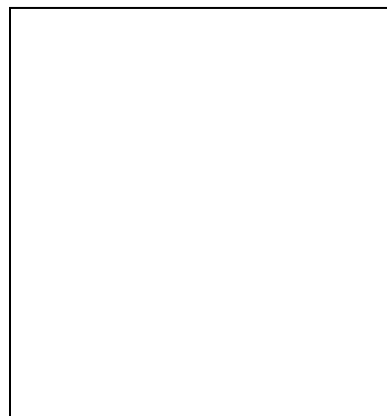
Beetlemania!

Look at the wall display of beetles. Pick the one that you like the most. Draw a sketch of your beetle. Write its name and where it can be found under your sketch. Then make a few notes about its size, shape, color, and any other details you want to remember about your beetle.

Sketch



Notes





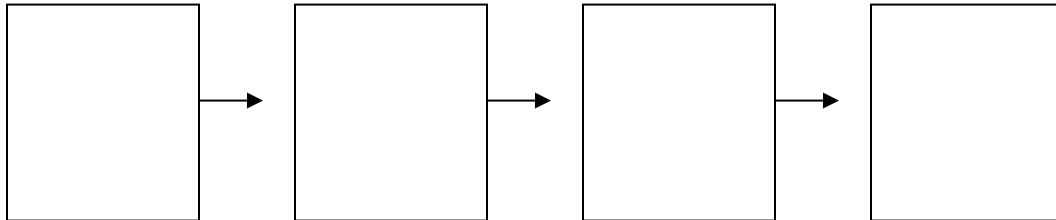
More than Six Legs

How many legs does an arachnid have?

If you capture five arachnids, how many legs will you have in all? Write a math problem to show how you found your answer.

The Chrysalis Corner

Draw a flow chart to show the stages of metamorphosis of a butterfly.



Butterfly or Moth?

Look closely at both the butterfly and the moth. At first glance, they may seem the same, but there are actually many differences. Identify three differences between butterflies and moths.

- 1.
- 2.
- 3.

Rainforest

List seven elements that you see that make up the rainforest.

- 1.
- 2.
- 3.
- 4.
- 5.
- 6.
- 7.



4th Grade Curriculum



Inside the Rain Forest

List everything you see in this environment that contributes to the survival of the plants and creatures that live here. If you eliminated one of the elements listed, what do you think would happen?

Could a carnivore live in this environment? Why or why not?



Introduction to Insects

Listen to the video as you first enter the exhibit. Write one fact sentence and one opinion sentence about insects that you hear in the video.

Fact:

Opinion:



Dragonfly

Why would you not see a dragonfly with a 30 inch wingspan in your yard?

The largest dragonfly today is about 6 inches long. How much larger was the prehistoric dragonfly than today's dragonfly?

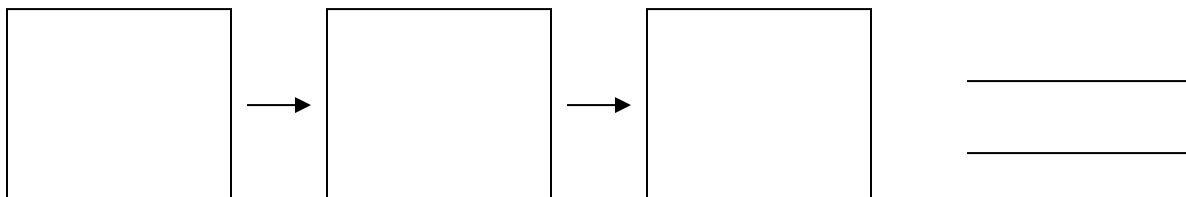
What enabled larger insects to live in prehistoric times?

What creature today is called a "living fossil"? Why?

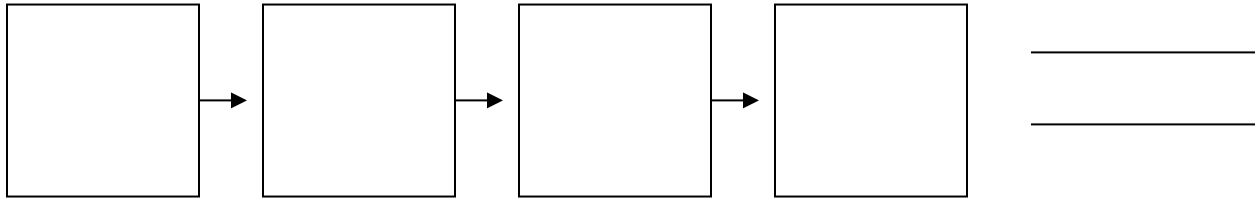


How Insects Grow

Create a flow chart showing the steps of simple metamorphosis. List two insects that undergo this process.



Create a flow chart showing the steps of complete metamorphosis. List two insects that undergo this process.



Insect Mouthparts

What are the four basic mouthparts of an insect?

- 1.
- 2.
- 3.
- 4.

Could an insect with a chewing mouth learn how to sponge or lap up liquids? Why or why not?

Is an insect's ability to eat a learned characteristic or an inherited trait?



Camouflage

Pick one of the insects in the display and describe how it is able to camouflage itself in its environment.

Why can walking sticks be displayed together, but praying mantis can not?



Stop Signs and Warning Colors

Why are some insects so colorful?

Mimicry: Insects Identity Theft

How are insects that can mimic poisonous or venomous insects protected in nature?



Beetlemania

Use the information on the touch screen to write two facts about one of the beetles.

- 1.
- 2.

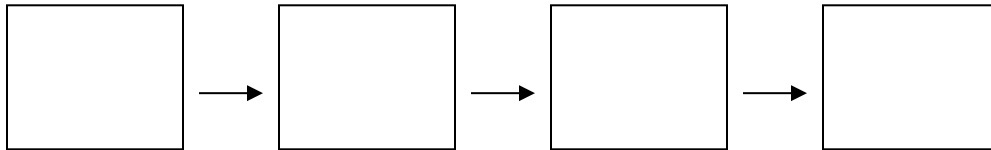
Now look at the beetles in the display case. Pick two beetles and write an opinion statement about them.

- 1.
- 2.



The Chrysalis Corner

Draw a flow chart to show the stages of metamorphosis of a butterfly. Label each stage.



Family Ties

What four insects live in family groups?

- 1.
- 2.
- 3.
- 4.

Complete the chart with the job description of each member of the family group of leaf cutter ants.

Title	Job Description
Queen	
Male	
Soldier	
Major worker	
Minor worker	
Mimims	

What happens if the queen is killed in one of these family groups?

Symmetry

Give two examples of symmetry that you found in this exhibit hall.

- 1.
- 2.



5th Grade Curriculum



Dragonfly

Why would you not see a dragonfly with a 30 inch wingspan in your yard?

The largest dragonfly today is about 6 inches. How much larger was the prehistoric dragonfly than today's dragonfly?

What enabled larger insects to live in prehistoric times?

What creature today is called a "living fossil"? Why?

All Arthropods Have an Exoskeleton

Make a chart showing the advantages and disadvantages of an exoskeleton.

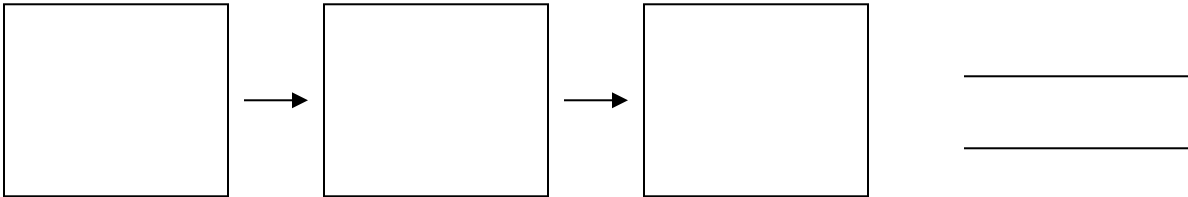
Advantages	Disadvantages

Have you ever heard anyone say they would like to be a fly on the wall? Why can a fly climb up a wall without falling off, but you can't?

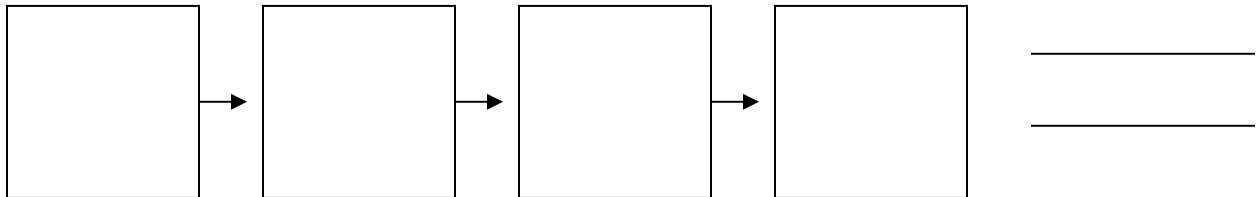


How Insects Grow

Create a flow chart showing the steps in simple metamorphosis. List two insects that undergo this process.



Create a flow chart showing the steps of complete metamorphosis. List two insects that undergo this process.





Winging It

The wings of insects have a wide variety of shapes, sizes, colors, hardness, membranes, and functions. Use the information in the display to finish the chart.

Prefix	+	Root	=	Description
ortho	+	ptera	=	straight wing
	+	ptera	=	
	+	ptera	=	
	+	ptera	=	
	+	ptera	=	
	+	ptera	=	

Cricket Weatherman

Find a friend with a watch with a second hand and count the number of chirps for 13 seconds of one of the crickets in the display. Use that information to complete the equation below.

_____ + 40 = _____ degrees Fahrenheit

Number of chirps per 13 seconds temperature

Camouflage

Pick one of the insects in the display and describe how it is able to camouflage itself in its environment.

Why can walking sticks be displayed together, but praying mantises cannot?



Stop Signs and Warning Colors

Why are some insects so colorful?

Mimicry: Insects Identity Theft

How are insects that can mimic poisonous or venomous insects protected in nature?

Insect Achievements

Complete the chart with information from the text panel.

Achievement	Insect
Longest insect	
Fastest runner	
Heaviest insect	
Loudest insect	
Largest wing	
Highest jump	
Biggest crowd	
Strongest insect	



Beetlemania

Look at all the beetles in the display case. Draw your favorite one and write an opinion sentence about it.

Use the information on the touch screen to write two facts about one of the beetles.

- 1.
- 2.

One in every four animals on Earth is a beetle. Why are there so many?



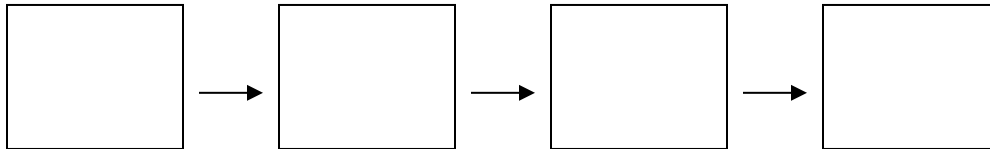
Hairy, Scary With Fangs

Why do you think tarantulas are the spider used in scary movies when actually they do not bite or have poisonous venom?



The Chrysalis Corner

Draw a flow chart to show the stages of metamorphosis of a butterfly.



Often a chrysalis appears to be either gold or silver. What causes this illusion of color?



Entomology

Downstairs you'll enter an entomologist's lab. Notice the set of drawers on the left. Open the drawers and discover the incredible specimen collections. Choose one drawer and answer the following questions:

What type of specimen is in the drawer you chose?

What color are the insects in this drawer?

How many legs do they have?

Do they have body segments? If so, how many?

Do they fly? How do you know?

Do these specimens have antennae?

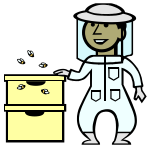
Draw one of the specimens in the drawer you have chosen.



Entomologists' Tools

Look at the case with the entomologists' tools. List three tools that they use.

- 1.
- 2.
- 3.



Backyard Beekeeper Donald Burger Video

What tools does he use while working on his hive?

What does he say about the life expectancy of the queen bee?

What job do the other female bees have in the hive?



Pollination

Why do plants need insects to survive?



Finger Lickin' Good

Why do some cultures eat insects?

How many insects do you probably eat in a year?

If you eat a three ounce chocolate bar, about how many insect fragments will you eat?

If you put a half pound of berries on your cereal in the morning, about what number of adult insects will you eat?



6th Grade Curriculum

“Life Cycle: Gulf Fritillary Butterflies on Their Passionflower Vine Host Plant”

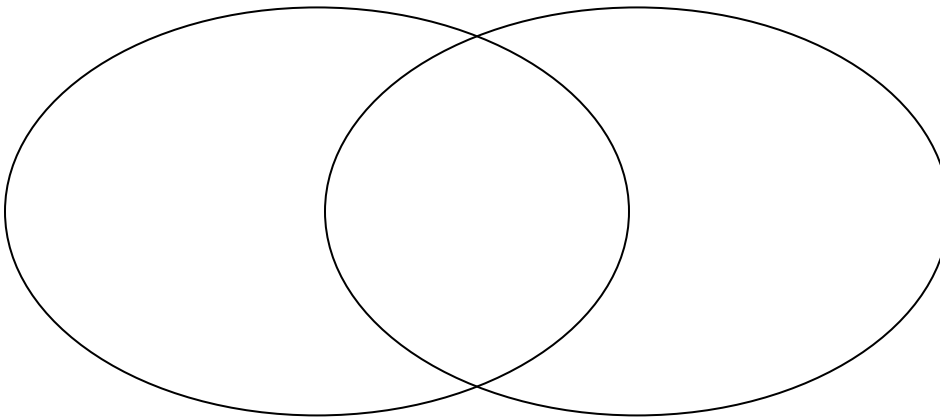
by **Brian Zievert**

Before you enter the Butterfly Center stop and look up at the sculpture hanging from the ceiling. Take some time to identify the steps in the life cycle of a butterfly. List the steps below.



Poison Dart Frogs

Compare and contrast most frogs to the poison dart frogs using the Venn diagram provided.



What causes the secretions of the poison dart frog to be poisonous?

Do you think the frogs in this case are deadly? Why or why not?

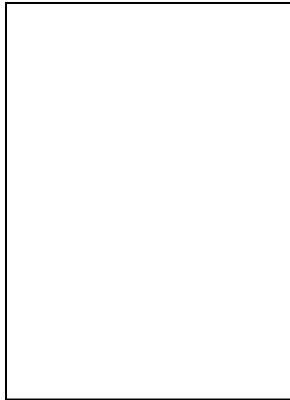
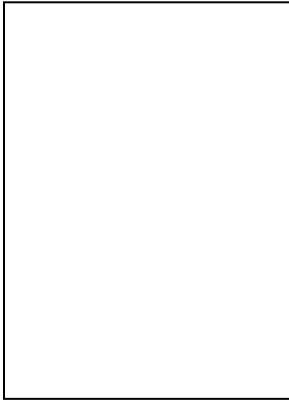
Illustrate the “Life History” of the poison dart frog. Be sure to incorporate the ecosystem.

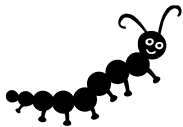
List three reasons why wild frog populations are decreasing.

- 1.
- 2.
- 3.

“Insects in a Texas Meadow” by Tony Upton

As you climb the stairs to the Insect Zoo, notice the mural on the walls next to you. When you reach the top of the stairs, choose three Arthropods from the mural and sketch them. Keeping your choices in mind when you walk through the exhibit, label your drawings as an arachnid, insect, or myriapod.





Meet the Arthropods!

Define arthropod, give two facts about them, and write down two examples of an arthropod.

Arthropod: _____.

Facts:

1.

2.

Examples:

1.

2.

Video: The Good, the Bad, and the Ugly!

Watch the video and answer the questions that follow.

What does a butterfly do?

List two items that we would be without if it weren't for the help of the bees.

- 1.
- 2.

Which animal in the video is not an insect? What is it?



Horseshoe Crab

Why is the horseshoe crab called a “living fossil”?

Prehistoric Dragonfly

You discovered in the text panel that a prehistoric dragonfly had a wingspan of 30 inches and its modern day counterpart's wingspan is 6 inches. How much smaller is the modern day dragonfly than the prehistoric dragonfly? Give your answer in the form of a fraction.



Cave Cockroaches

After reading the text panel, what conclusion can you draw about the cave cockroaches?

Head

How is the insect head like the human head?

Draw and label the insect head.

Where are an insect's legs and wings attached?



All Arthropods Have an Exoskeleton

List the advantages and disadvantages of an exoskeleton in the chart below.

Advantages	Disadvantages
1.	1.
2.	2.
3.	

Why can flies walk on walls?

How Insects Grow

Define molt.

Use the chart below to define and give examples of different types of metamorphosis.

Type of Metamorphosis	Stages	Example
No Metamorphosis		
Simple Metamorphosis		
Complete Metamorphosis		



How Insects See: Through Kaleidoscope Eyes

Define compound and simple eyes.

Compound: _____.

Simple: _____.

How are compound and simple eyes different from the human eye?

Antennae...Not Just on Your TV!

Why are insect antennae incredibly important?



Wing It

List one characteristic that differentiates some insects from other arthropods. Draw two examples.

Characteristic: _____.

Example 1	Example 2

The Language of Perfume

Name two functions of a pheromone.

1.

2.



Inside the Rainforest

While walking through the rainforest be careful not to step on any butterflies and be sure to stay on the paths.

Make a note of all the different components of the rainforest. List all the necessary elements for re-creating a rainforest. What would happen if the waterfall was taken out? How do you think the butterflies would react if a large tree was no longer there? What if the Museum raised or lowered the temperature inside the rainforest; how would the animals that live there react?



Downstairs Entomology Hall

When you continue ahead you'll enter an entomologist's lab. Notice the set of drawers on the left. Open the drawers and observe the specimen collections that lie within. Choose one drawer and answer the following questions:

What type of specimen is in this drawer?

What color are the bugs in this drawer? If the bugs were a different color would this be a liability to their well being? Why or why not?

How many legs do they have?

Do they have body segments? If so, how many?

Do they fly? How do you know? If your specimen flies how do you think this ability helps the animal survive?

Do they live in water? How do you know? If your specimen lives in water how do you think this ability helps the animal survive?

Do these specimens have antennae?

What type of specimen are you looking at? (Insect or Arachnid)

Draw the shape of one of the specimens in your chosen drawer.

What type of environment do you think your specimen lived in? How do you know? Which part of your specimen's body do you think is the most important for its survival in its environment? Justify your answer.



Video: Backyard Beekeeper Donald Burger

What does Donald Burger say about the life expectancy of the queen bee?

What job do the other female bees have in the hive?

What does propolis do?

Pollination, Why Plants Need Insects

List two ways pollen is spread from one flower to another.

1.

2.

The Buzz About Bees

What is honey? How is it created?

What role do bees play in our lives and economy that is more important than honey production?

If You Plant It, They Will Come

Video: If you see butterflies in your garden what does that indicate?

What are host plants used for?

Why would you want a garden with host plants and nectar plants? Give an example of each.

Insect Products

Read the text panel and pick five products made from insects that interest you.

- 1.
- 2.
- 3.
- 4.
- 5.

“Yuck!”

If you were going to eat enough crickets to equal the protein from 4 ½ cows how many crickets would you have to eat?

Be sure to see the vending machine filled with exotic insect delicacies!

Worker Bee’s Daily Chore List

To answer the following questions you will need to walk just beyond the caterpillar to the children’s reading area.

If you were a house bee and your hive suddenly became too hot melting the honey inside, how would you respond to the situation?

Who has the job of taking the trash out of the hive?

If you could not be the queen bee, which worker bee would you like to be? Explain why.



7th Grade Curriculum

Inside Lobby of the Butterfly Center

When you walk into the lobby of the Butterfly Center observe the case of poison dart frogs. Take notes about their environment, what they look like, and what they are eating.

Discuss with your group why the frogs' specific environment is important. What do you think would happen if the poison dart frogs were placed in a desert environment? Why?

Inside the Rainforest

Identify three components that make up the rainforest ecosystem.

- 1.
- 2.
- 3.

If you eliminated one of the components listed above, what do you think would happen to the ecosystem?

Inside the Entomology Hall

As you enter the Insect Zoo, take a moment and see if you can find all of the camouflaged insects. List at least three of the physical characteristics you feel help these bugs survive in their individual habitats. Choose two insects from varying environments and explain why they would have trouble surviving in each others' surroundings.



Insect Achievements

Read the information and choose four facts to share with your classmates:

- 1.
- 2.
- 3.
- 4.

Choose one of the achievements above and explain how you think it helps the insect survive.



Beetlemania!

Choose one beetle on display and explain why you think it looks the way it does. What type of environment must it live in? What would happen if this beetle moved to an environment different from its own?



Butterfly or Moth?

Identify three differences between butterflies and moths.

- 1.
- 2.
- 3.

Choose one physical characteristic of a butterfly and one physical characteristic of a moth. Explain how these characteristics help them survive in their natural habitat.

Butterfly:

Moth:



When you enter the lower level of the Entomology Hall visit the section based on an entomologist's lab. Notice the set of drawers on the left. Open the drawers and examine the specimen collections that lie within. Choose one drawer and answer the following questions:

What type of specimen is in this drawer?

What color are the insects in this drawer?

How many legs do they have?

Do they have body segments? If so, how many?

Do they fly? How do you know?

Do they live in water? How do you know?

Do these specimens have antennae?

What type of specimen are you looking at? (Insect or Arachnid)

What type of environment do you think your specimen lived in? How do you know?

Draw the shape of one of the specimens in your chosen drawer.



Video: Backyard Beekeeper Donald Burger

What tools does Burger use while working on his hive?

What does he say about the life expectancy of the queen bee?

What job do the other female bees have in the hive?

What does propolis do?



8th Grade Curriculum

Inside the Lobby of the Butterfly Center

When you walk into the lobby of the Butterfly Center take a few notes about the poison dart frogs. What do they look like? What type of food are they eating? What type of environment are they living in?

Inside the Rainforest

List everything you see in this environment that contributes to the survival of the plants and creatures that live here.

If you eliminated one of the elements listed above, what do you think would happen?

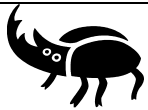
Inside the Entomology Hall



Insect Achievements

Complete the chart with information from the text panel.

Achievement	Insect
Longest insect	
Fastest runner	
Heaviest insect	
Loudest insect	
Largest wing	
Highest jump	
Biggest crowd	
Strongest insect	



Beetlemania!

Identify three reasons why there are so many beetles:

- 1.
- 2.
- 3.

Choose a beetle from the specimen case and draw a picture of it below.

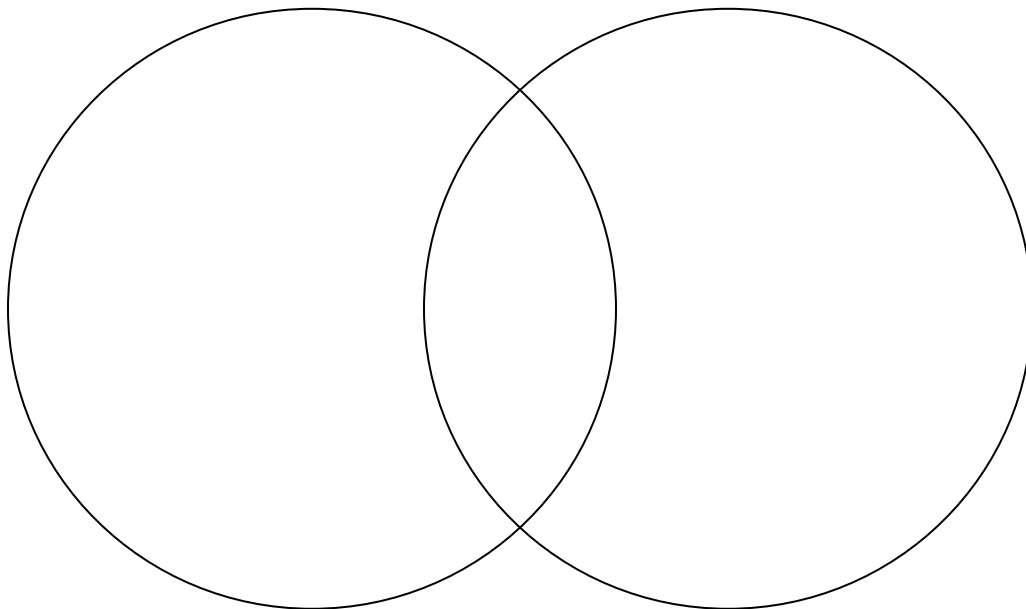
Name of beetle: _____

Explain why you think the beetle you chose looks the way it does. What type of environment must it live in? What would happen if this beetle moved to a desert/tropical area?



Butterfly or Moth?

Compare and contrast butterflies and moths using the Venn diagram below.





While visiting the lower level of the Entomology Hall, you will have the opportunity to listen to real life entomologists on the touch screen computer. Listen to several and discover what led them to become entomologists and what types of jobs they do.

List three different careers fields an entomologist can enter.

- 1.
- 2.
- 3.



As you continue, you will enter an entomologist's lab. Notice the set of drawers on the left. Open the drawers and observe the specimen collections that lie within. Choose one drawer and answer the following questions:

What type of specimen is in this drawer?

What color are the insects in this drawer?

How many legs do they have?

Do they have body segments? If so, how many?

Do they fly? How do you know?

Do they live in water? How do you know?

Do these specimens have antennae?

What type of specimen are you looking at? (Insect or Arachnid)

Draw the shape of one of the specimens in your chosen drawer.

What type of environment do you think your specimen lived in? How do you know?

Entomologists' Tools

Look at the case with the entomologists' tools. List three tools that they use.

- 1.
- 2.
- 3.

Be sure to browse the vending machine, which is filled with exotic insect delicacies.