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Learn the Beetle & Discover the Blue

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Learn the Beetle & Discover the Blue



Created by: Nicole Luhr

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Lesson overview

Targeted audience is for teachers.

Learn the Beetle and Discover the Blue

Details

Time

Lesson Instruction: 10-15 min

Activity #1: 15-20 min

Activity #2: 20 min +

Activity #3: 20 min + for 5 days

Age Range

Preschool/Kindergarten/First Grade



Objectives

For children to:

1. Learn basic body parts of a beetle and put their own together.
2. Observe and relate body parts of a beetle to a live beetle.
3. Determine how humidity levels affect the color of beetles.



Nebraska Standards Met

Early Learning Guidelines

AL.01: Develops foundational skills that support initiative, self-direction, and curiosity.

- Children begin to follow directions and demonstrate interdependence; children continue to communicate to ask questions and seek answers.

LL.05: Conveys meaning through drawing, letters, and words.

- Children begin to use drawing, scribbling, and letters as a form of communication.

S.01: Demonstrates a basic awareness and use of scientific concepts.

- Children begin to ask more complex questions regarding science concepts; later, children begin to make increasingly complex observations of objects, organisms and events.

S.02: Develops foundational skills in learning and understanding about the world through exploration and investigation.

- Children begin to use simple tools to extend investigations; later, children begin to use senses, materials, tools, technology, events in nature, and the environment to investigate and expand knowledge.

CA.02: Develops foundational skills that support creative expression through the process, production, and appreciation of visual art forms.

- Children begin to broaden artistic exploration; later, children begin to develop confidence in expressing creativity.

NGSS

K-LS1-1: Use observations to describe patterns of what plants and animals (including human) need to survive.

- Use observations (firsthand or from media) to describe patterns in the natural world in order to answer scientific questions; patterns are observed and used as evidence.
- W.K.7: Participate in shared research and writing projects.
- W.K.2: Use a combination of drawing, dictating, and writing to compose informative/explanatory texts in which they name what they are writing about and supply some information about the topic. (K-ESS2-2) (K-ESS3-3)

Activities

- Build a Beetle
- Beetle Exploration
- Humidity Experiment



Questions to Get Started

- What is an insect?
- Where can you find insects?
- Why are insects important?
- Do insects have bones like humans?
- What's your favorite kind of insect?

Insect Background

Read or explain the following material to the children prior to the lesson instruction.

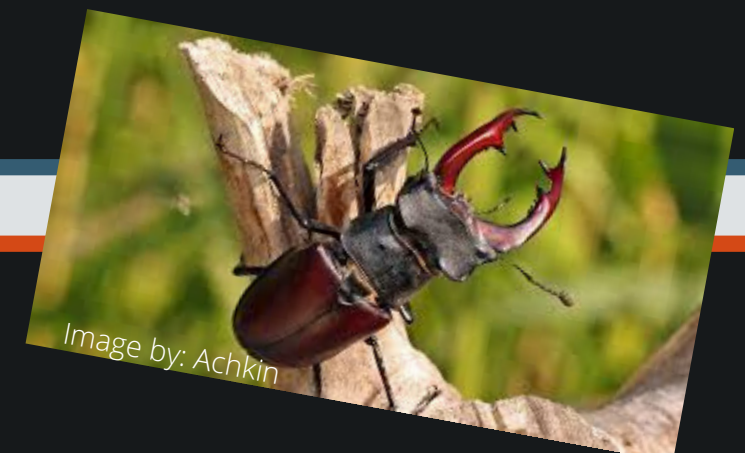
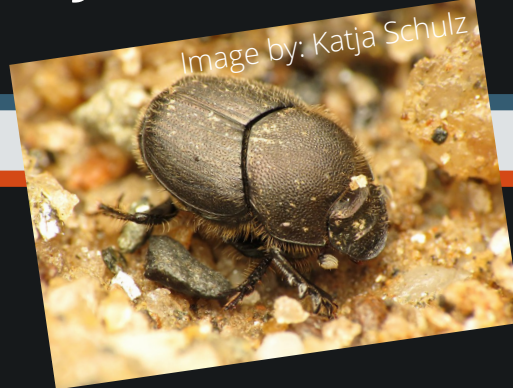
Learn the Beetle and Discover the Blue



Basic Insect Information

Insects, known as arthropods, are found almost everywhere in the world on land and in water. They represent the largest group of animals on the planet. People who study insects are called entomologists. Some insects are nocturnal (active at night) and others diurnal (active during the day). A few different kinds of insects include the following: beetles, butterflies, grasshoppers, bees, dragonflies, and ants. Spiders are not insects, they are called arachnids since they have four pairs of legs. A variety of insects assist people by providing products to eat and pollinating many crops.

Insects don't have bones or a backbone like people, which makes them invertebrates. They have an exoskeleton on the outside of their body that serves as body armor to protect them. Three main body parts make up an insect along with wings (most of them), antennae, and three pairs of legs. Insects have a variety of adaptations to survive, such as mouthparts, to eat plants, other animals (dead or alive), or decomposing materials. Most of the insects can fly and hatch from eggs. Since there are a lot of predators, females lay eggs in large amounts so there is a higher chance of survival.



Beetle Information

Beetles are in a group of their own called Coleoptera and considered the largest group of insects. In addition to the basic insect characteristics, they have chewing mouthparts, called mandibles, that help them cut and crush their food to eat. As for food, they can eat dead or living plants, alive or dead animals, fruits, vegetables, or even other animal feces. Most beetles live on plants while others live in tunnels or swim. Since beetles can't see well, they have unique ways of communicating with one another with certain scents, sounds, or vibrations. To protect themselves, they can blend in with their surroundings, pretend they are something else, actively defend themselves, or release a toxic substance. They also play an important role in the ecosystem by decomposing various materials, pollinating flowers by feeding on pollen, and eliminating waste.

Engagement

Families should be encouraged to participate in nature activities outside to grow the appreciation of insects and further the child's curiosity. Insects provide hands-on experience and have important environmental roles. What kinds of insects can be found around the house? What similarities and differences are observed with different insects?



Books to Reference

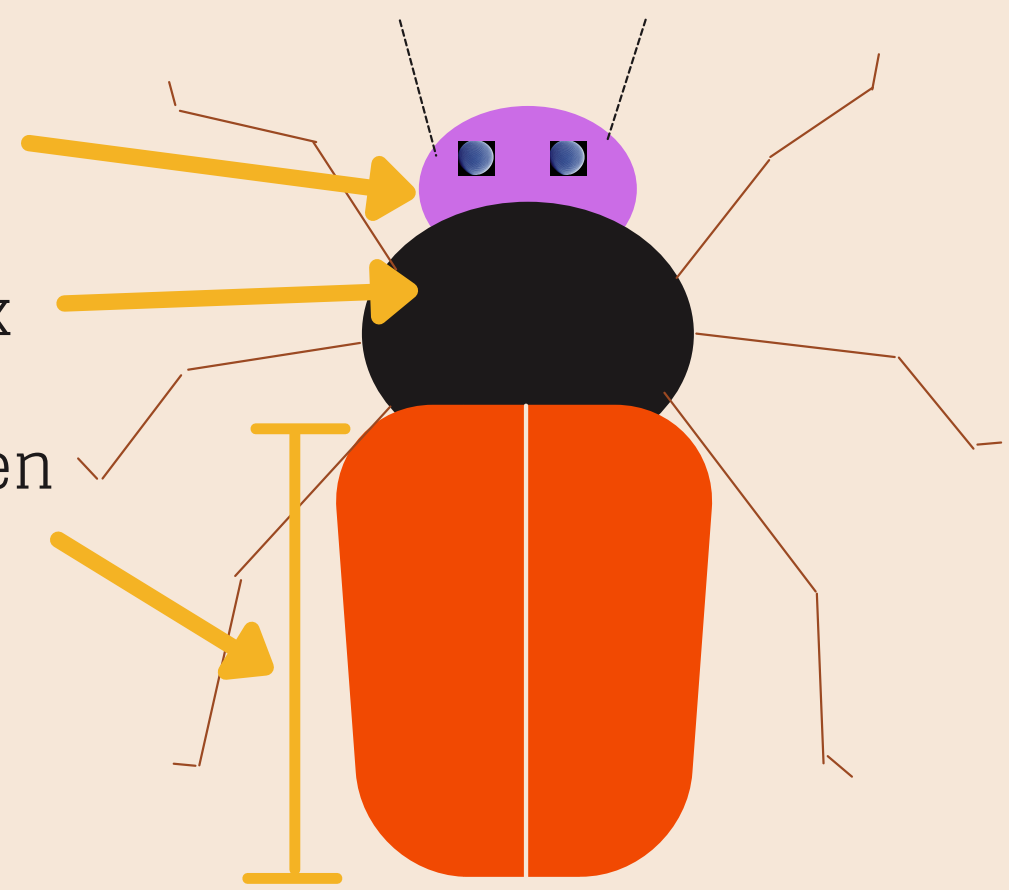
Insect Detective by Steve Voake
The Backyard Bug Book for Kids by Lauren Davidson
The Bug Book by Sue Fliess
Insects and Bugs for Kids by Jaret C. Daniels
The Beetle Book by Steve Jenkins
The Beetle Alphabet Book by Jerry Pallotta
A Beetle is Shy by Dianna Hutts Aston

LESSON INSTRUCTION

Beetle Anatomy

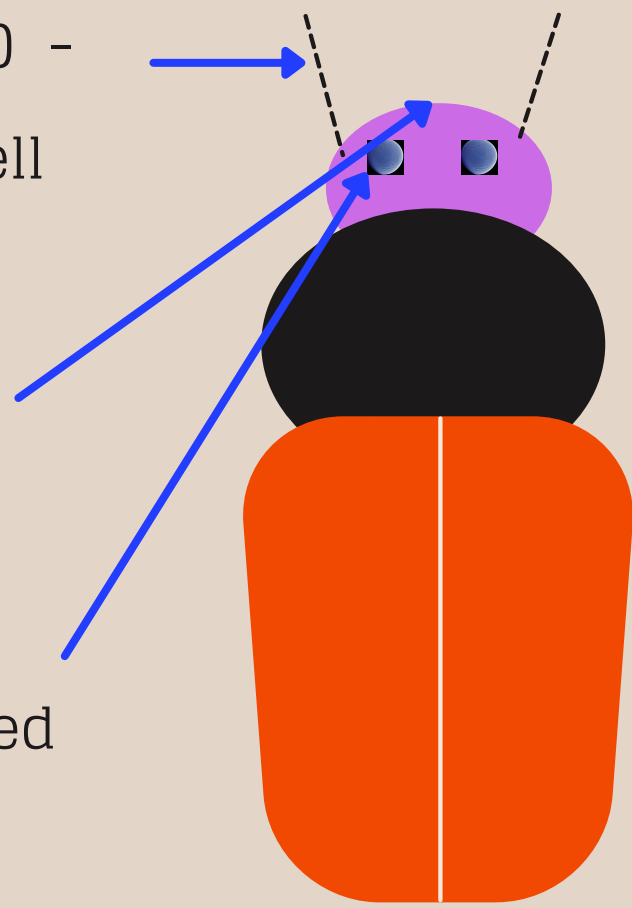
An insect has 3 body segments:

1. Head
2. Thorax
3. Abdomen



Head

1. Antennae (2) - feel and smell things
2. Mouth - crushes and cuts food
3. Eyes (2) - used to see



Fun Fact

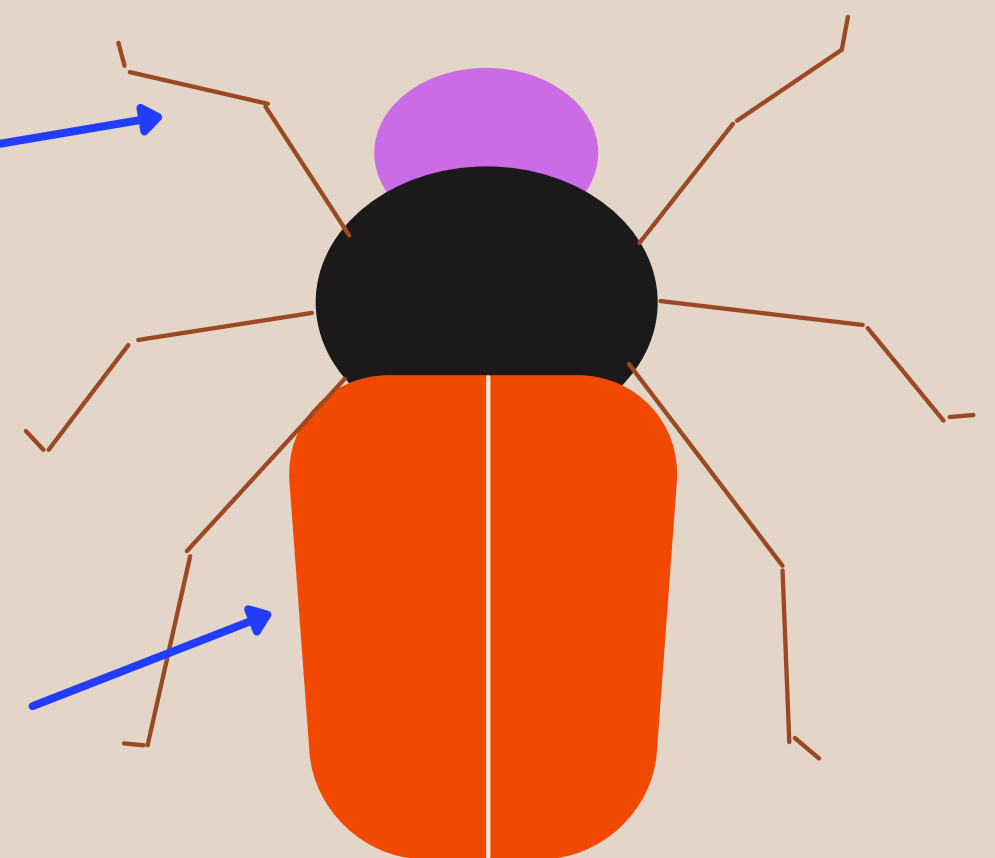
Almost all beetles are deaf; only a few of them have ears.

Questions to ask the children:

1. What do you see on the head?
2. How do you think beetles move?
3. Do you think beetles can hear?
4. How many legs do you see?

Thorax

1. Legs (6) - used to swim, jump, walk, run, or dig
2. Wings - used to fly

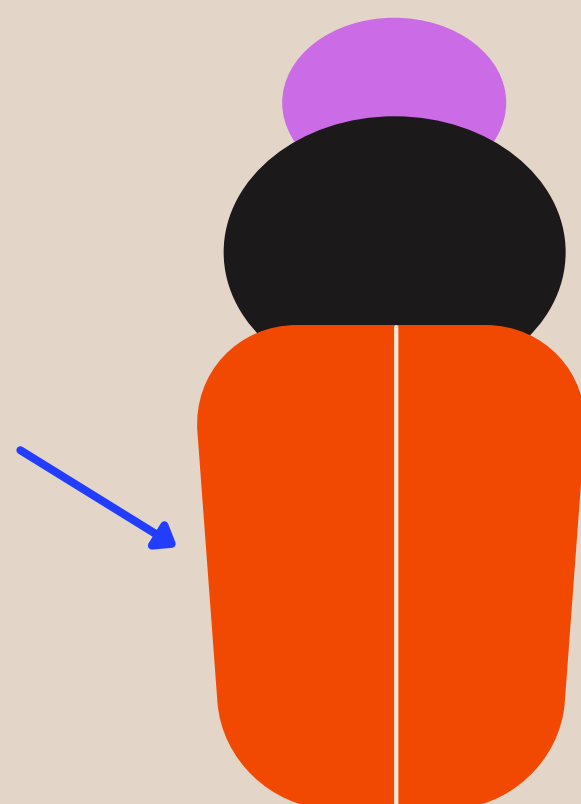


Fun Fact

Some beetles can't fly.

Abdomen

Under the wings and carries the beetle's gut inside



ACTIVITY #1

Build a Beetle (After Lesson Instruction)

Getting Started

Each child will create their beetle from the materials given to them and following the steps on how to build a beetle. With supervision, the child is to put their insect together with the body parts in the proper place.

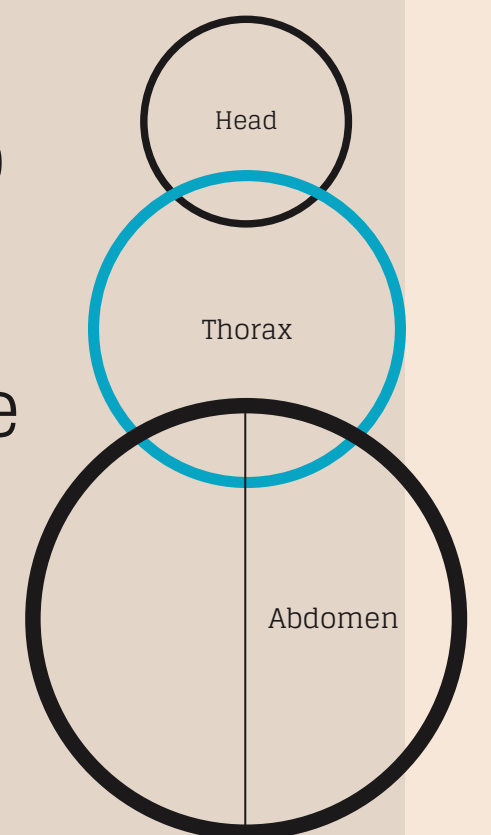
Materials

- white cardstock for insect body cut outs to be printed on
- pipe cleaners cut to 1" for antennae
- pipe cleaners cut to 2" for legs
- small wiggle eyes to fit on insect head
- crayons or markers
- glue bottle
- scissors



How to Build a Beetle

1. Color the insect body sections and then cut them out around the bold line. (Tell the children what each circle represents.)
2. Glue the middle sized circle to the small circle and then glue the biggest circle to the middle sized circle.
3. Next, glue on the eyes on the head.
4. Then, glue the shorter pipe cleaner pieces on the head for the antennae.
5. Last, the 2" pipe cleaner pieces will be glued to the thorax for the legs.

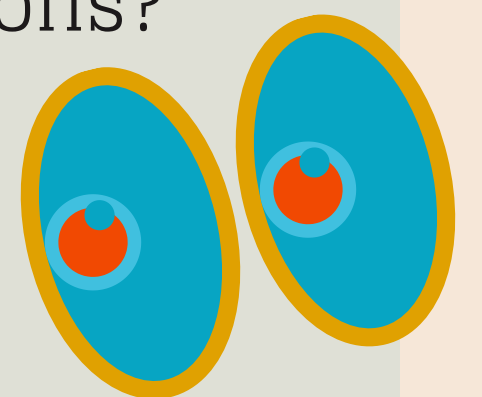


Assessment

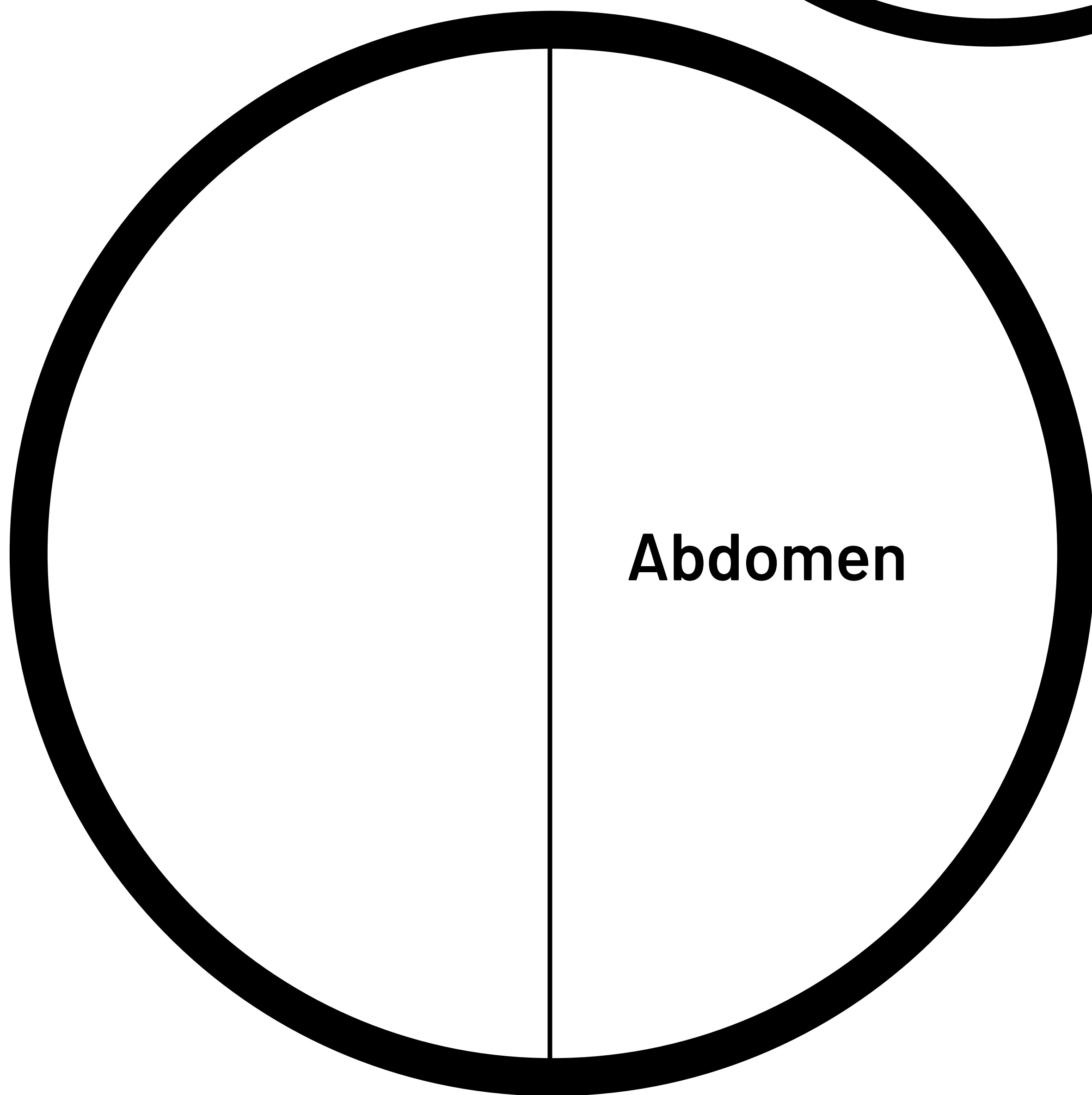
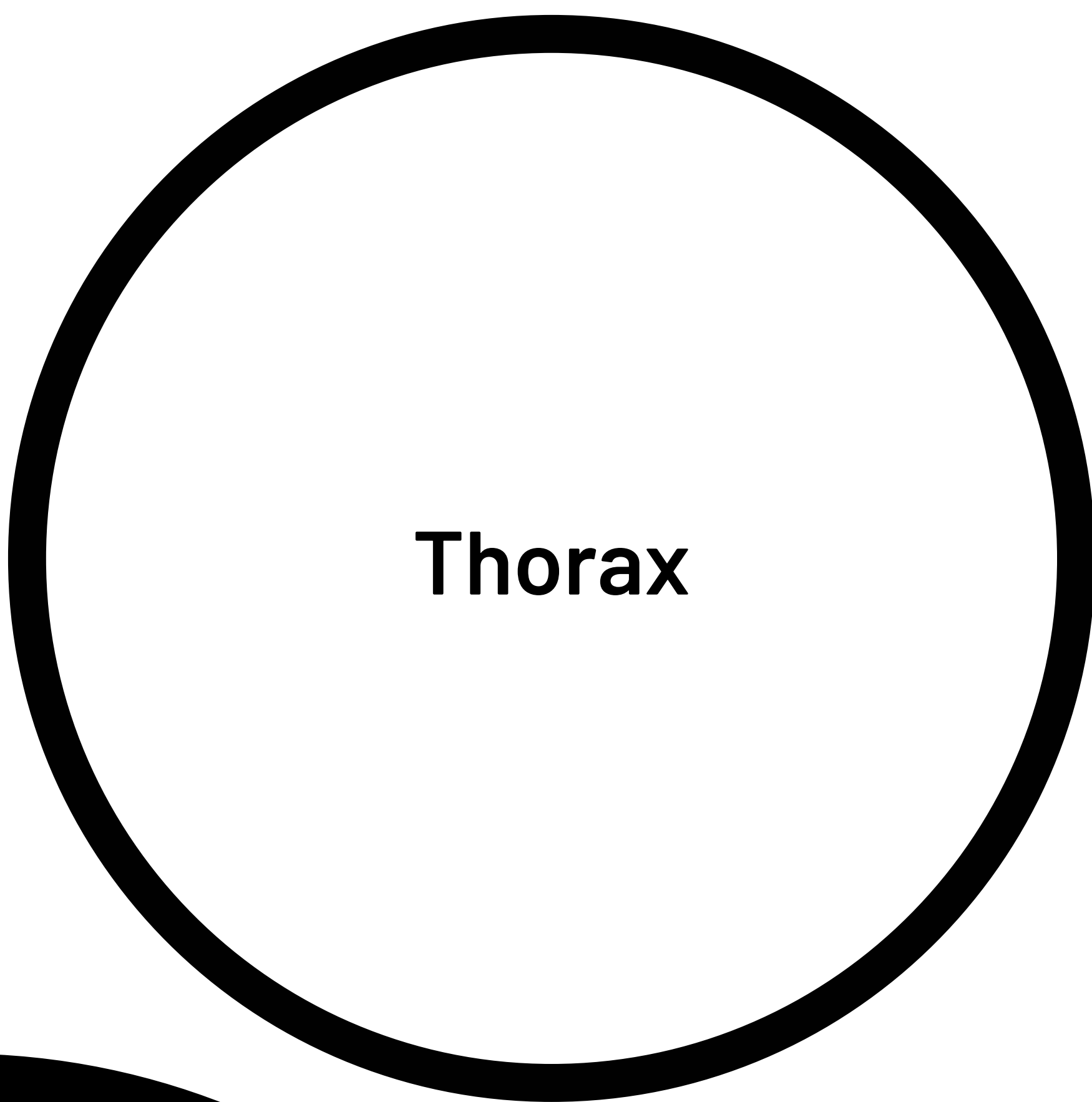
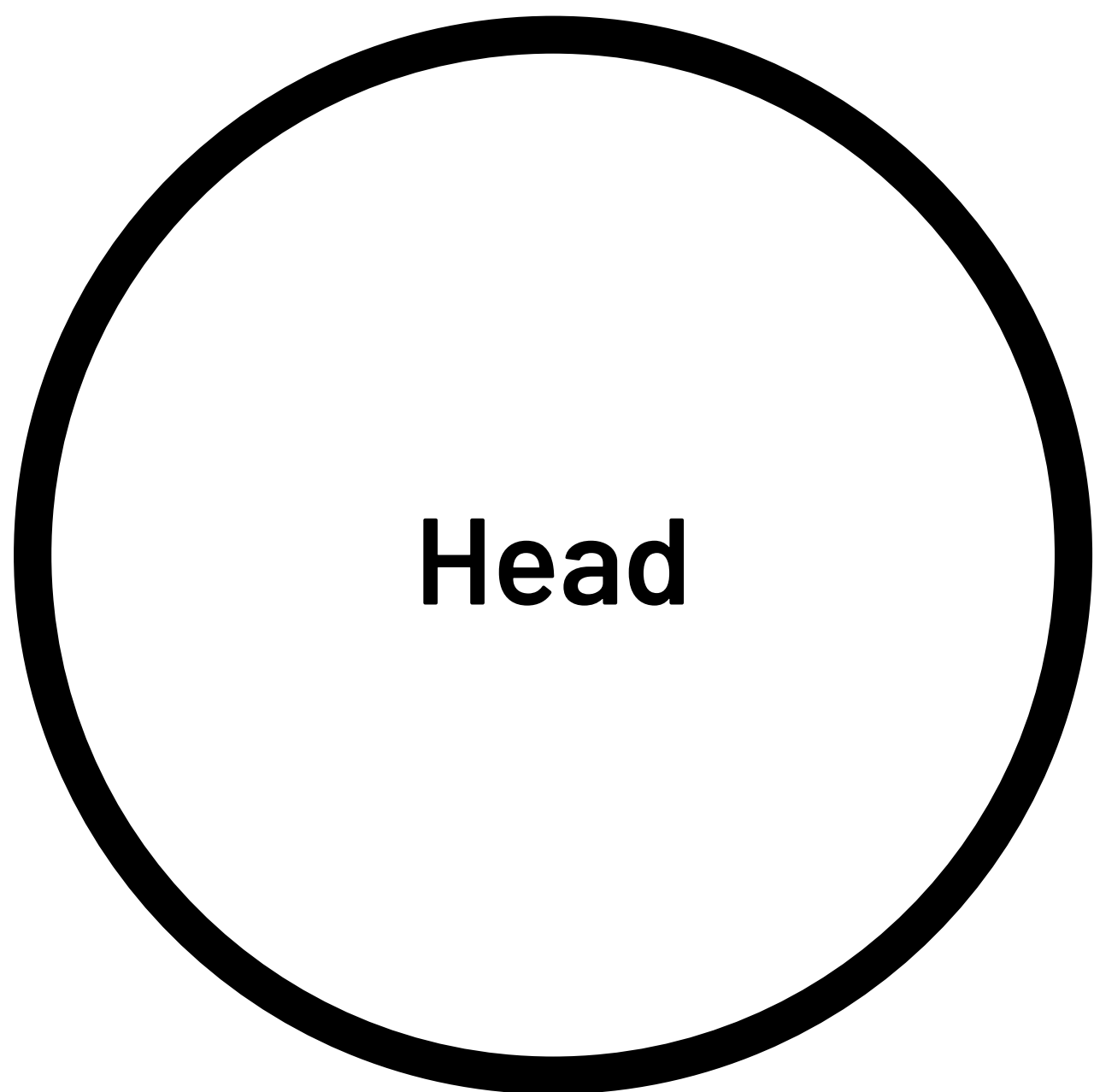
Observe children as they put their beetle together and assess their finished product.

Questions to consider:

- Are they able to follow directions?
- Are body parts in the correct location?
- Do they have the appropriate number of antennae, eyes, and legs glued on?



Insect body cut outs.



Beetle Info & Care

Read or explain the following material to the children prior to Activities #2 and #3.

Blue Death Feigning Beetles

Reference for Activity #2 and #3

Blue Death Feigning Beetles Basic Intro

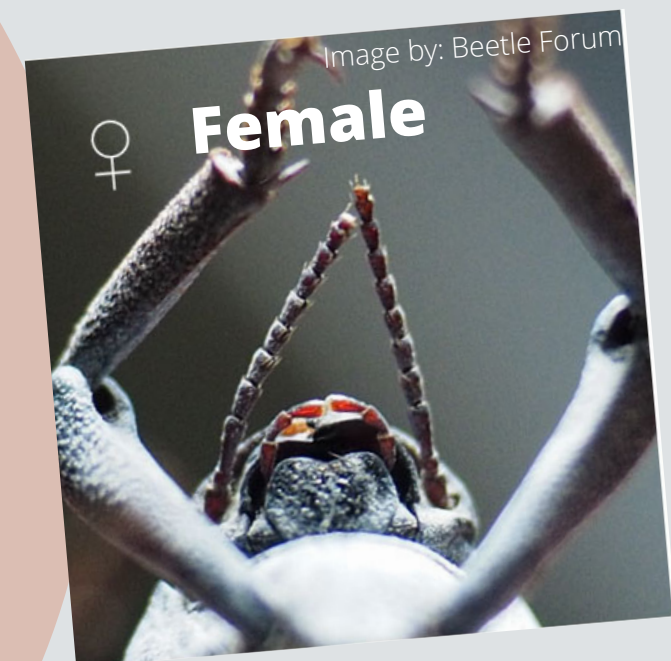
Blue Death Feigning Beetles are naturally found in deserts of Southwestern United States and Mexico and can survive long hot, dry periods. Another name for them is Ironclad Beetles from how hard their exoskeleton is. The bumps on the top of their abdomen secrete the waxy substance that helps preserve the water that's in the body. They can get up to an inch in length, do not fly, are very hardy, and do not bite or release toxic substances. In general, they can average a life span of around 8 years in captivity. The beetles are diurnal, active during the day and rest at night.



Male

Fun Fact

Males have hairs on their antennae that are visibly noticeable compared to females that have very small hairs where you can barely see them.



Female



Habitat

Blue Death Feigning Beetles can be housed in a glass or plastic container. As a general rule, two beetles per gallon. Put approximately 2-3 inches of substrate (dry sand or coconut fiber) in the bottom. Some rocks can be added for them to climb as well as a log for hiding (or something to hid under). A lid can be placed on top of the container to protect them from external factors (i.e., children), but make sure it's still well ventilated.

About 8-12 hours of natural lighting is sufficient for the beetles at room temperature since they can handle hot days and cool nights in the desert. Typically, no added humidity is necessary.

Blue Death Feigning Beetles

Reference for Activity #2 and #3

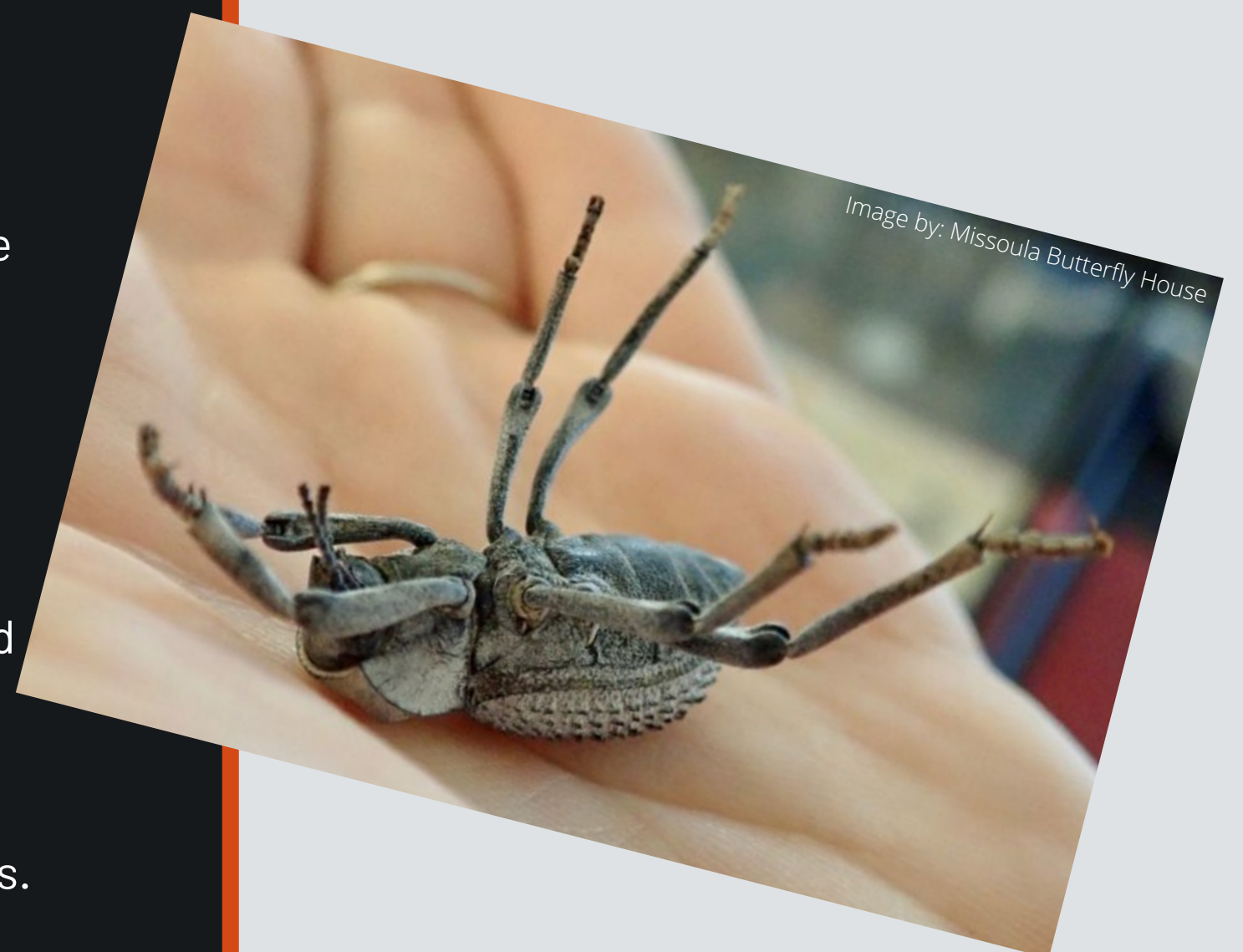


Food and Water

Since Blue Death Feigning Beetles are scavengers, they can feed on decomposing plant and animal material along with fruits and vegetables. Protein is something that is necessary for them to thrive as well which they can get from dry dog or cat food. It's not necessary to provide a separate water source since the fruits and vegetables provide enough water for them.

Behavior

These insects got the name "Blue Death Feigning Beetles" since they are blue in color and demonstrate a feigning behavior. The term "feign" means to pretend. To avoid major predators (i.e. spiders), they play dead by rolling over and putting their legs in the air. Spiders, especially tarantulas, don't like eating dead prey, so they avoid the beetle since it is deemed inedible to them. Pretending to be dead can last anywhere from seconds up to a few hours, all depending on how long it takes for the danger to pass.



Where to Buy Live Insects



<https://insectsales.com/>

<https://www.satooreptilesandaquatics.com/>

<https://bugsyncyberspace.com/>

Helpful Links



Kiddle Beetle Facts -
<https://kids.kiddle.co/Beetle>

Pest World for Kids -
<https://www.pestworldforkids.org/>

Smithsonian -
<https://www.si.edu/spotlight/buginfo>

National Geographic -
<https://kids.nationalgeographic.com/animals/invertebrates/topic/insects>

ACTIVITY #2

Beetle Exploration



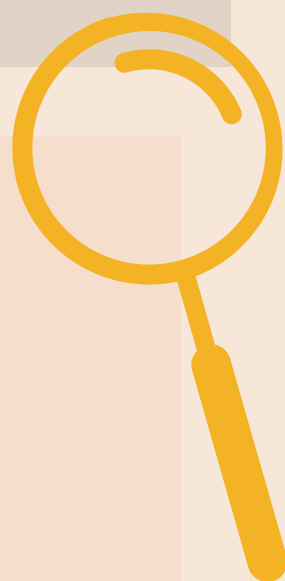
Live Insect Observation

Insects are a great learning tool for observation especially since they are small and easy to care for. Children are curious so it is important to start building observation skills now since they are an important aspect for their educational years. With this activity, children are able to discover cause and effect of the insect responding to them and them responding to the insect.

Children can document what they see by writing notes of what the insect is doing and drawing pictures. Tweezers, eye dropper, and magnifying glasses are some scientific tools that may assist with the observations. With this activity, children may need support from adults with handling fear or other emotions they may experience.

Materials

- insect journal
- 4+ Blue Death Feigning Beetles
- pencils, crayons, and markers
- magnifying glasses (optional)
- tweezers (optional)
- eye dropper (optional)



Exploration Activity Steps

1. Provide Blue Death Feigning Beetles for the children to observe. If the children wish to handle a beetle, they may do so by grabbing their thorax gently and placing it in their hand. The beetle may play dead the entire time while it's being held.
2. Provide the insect journal to each child for them to record what they observe through pictures, dictation, words, or all three about their beetle.
3. Have the child count the number of body segments and how many legs there are. What shapes do they see? What colors do they see? What does the beetle feel like (if the child is willing)? What are the beetles doing? How are they the same as other beetles they have seen?



Assessment

Observe the children as they explore and learn about the beetle. Assess the journal of each child.

Questions to consider:

- Can they correctly show or say what they are seeing?
- Are they using previous information and applying it to the current experience?
- Are they using various senses for observation?



MY INSECT JOURNAL

NAME



HOW MANY LEGS?

COLORS I SEE

SHAPES I SEE

WHAT IS THE BEETLE DOING?

WHAT DOES IT FEEL LIKE?



MY INSECT JOURNAL



DRAWINGS OF THE BEETLE

Blank area for drawing the beetle.

ADDITIONAL DRAWINGS

Blank area for additional drawings.

ADDITIONAL NOTES

Blank area for additional notes.

ACTIVITY #3

Humidity Experiment

Hypothesis

The beetles will become darker blue as the humidity increases.

Background

Blue Death Feigning Beetles live naturally in deserts and secrete a waxy substance that serves as sunscreen to protect themselves from extreme heat experienced in their habitat and to preserve moisture. Their color can be anywhere from a light blue to black, depending on the amount of humidity in the air.

The amount of moisture in the air is called humidity. Since deserts have minimal rainfall, moisture needs to be preserved in their body. Blue Death Feigning Beetles adjust how much of the waxy substance they secrete based on the humidity in their environment. Beetles are a lighter blue when there is low humidity. When the humidity is higher, the beetles are darker since less secretions occur. If the Blue Death Feigning Beetle gets full of moisture, what happens? As a group/class, follow the steps provided to carry out the experiment.

Materials

- experiment worksheets
- 4+ Blue Death Feigning Beetles
- pencils
- spray bottle with water
- 4 critter carriers or plastic containers with the same substrate and place to hide for each

Step 1

Prepare each of the 4 containers with the substrate and a hide with the same food and same amount of food in each.

Step 2

Place 1-2 beetles in each container and number them 1, 2, 3, 4.

Step 3

Set the spray bottle nozzle to a mist setting after filling it with tap water.

ACTIVITY #3 CONT.

Step 4

Once a day for a week (5 consecutive days), the humidity will be modified using the spray bottle by a child or adult applying the following guidelines daily:

Container 1: No spray

Container 2: 1 spray per day

Container 3: 2 sprays per day

Container 4: 3 sprays per day

Step 5

Each child is to observe what they see and document any behavior or color change using the corresponding experiment worksheet.

Step 6

If desired, this experiment may be done again to compare and contrast the results. Wait two weeks for the beetles to get back to normalcy.

Tips

- Keep the beetle containers out of direct sunlight in a well-lit area.
- All variables, except the sprays, should be the same. The same kind of food and same amount should also be used.

Questions to Think About

- Was the color of the beetles affected from the various number of sprays?
- Why should you do more than one day for the experiment? Or, why shouldn't you?
- What did the beetles do when water was sprayed into their container?
- What if the sunlight was exposed to the beetle containers?

Additional Ideas

- Take a before and after picture of the beetles in each container each day the experiment is done to compare differences. Is there a difference?
- Have two containers sprayed at one foot above the beetles and the other two containers at two feet above. Does the height of spraying into the containers have an affect on the color of the beetles?
- Pick up two beetles by from above and then two by going from the front of them. Does the method of picking them up affect whether or not they feign?

Assessment

An assessment checklist is provided to be used as the experiment is completed to evaluate each child. An additional page is provided for extra notes, additional observations, and areas for improvement.

HUMIDITY EXPERIMENT DAY 1



NAME

CONTAINER #1

CONTAINER #2

CONTAINER #3

CONTAINER #4



HUMIDITY EXPERIMENT DAY 2



NAME

CONTAINER #1

CONTAINER #2

CONTAINER #3

CONTAINER #4



HUMIDITY EXPERIMENT DAY 3



NAME

CONTAINER #1

CONTAINER #2

CONTAINER #3

CONTAINER #4



HUMIDITY EXPERIMENT DAY 4



NAME

CONTAINER #1

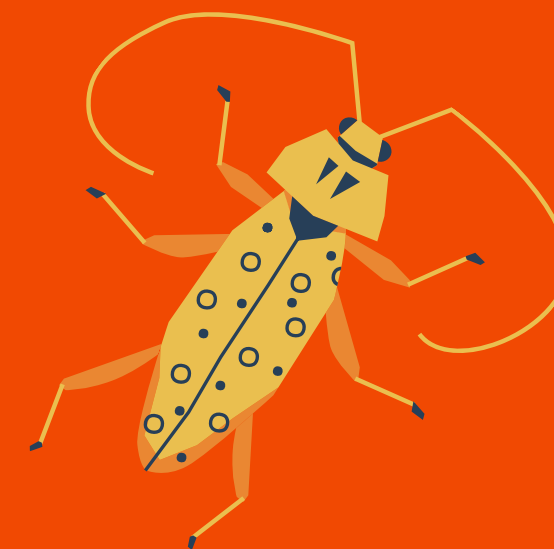
CONTAINER #2

CONTAINER #3

CONTAINER #4



HUMIDITY EXPERIMENT DAY 5



NAME

CONTAINER #1

CONTAINER #2

CONTAINER #3

CONTAINER #4



ASSESSMENT CHECKLIST

Early Childhood Science Assessment

This checklist is based off of the Nebraska Early Learning Guidelines. There are seven domains of learning and development that the Nebraska Department of Education provides information on.

Observation

Describes observed behaviors

Explores different materials to learn about characteristics of insects

Can handle live insects (optional)

Prediction

Object properties are compared and contrasted

Tries various strategies to see what happens and asks questions

Can handle live insects (optional)

Documentation

May use invented spelling in addition to identifying numbers and letters

Can describe information and record it through drawings and discussion

Represents ideas and thoughts with shapes, scribble, and/or pictures

Retelling

Observations are related to the predictions and experiment

Experiment steps are described in the correct order

Observations and drawings are dictated accurately

Definitions are suggested to scientific words that are unknown

Discussion

Additional sources are explored for more information (i.e. websites, books, media, etc.)

Observable phenomena is simply described with labels and adjectives

Nonliving and living organisms can be differentiated

Scientific vocab is used (i.e. insect, experiment, observe, etc.)

ASSESSMENT NOTES

Notes and Comments

Additional Observations

Areas for Improvement

Additional Notes

Glossary and References

Glossary

Adaptation - changing a feature or act to better survive in the environment
Arachnid - creature with 8 legs
Arthropod - invertebrate and has an exoskeleton
Beetle - an insect that may or may not have wings
Decomposing - material that is being broken down naturally
Diurnal - active during the day
Entomologist - person who studies insects
Exoskeleton - a hard outer shell that protects an arthropod
Feign - to pretend
Humidity - moisture in the air that can't be seen
Insect - an arthropod with three body segments and six legs
Invertebrate - an animal that doesn't have a backbone
Mandibles - chewing mouthparts
Nocturnal - active at night
Pollinate - when a grain of pollen is moved from flower to flower to produce seeds
Predator - an animal that hunts for another animal
Prey - an animal that is being hunted by another animal
Secrete - to give off or produce
Substrate - a layer of material for the bottom of a habitat
Toxic - bad or harmful

References

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Credit to Sarah Roberts for Activity #2 and #3.