

AMAZEMENT IN THE BASEMENT: EDUCATOR CURRICULUM

ALL LESSON PLANS



AMAZEMENT IN THE BASEMENT: KNOW BEFORE YOU GO - EDUCATOR PRE-VISIT INFORMATION

GRADE LEVEL: K-5



INTRODUCTION

Standards Alignment

Each lesson is aligned to the Next Generation Science Standards and lists what Science and Engineering Practices (SEPs), Disciplinary Core Ideas (DCIs), and Crosscutting Concepts (CCCs) the lesson connects to.

In-Museum Visit Activity Lessons

- The curriculum for each lesson is designed to provide you with the background information to prepare your students for the activity in the exhibit. We recognize that not every activity or piece of content will be appropriate for every grade level or learner, so we encourage you to adapt the materials to best meet the needs of your class.
- To support differentiation in learning, all student worksheets are offered in two versions:
 - With sentence frames – helpful for younger students, English language learners, or any students who benefit from additional scaffolding.
 - With open response lines – designed for students who are ready to write their own answers.

Exhibit Overview

- *Amazement in the Basement* offers a rare “backstage” glimpse into the Museum’s collections and research work. It invites people to marvel at the diversity of nature, think like a scientist, and peek into the brand-new Paleontology Center.
- The exhibit is divided into three main sections. If you are visiting the exhibit with a group of 15 or more students, we recommend splitting into three groups to rotate through each section.

LOWER LEVEL MAP

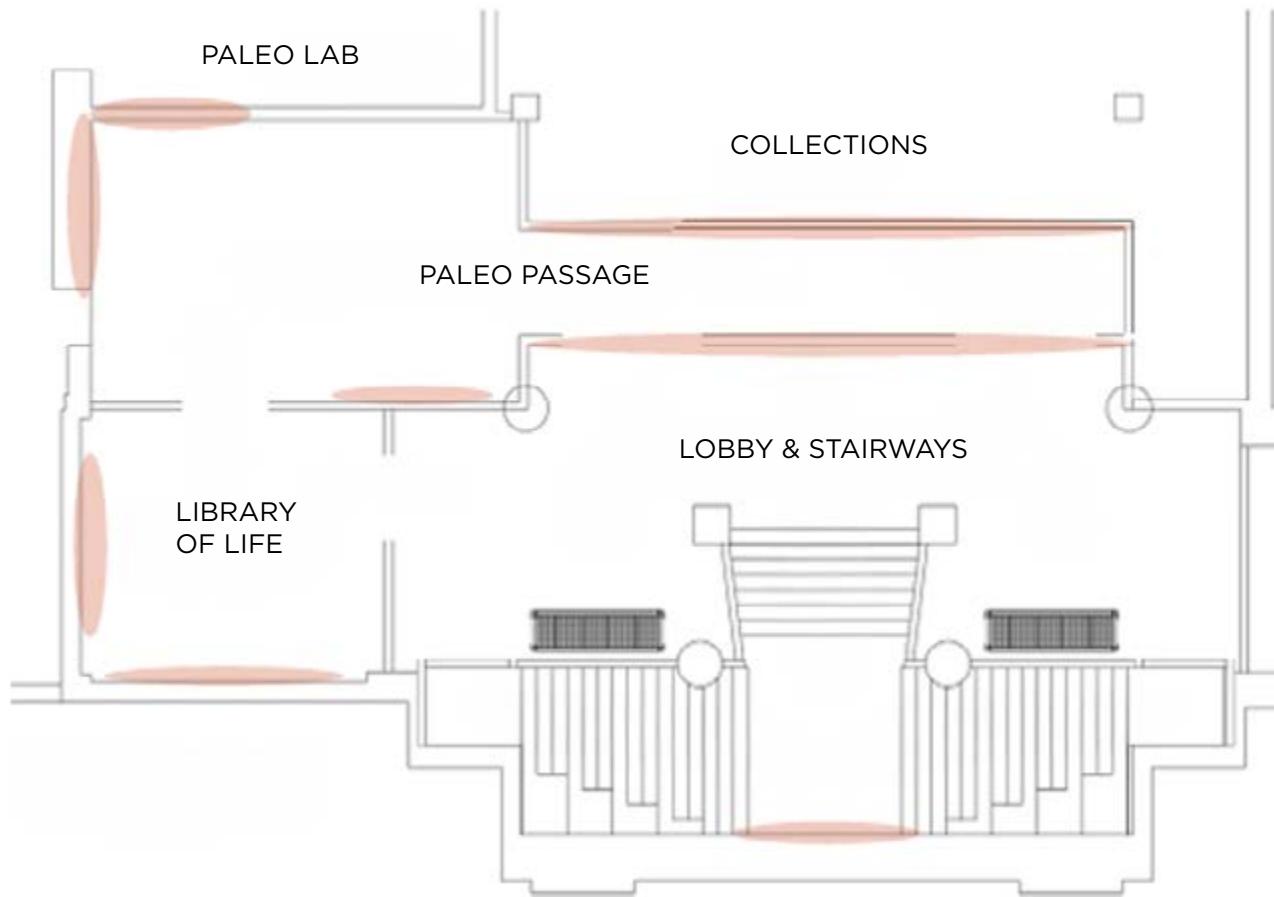


EXHIBIT HIGHLIGHTS

Lobby & Stairways

The entry is dominated by a suspended whale skeleton and towering shelves packed with plants, animals, minerals, and fossils that represent just a taste of the 9 million specimens stored behind gallery walls.

Paleo Passage

- San Diego is one of the most fossil-rich areas in the United States, and our collection is the region's most important repository for many of them, there might be new specimens here the next time you visit!
- We use compactors to maximize the storage in the paleontology collection. Without them, this room would need to be nearly twice this size to fit everything.
- The oversized fossil specimens behind the glass within the large collections room are organized by geologic time. The specimens in the left 3 vertical sections are Pliocene (24 million years old) and to the right are Cretaceous (75 million years old).

Library of Life

- Explore the cabinets and take in the wonder, breadth, and significance of The Nat's collections. Each display focuses on a different research department and demonstrates how the collections answer questions about life around us.
- All of the herbarium sheets in the backlit grid feature specimens with some medicinal value. For native species, Kumeyaay and other Native People knew of the medicinal properties of these plants long before they were utilized by western science.
 - Southwestern pipevine: used to treat snakebites, malaria, and infections.
 - Purple coneflower: used to boost the immune system and fight off infections.
 - Foxglove: used to treat heart conditions.
 - German chamomile: used for its calming and anti-inflammatory properties.
 - Yarrow: used to stop bleeding, reduce inflammation and treat wounds.
 - English lavender: used for its calming and relaxing properties.
 - Pacific yew: bark contains paclitaxel (also known as Taxol), used to treat various cancers including ovarian, breast, and lung cancer.
 - Hidden lily ginger: used to treat nausea, inflammation, and improve digestion.

Our Research Collections and Careers

Learn more about our [research departments](#) and their [collections](#).

Museum Research Careers

- **Curator** - Directs research and collections at The Nat within their department's specific discipline. Curators play a leadership role in using an evidence-based, scientific approach to inspire and steer biological research at The Nat. They serve as The Nat's face for science. In this capacity, Curators act as a strong representative of The Nat within the local, regional, and global scientific community.
- **Collection Manager** - Oversees the organization, improvement, and use of the research collection in their department's specific discipline. They also handle incoming and outgoing specimen loans, lead interpretive tours of collection spaces for visitors, assist visiting scholars and students in using the collection, and supervise and train employees and volunteers in the department.
- **Technician** - Assists with field and laboratory investigations of regional biodiversity. They are responsible for field collection of biological specimens or data, and are familiar with taxonomic keys or field guides to identify target organisms to genus and species.
- **Postdoctoral Researcher** - Highly trained Ph.D.-level scientists that fulfill specific research and program objectives at The Nat, under the direction of their departmental Curator. Postdoctoral Researchers perform technical work related to the publication of peer-reviewed scientific research on regional biodiversity.

PRE-VISIT ACTIVITES

Before bringing your class to see *Amazement in the Basement*, here are some ways to engage your students with content that connects to the exhibit.

ACTIVITY: CLASSROOM CLASSIFICATION

Objective

Students will classify living and non-living things by creating groups based on common features.

Materials

Select enough of each item for the number of groups you will have. This is not a comprehensive list, just a recommendation of common classroom objects that could be used for this activity:

- Rubber bands
- Post-its
- Paper clips
- Pipe Cleaners
- Craft feathers
- Pom Poms
- Manipulatives
- Markers or Crayons
- Beads
- Buttons

INSTRUCTIONS

Introduction (5 minutes)

- Begin by asking students, have you ever placed items into groups based on similar characteristics or features? If so, you have practiced classification. Ask students to share ways they have sorted items (ex. by color, shape, material, size, flavor, feel, type).
- Classification is when you organize things into groups based on similar characteristics. Scientists do this a lot with organisms like plants and animals, but today we are going to practice this skill using items from our classroom.

Exploration (10 - 15 minutes)

- Place all materials in a basket, providing each group with their own set of classroom objects.
- Ask students to work together to sort the objects into groups based on characteristics they notice. Tell them there is no single “right” way to classify, as their group can decide what features matter most.
- Encourage groups to label their categories on sticky notes or slips of paper.
- Circulate around the room, asking prompting questions to deepen their thinking:
 - What made you decide on these groups?
 - Could any of the objects belong to more than one group?
 - What might be another way to sort them?
- If there is time: After students finish their first round of sorting, challenge them to think of a different way to group the same set of objects. For example, if they started with color, can they try material type?

Discussion and Wrap-Up (10 minutes)

- Give groups a chance to walk around the room and see how other groups sorted their items. Did they do it similarly or different?
- Ask each group a follow up question regarding how they sorted their items.
 - What do these things have in common?
 - How is this similar to this? How is that the same as this?
 - Does this look like anything else here?
 - Why did you put these things together?

ACTIVITY: COLLECTION SHOW & TELL

Ask students to think if they collect anything at home. Provide an opportunity for them to bring in their “collection” (or a photo of their collection) and share it with the class.

- How is the home collection organized?
- Have they sorted or “classified” their collection?

OTHER PRE-VISIT ACTIVITIES

Take a look at our [Career Spotlight](#) videos. Pick one or two to share with your students before your field trip.










Check out specimens from the [Nature to You Loan Program](#), including our Experience Boxes that focus on collections.

Name _____

Date _____

AMAZEMENT IN THE BASEMENT: SPECIMEN BINGO

Directions: Explore the exhibit and try to find all items in a row, column, or diagonal to get BINGO. Are you up for a challenge? Find all 9 specimens and write the type of specimen they are below the photo! (e.g., fossil, bird, insect, arachnid, etc.)

<input type="checkbox"/>  _____	<input type="checkbox"/>  _____	<input type="checkbox"/>  _____
<input type="checkbox"/>  _____	<input type="checkbox"/>  _____	<input type="checkbox"/>  _____
<input type="checkbox"/>  _____	<input type="checkbox"/>  _____	<input type="checkbox"/>  _____

Name _____

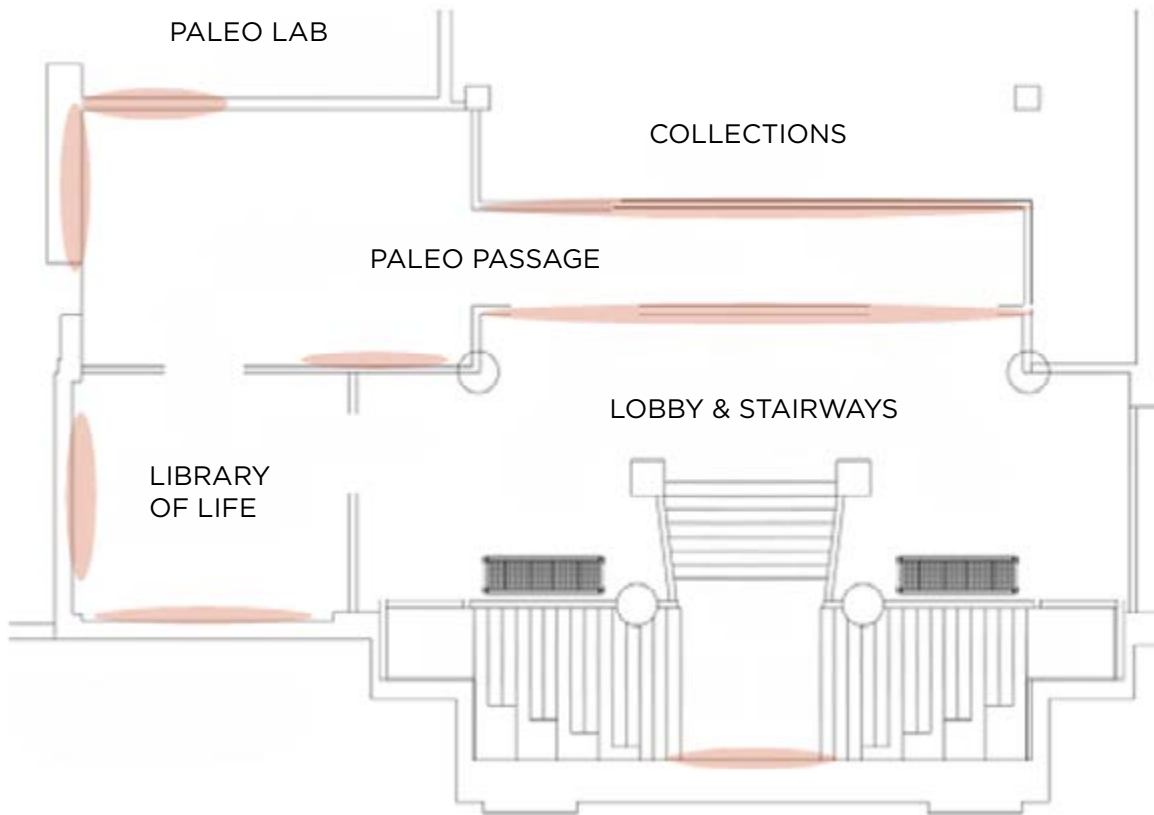
Date _____

AMAZEMENT IN THE BASEMENT: SCAVENGER HUNT

Have you ever wondered what goes on behind the scenes at The Nat?

Our newest experience offers a rare “backstage” glimpse into the Museum’s collections and research work. Use this scavenger hunt to explore *Amazement in the Basement*.

LOWER LEVEL MAP



LOBBY & STAIRWAYS

1. With a wave of my fin, I welcome visitors in. What am I?
2. One to the left and one to the right, we stare you down with our feathers of white. What are we?
3. We crawl, flutter, and buzz as we pass by. How many boxes can you spy that are filled with specimens of our kind?

PALEO PASSAGE

1. Rock-a-bye baby fossil in the paleo collection. What do you call the big white things that protect our fossils in storage?
 2. About 120,000 years ago this bone played an important part in helping me roam. I am a distant relative of the elephant. Who am I? What bone of mine can be found on display?
 3. Scientists solved the mystery of what I was when I was found near the Museum. Can you put the puzzle together and discover what I am?
-

LIBRARY OF LIFE

1. I'm elusive and quiet, I hunt in the night. Droppings filled with fur, my diet is clear—What am I that leaves such signs near?
2. We can be big or small; but always watch out when we fall. To help our trees grow strong and tall, spreading seeds is our call. Name one of us that you can find.
3. In ponds and streams where red-legged frogs like to play, a tiny fungus gets in their way. It is hard to see, but it makes them sick—invasive frogs carry this disease without dying from it. What is it called?

ANSWER KEY

LOBBY & STAIRWAYS

1. With a wave of my fin, I welcome visitors in. What am I?
Cuvier's beaked whale or gray whale fin
 2. One to the left and one to the right, we stare you down with our feathers of white.
What are we? **American White Pelican**
 3. We crawl, flutter, and buzz as we pass by. How many boxes can you spy that are filled with specimens of our kind? **8**
-

PALEO PASSAGE

1. Rock-a-bye baby fossil in the paleo collection. What do you call the big white things that protect our fossils in storage? **Cradle**
 2. About 120,000 years ago this bone played an important part in helping me roam. I am a distant relative of the elephant. Who am I? What bone of mine can be found on display? **Mastodon leg bone**
 3. Scientists solved the mystery of what I was when I was found near the Museum. Can you put the puzzle together and discover what I am? **Dire wolf**
-

LIBRARY OF LIFE

1. I'm elusive and quiet, I hunt in the night. Droppings filled with fur, my diet is clear—
What am I that leaves such signs near? **Mountain Lion**
2. We can be big or small; but always watch out when we fall. To help our trees grow strong and tall, spreading seeds is our call. Name one of us that you can find.
Coulter, Torrey, Sierra lodgepole, Shortleaf, or Cedros Island pinecone
3. In ponds and streams where red-legged frogs like to play, a tiny fungus gets in their way. It is hard to see, but it makes them sick—invasive frogs carry this disease without dying from it. What is it called? **Chytrid fungus**

AMAZEMENT IN THE BASEMENT: COMPARING CREATURES ACTIVITY

GRADE LEVEL: 3-5



Standards Connection

- SEPs: Constructing Explanations and Designing Solutions, Engaging in Argument from Evidence
- DCIs: LS1.A, LS3.A, LS3.B, LS4.C, LS4.D
- CCCs: Patterns, Systems and System Models, Structure and Function

Objectives

- Students will observe and compare traits of two different animal specimens
- Students will identify the habitat where each specimen lives
- Students will analyze how adaptations help organisms survive in their habitats

Key Vocabulary

- Specimen: Any object (animal, plant, or non-living) that is preserved for scientific use. Specimens can be whole or incomplete and can include skeletons, skins, flowers, minerals, etc.
- Habitat: The place where an animal or plant lives
- Trait: A feature of a plant or animal, like its size, color, or body parts
- Adaptation: A trait that helps a plant or animal live in its habitat

Materials

- Specimen displays in the exhibit
- Two worksheet printouts: one with sentence frames and another with open response lines to support different learning approaches.
- Pencils and/or colored pencils

INSTRUCTIONS

We recommend completing the Introduction section in the classroom or as a group prior to entering the Museum. The Discussion and Wrap-Up section can then be conducted back in the classroom following your field trip.

Introduction (5-10 minutes)

- Begin by asking students:
 - What are some different types of habitats? What is that habitat like? Can you describe it?
 - Who else has a habitat to share? What are some things that make that habitat different from the one your peer shared?
 - Have you seen animals that live in very different habitats (e.g., the ocean and the desert)? Do they look similar or different? Why?
- Explain that in the exhibit, they will be comparing two museum specimens to explore how animals have different traits (or adaptations) that help them survive in different habitats.

Exploration (20 minutes)

- Support students as they explore the exhibit and choose two animal specimens from different habitats (e.g., a pelican and a colorful parrot).
 - To adjust for younger students and ELLs, name two habitats for students to look for animals from. For example, choose one animal that lives in the desert and one animal that lives in a pond.
- Distribute worksheets and have students:
 - Draw each specimen and label it.
 - Describe adaptations that each specimen has and based on those, share what habitat they think it lives in.
 - Answer the questions:
 - » What is one trait that each specimen has? How does that adaptation help the specimen survive where it lives?
 - » What differences do you observe between the two specimens?
 - » What do you think would happen if the specimens switched habitats? Would they survive in the habitat of the other specimen?
- Encourage students to think about how things like color, shell, claws, or size help the animal in its specific habitat.

Discussion and Wrap-Up (10 minutes)

- Have students share their comparisons in small groups.
- Lead a class discussion using guiding questions:
 - What did you notice about the two animals?
 - How are their adaptations different or the same?
 - Why do you think animals in different habitats need different adaptations?
- Reinforce the idea that animals have adaptations that help them survive in the place they live.

Extension Ideas

- Set up a sorting activity station where students group plant/animal figurines or photos by their habitats or traits.
- Let students choose two animals from a book or video and compare their habitats and adaptations.
- Create a bulletin board display showing animals from different habitats and their key traits or adaptations.

Name _____

Date _____

AMAZEMENT IN THE BASEMENT: COMPARING CREATURES

Directions: Find two animal specimens that live in different habitats. Draw each one. Label their traits, or what makes them special (e.g., color, size, fur, leaves, teeth).

Specimen 1

Habitat: _____

Traits: _____

Specimen 2

Habitat: _____

Traits: _____

What is one trait that each specimen has? How does that trait help the specimen survive where it lives?

Specimen 1: The _____ has _____ (trait)
which helps it _____ in the
_____ (habitat).

Specimen 2: The _____ has _____ (trait)
which helps it _____ in the
_____ (habitat).

What differences do you observe between the two specimens?

One difference I see is that the _____ (specimen 1)
has _____ (trait), but the _____ (specimen 2)
has _____ (different trait).

Another difference I see is that the _____ (specimen 1)
has _____ (trait), but the _____ (specimen 2)
has _____ (different trait).

What do you think would happen if the specimens switched habitats? Would they survive in the habitat of the other specimen?

If the _____ (specimen 1) lived in the _____
(habitat of specimen 2), it might _____
because it _____.

If the _____ (specimen 2) lived in the _____
(habitat of specimen 1), it might _____
because it _____.

Name _____

Date _____

AMAZEMENT IN THE BASEMENT: COMPARING CREATURES

Directions: Find two animal specimens that live in different habitats. Draw each one. Label their traits, or what makes them special (e.g., color, size, fur, leaves, teeth).

Specimen 1

Habitat: _____

Traits: _____

Specimen 2

Habitat: _____

Traits: _____

What is one trait that each specimen has? How does that trait help the specimen survive where it lives?

What differences do you observe between the two specimens?

What do you think would happen if the specimens switched habitats? Would they survive in the habitat of the other specimen?

AMAZEMENT IN THE BASEMENT: CURATOR FOR A DAY ACTIVITY

GRADE LEVEL: K-5



Standards Connection

- SEPs: Analyzing and Interpreting Data, Constructing Explanations and Designing Solutions
- DCIs: LS1.A, LS3.B, LS4.C, LS4.D
- CCCs: Patterns, Systems and System Models, Structure and Function

Objectives

- Students will analyze specific specimen features (e.g., adaptations in bones, coloration) that help organisms survive
- Students will curate their own collection based on chosen features
- Students will justify their selections by identifying patterns in adaptations

Key Vocabulary

- Specimen: Any object (animal, plant, or non-living) that is preserved for scientific use; can be whole or incomplete and can include skeletons, skins, flowers, fossils, etc.
- Natural history collections: Specimens collected and grouped by type. They are like a library for biodiversity, supporting the work of our researchers as well as the needs of visiting scholars, government agencies, and conservation organizations
- Curator: Directs research and collections within their department's specific discipline
- Collection Managers: Oversees the long-term preservation of the research collection
- Trait: A feature of a plant or animal, like its size, color, or body parts
- Adaptation: A trait that helps a plant or animal live in its habitat
- Biodiversity: The variety of living things in a given place

Materials

- Exhibit panels and displays featuring specimens
- Two worksheet printouts: one with sentence frames and another with open response lines to support different learning approaches.
- Pencils and/or colored pencils

INSTRUCTIONS

We recommend completing the Introduction section in the classroom or as a group prior to entering the Museum. The Discussion and Wrap-Up section can then be conducted back in the classroom following your field trip.

Introduction (15 minutes)

- Begin by leading a discussion on museum collections. Ask students:
 - Do you collect anything? How did you choose to collect that?
 - Museums have collections as well. How do you think a personal collection is similar to or different from a museum collection?
 - How do you think museums decide what to include in their collections?
 - Do museum collections need someone to take care of them? Why or why not?
 - What do you think would happen if no one maintained a museum's collection?
- After students share their thoughts, explain that the people who take care of museum collections are the curator and collection manager.
 - What do you think curators and collection managers do in museums?
 - Why do you think museums have collections?
 - How do curators and collection managers decide what to include in the museum collection?
 - What might be the challenges of being a curator or collection manager?
- Explain that in the exhibit, they will become curators and create their own collection based on observed specimen traits.
- Discuss how organisms have unique adaptations that help them survive in their environments. Ask students, what are some adaptations that you can think of?
 - Here are a few examples:
 - » Camouflage helps animals hide to avoid predator
 - » Beak shapes in birds help them eat specific foods
 - » Leaf shapes in plants help conserve water
- Introduce the term 'biodiversity' and explain that The Nat's collections help us understand the variety of life in Southern California and the Baja California Peninsula.

Exploration (20 minutes)

- Distribute a worksheet and pencil to each student. This activity can also be done in small groups.
- Instruct students to explore the exhibit and observe different specimens.
- Encourage them to choose a specific feature (e.g., color, size, specimen type, adaptations) as the focus for their collection.
 - Younger students: Guide them to pick an easy feature, such as specimens that are all the same color (e.g., blue), the same size (e.g., small), or the same type of animal (e.g., birds).
 - Older students: Challenge them to choose more complex features, such as grouping by similar coverings (fur, feathers, exoskeletons), or selecting specimens that share a specific adaptation or habitat
- Ask students to choose specimens that have their chosen feature and record them by either drawing or writing their names in their collection drawer.
- Students can name their collection and write a brief statement explaining the focus of their collection.

Discussion and Wrap-Up (10-15 minutes)

- Have students share their collections with the class or in small groups.
- Ask guiding questions during share-out:
 - Why did you choose these specimens?
 - How do their features help them survive?
 - How does your collection show biodiversity (or a variety of life)?
- Conclude by reinforcing the idea that museum collections help people learn about and appreciate the natural world.

Extension Ideas

- Have students create a poster or digital version of their collection. Then, host a “mini museum,” where other classes at your school can come and see the collections that your students curated.
- Take a nature walk and have students create a photo collection that shows the biodiversity of your local habitat.

Name _____

Date _____

AMAZEMENT IN THE BASEMENT: CURATOR FOR A DAY

Directions: Walk around the exhibit and look closely at the specimens, noticing things like color, size, or shape. Choose a feature to focus on for your collection, give it a name, then draw and label your specimens in the collection drawer below.

Collection Name: _____

Draw and Label Specimens in Collection:

Mission Statement: What trait(s) do the specimens you picked have in common? Why did you choose to put these specimens in your collection?

All of the specimens in my collection have _____ (trait)

because _____

_____.

Name _____

Date _____

AMAZEMENT IN THE BASEMENT: CURATOR FOR A DAY

Directions: Walk around the exhibit and look closely at the specimens, noticing things like color, size, or shape. Choose a feature to focus on for your collection, give it a name, then draw and label your specimens in the collection drawer below.

Collection Name: _____

Draw and Label Specimens in Collection:

Mission Statement: What trait(s) do the specimens you picked have in common? Why did you choose to put these specimens in your collection?

AMAZEMENT IN THE BASEMENT: FOSSIL DETECTIVES ACTIVITY

GRADE LEVEL: 3-5



Standards Connection

- SEPs: Asking Questions and Defining Problems, Analyzing and Interpreting Data, Engaging in Argument from Evidence, Constructing Explanations and Designing Solutions
- DCIs: ESS1.B, ESS3.C, LS2.C, LS4.A, LS4.C, LS4.D
- CCCs: Cause and Effect; Scale, Proportion and Quantity; Stability and Change

Objectives

- Students will analyze fossil evidence to learn about ancient organisms and their habitats
- Students will compare prehistoric environments to present-day environments
- Students will discuss how environmental changes affect organisms and their adaptations

Key Vocabulary

- Fossil: The remains or traces of plants and animals that lived a long time ago, like bones or imprints in rocks
- Prehistoric: A long time ago—before people started writing down history
- Evolution: The way plants and animals slowly change over a long time to better survive in their environment
- Adaptation: A special trait or feature that helps a plant or animal survive in its environment, like a turtle's shell for protection
- Habitat: The specific place where an animal or plant lives and gets what it needs to survive, like a pond for a frog
- Environment: The broader surroundings that affect living organisms, including climate, soil, water, and other organisms

Materials

- Large map in exhibit with fossil specimens and where they were collected
- Two worksheet printouts: one with sentence frames and another with open response lines to support different learning approaches.
- Pencils and/or colored pencils

INSTRUCTIONS

We recommend completing the Introduction section in the classroom or as a group before entering the Museum. The Discussion and Wrap-Up section can then be conducted back in the classroom following your field trip.

Introduction (10 minutes)

- Begin by asking students:
 - What do you think fossils are?
 - Have you ever seen a fossil? Where do you think fossils are found?
 - What do you think a fossil can tell us?
 - How do we know what Earth looked like a long time ago?
 - Have you ever found a fossil?
- Explain that in the exhibit they will act as fossil detectives, analyzing fossil evidence to learn about ancient environments.

Exploration (30 minutes)

- Guide students to examine the large map in the Paleontology section of the exhibit, where fossils specimens are displayed.
- Distribute worksheets and pencils to students, they can work individually or in small groups. Make sure there are a mix of the different worksheet options so not all students/groups are looking at the same specimen. Help the students think about what the area looks like today.
- Have students:
 - Find a specimen on the map and draw it.
 - Answer the questions:
 - » In what part of San Diego was your fossil specimen found?
What does this area look like today and what organisms are found there?
 - » How is the current habitat of this area different from where the prehistoric organism would have lived?
 - » What adaptations could help your organism survive in today's environment?
- Have students answer these questions directly on their worksheets, recording their observations and hypotheses.

Discussion and Wrap-Up (10-15 minutes)

- Have students share their findings in pairs or small groups. Encourage students to ask questions about their partner's findings.
- Lead a class discussion using guiding questions:
 - What surprised you about where fossils were found?
 - What do these fossils tell us about Earth's past?
 - How do environmental changes affect living things?
 - Do you think animals today are still adapting to environmental changes?
Why or why not?
- Reinforce the idea that fossils provide clues about past life and how organisms change over time.

Extension Ideas

- Have students research a specific prehistoric animal and present how it adapted to its environment.
- Compare and contrast fossils and modern-day animals to discuss evolutionary connections
 - » Examples: mammoths and Asian elephants, Megalochelys and Galapagos tortoise, megalodon and mako shark

Name _____

Date _____

AMAZEMENT IN THE BASEMENT: FOSSIL DETECTIVES

Directions: Look at the large map in the exhibition and find the specimen listed below, then draw the specimen and answer the questions below.

Fossil Specimen

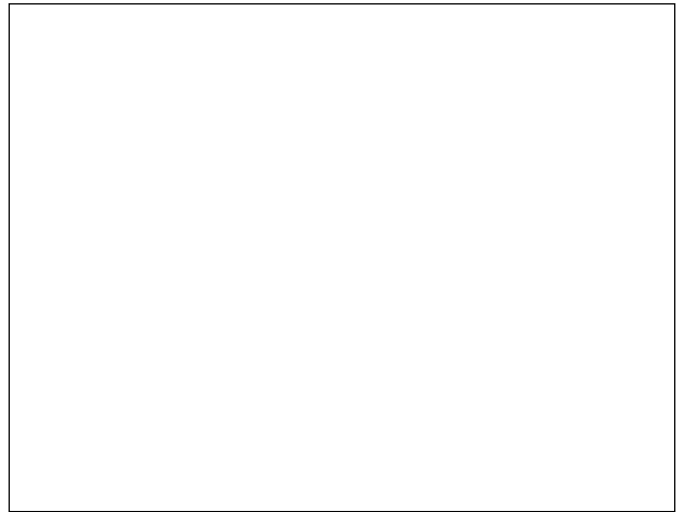
Crab, *Orbitoplax weaveri*

Eocene Epoch (~43 million years old)

Habitat: sandy, shallow marine



Draw the Fossil Specimen



In what part of San Diego was your fossil specimen found? What does this area look like today and what organisms are found there?

My specimen was found in _____ (location). Today, this area has _____ (description of habitat) and you can find _____ (plants/animals) there.

How is the current habitat of this area different from where the prehistoric organism would have lived?

My specimen's habitat was _____ while the current habitat is _____.
My specimen would / wouldn't survive in this area if it was alive today.

What adaptations could help your organism survive in today's environment?

To live in this area today, my prehistoric organism would have to _____

_____.

Name _____

Date _____

AMAZEMENT IN THE BASEMENT: FOSSIL DETECTIVES

Directions: Look at the large map in the exhibition and find the specimen listed below, then draw the specimen and answer the questions below.

Fossil Specimen

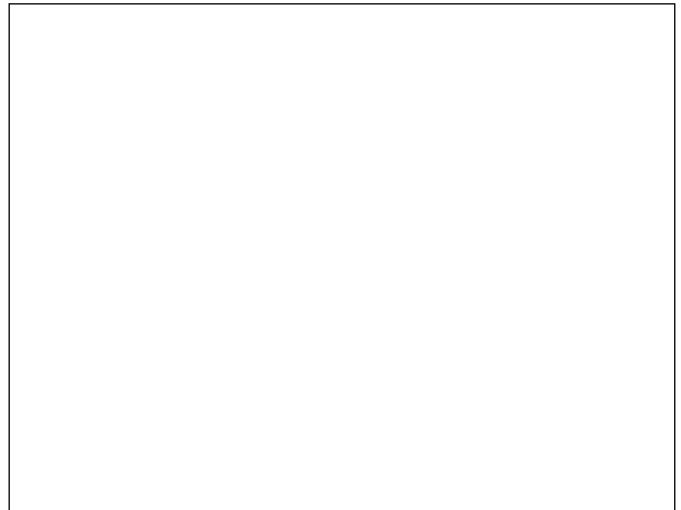
Crab, *Orbitoplax weaveri*

Eocene Epoch (~43 million years old)

Habitat: sandy, shallow marine



Draw the Fossil Specimen



In what part of San Diego was your fossil specimen found? What does this area look like today and what organisms are found there?

How is the current habitat of this area different from where the prehistoric organism would have lived?

What adaptations could help your organism survive in today's environment?

Name _____

Date _____

AMAZEMENT IN THE BASEMENT: FOSSIL DETECTIVES

Directions: Look at the large map in the exhibition and find the specimen listed below, then draw the specimen and answer the questions below.

Fossil Specimen

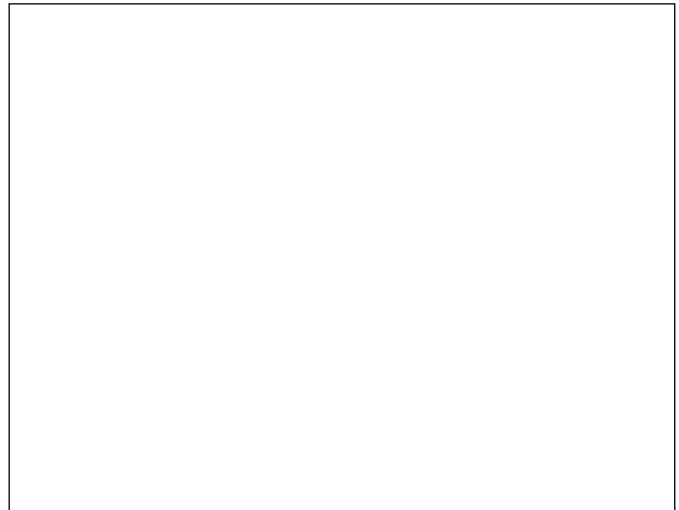
Cinnamon tree leaf, *Cinnamomum* sp.

Eocene Epoch (~45 million years old)

Habitat: wet, dense forest



Draw the Fossil Specimen



In what part of San Diego was your fossil specimen found? What does this area look like today and what organisms are found there?

My specimen was found in _____ (location). Today, this area has _____ (description of habitat) and you can find _____ (plants/animals) there.

How is the current habitat of this area different from where the prehistoric organism would have lived?

My specimen's habitat was _____ while the current habitat is _____.

My specimen would / wouldn't survive in this area if it was alive today.

What adaptations could help your organism survive in today's environment?

To live in this area today, my prehistoric organism would have to _____

_____.

Name _____

Date _____

AMAZEMENT IN THE BASEMENT: FOSSIL DETECTIVES

Directions: Look at the large map in the exhibition and find the specimen listed below, then draw the specimen and answer the questions below.

Fossil Specimen

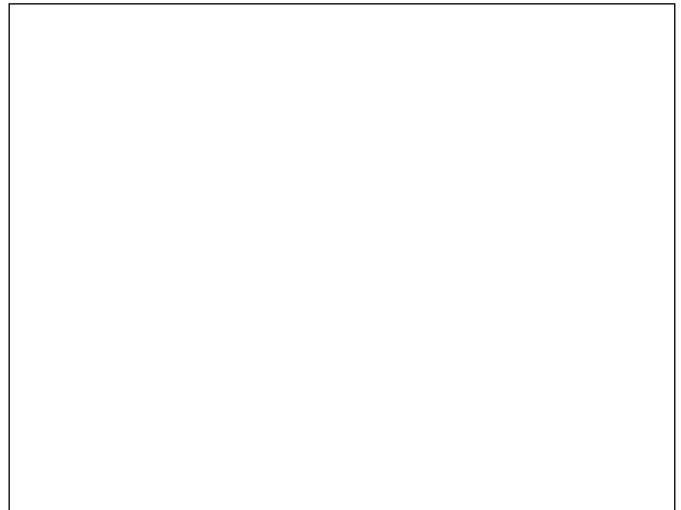
Cinnamon tree leaf, *Cinnamomum* sp.

Eocene Epoch (~45 million years old)

Habitat: wet, dense forest



Draw the Fossil Specimen



In what part of San Diego was your fossil specimen found? What does this area look like today and what organisms are found there?

How is the current habitat of this area different from where the prehistoric organism would have lived?

What adaptations could help your organism survive in today's environment?

Name _____

Date _____

AMAZEMENT IN THE BASEMENT: FOSSIL DETECTIVES

Directions: Look at the large map in the exhibition and find the specimen listed below, then draw the specimen and answer the questions below.

Fossil Specimen

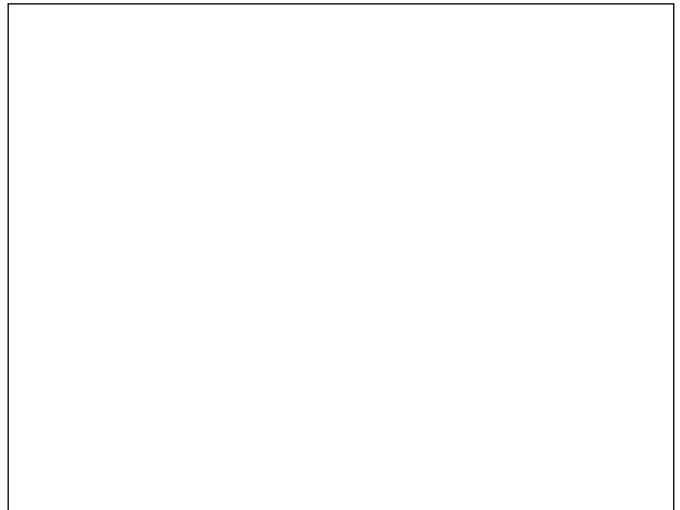
Columbian mammoth molar and toe segment, *Mammuthus columbi*

Pleistocene Epoch (~500,000 years old)

Habitat: open grassland/meadow



Draw the Fossil Specimen



In what part of San Diego was your fossil specimen found? What does this area look like today and what organisms are found there?

My specimen was found in _____ (location). Today, this area has _____ (description of habitat) and you can find _____ (plants/animals) there.

How is the current habitat of this area different from where the prehistoric organism would have lived?

My specimen's habitat was _____ while the current habitat is _____.

My specimen would / wouldn't survive in this area if it was alive today.

What adaptations could help your organism survive in today's environment?

To live in this area today, my prehistoric organism would have to _____

_____.

Name _____

Date _____

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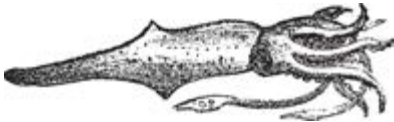
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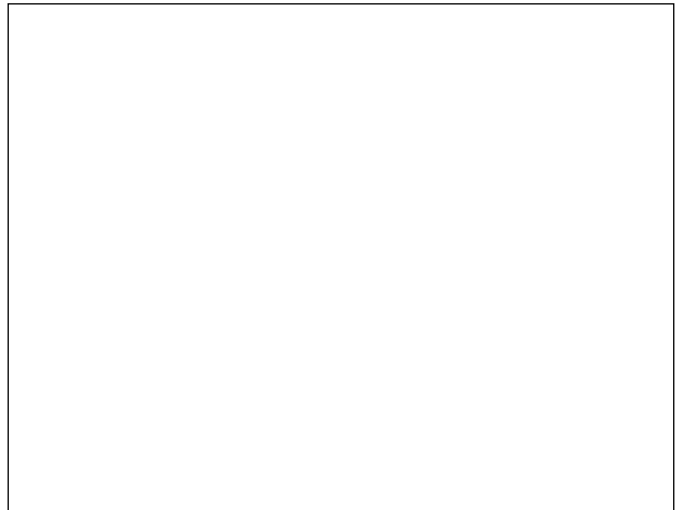
**Belemnite internal "shell",
Cylindroteuthis sp.**

Jurassic Period (~144 million years old)

Habitat: open marine (offshore)



Draw the Fossil Specimen



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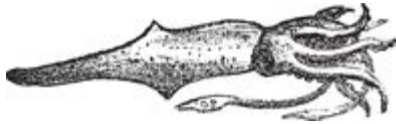
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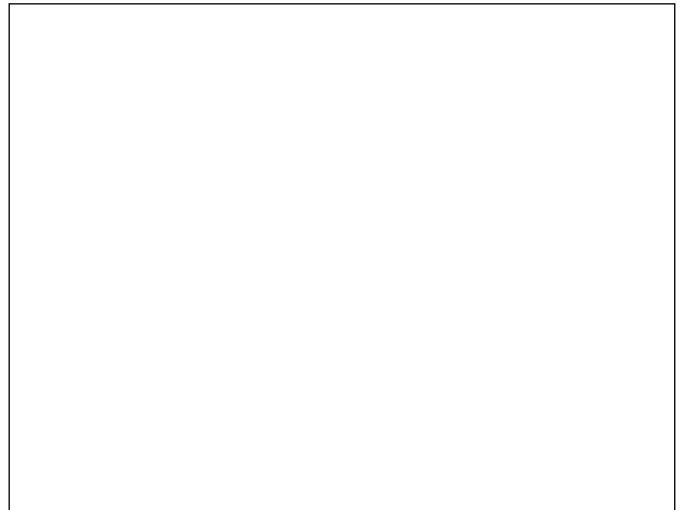
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AMAZEMENT IN THE BASEMENT: YOU BE THE SPECIMEN ACTIVITY

GRADE LEVEL: K-5



Standards Connection

- SEPs: Analyzing and Interpreting Data, Constructing Explanations and Designing Solutions, Engaging in Argument from Evidence
- DCIs: LS3.A, LS3.B, LS4.B
- CCCs: Structure and Function

Objectives

- Students will observe and compare physical traits in themselves and museum specimens
- Students will analyze similarities and differences between their own traits and those of specimens in the exhibit
- Students will discuss how traits vary among members of the same species

Key Vocabulary

- Traits: Characteristics or features of a person, animal, or plant, like eye color, height, or fur pattern
- Inherited Traits: Traits that are passed down from parents to their children, like having curly hair if your parents have curly hair
- Variation: Differences in traits between individuals of the same species, like some cats having short tails and others having long tails
- Symmetry: When something looks the same on both sides, like a butterfly's wings
- Coloration: The colors and patterns on an animal or plant that help it survive, like a zebra's stripes or a chameleon changing colors

Materials

- Exhibit panels and displays featuring specimens
- Two worksheet printouts: one with sentence frames and another with open response lines to support different learning approaches.
- Pencils and/or colored pencils

INSTRUCTIONS

We recommend completing the Introduction section in the classroom or as a group before entering the Museum. The Discussion and Wrap-Up section can then be conducted back in the classroom following your field trip.

Introduction (10 minutes)

- Begin by asking students:
 - What are traits? Can you name some traits that humans have?
 - Do you think animals have traits like us? Why or why not?
 - How do you think we get our traits? Do we all look the same?
- Pair students up and have them describe their partner's traits.
- Explain that in the exhibit, they will compare their traits with the specimens around them.

Exploration (20 minutes)

- Guide students to the lobby of the exhibit. Distribute a worksheet and pencil to each student. Before exploring, students should draw themselves inside the first specimen case and label their traits.
- Have students explore nearby specimens and choose one to observe closely.
- Instruct them to draw and label the traits they notice in that specimen, focusing on similarities and differences between themselves and the specimens (e.g., symmetry, color, shape).
- Encourage students to think about how the traits they observe might help the specimens survive.
 - Examples: bright colors can warn predators, camouflage helps animals blend into their environment, or how strong claws or beaks help with gathering food
- For specimens where there are multiple of the same kind (e.g., butterflies, Pacific pocket mouse, African clawed frogs), tell them to observe if there are any differences between individuals of the same species or if they all look exactly the same.

Discussion and Wrap-Up (10-15 minutes)

- Back in the classroom, have students share their observations with a partner or in small groups.
- Lead a class discussion using these guiding questions:
 - What traits did you notice in the specimens?
 - How were the traits similar or different from your own?
 - Did you notice variation/differences among specimens of the same species? What does that tell us?
 - Why do you think variation in traits is important for survival?
- Reinforce the idea that traits can be inherited but also vary within a species, which helps species adapt to their environment.

Extension Ideas

- Create a classroom "museum exhibit" where students display their drawings and findings.
- Compare human traits in class, such as eye color, hair type, or handedness, to explore variation within a species. This could be done as a game like Four Corners, where you label each corner with a variation of a trait (ex. eye color) and then students go to each corner of the room based on their variation of the trait (e.g., blue eyes, brown eyes, green eyes, etc.).

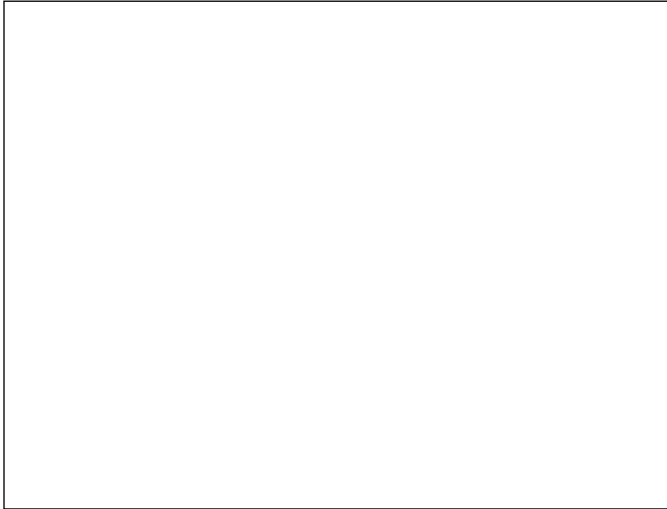
Name _____

Date _____

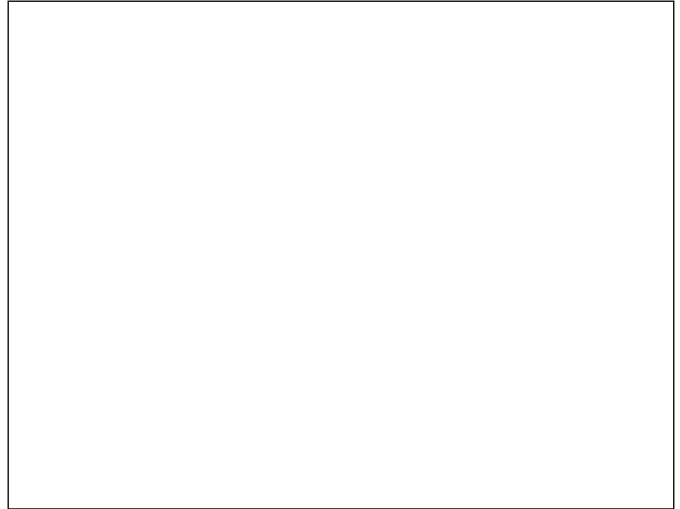
AMAZEMENT IN THE BASEMENT: YOU BE THE SPECIMEN

Directions: Draw a picture of yourself in Box 1. Pick your favorite specimen and draw it in Box 2.

Box 1: You



Box 2: Specimen



What is one trait that you have and how do you think it helps you survive?

I have _____ (trait) which helps me _____.

Do you and the specimen have any traits in common?

One thing we have in common is _____ (trait). I think we both have this trait because _____.

What traits make you different from the specimen?

I have _____ (trait) and the specimen has _____ (trait).
I think we are very different because _____.

**What differences and likenesses do you observe within the same species?
(E.g., butterflies, Pacific pocket mouse, African clawed frog)**

I observed multiple _____ (specimen type) and noticed that one specimen was _____ (difference) from the rest. I think this might be because

_____.

I observed multiple _____ (specimen type) and they all look the same.

I think this is because _____

_____.

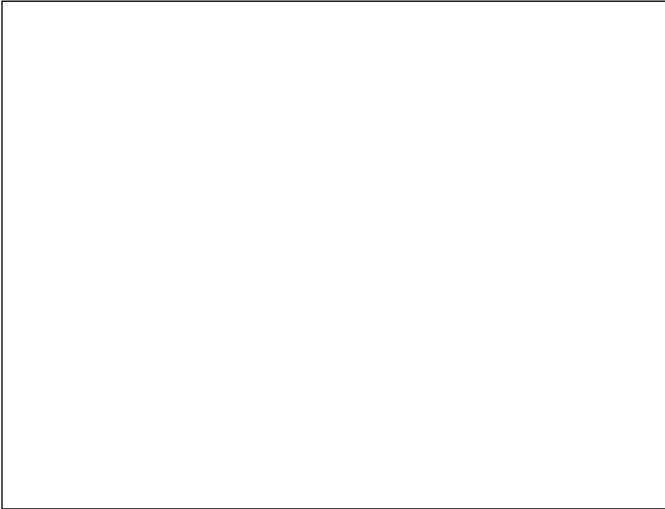
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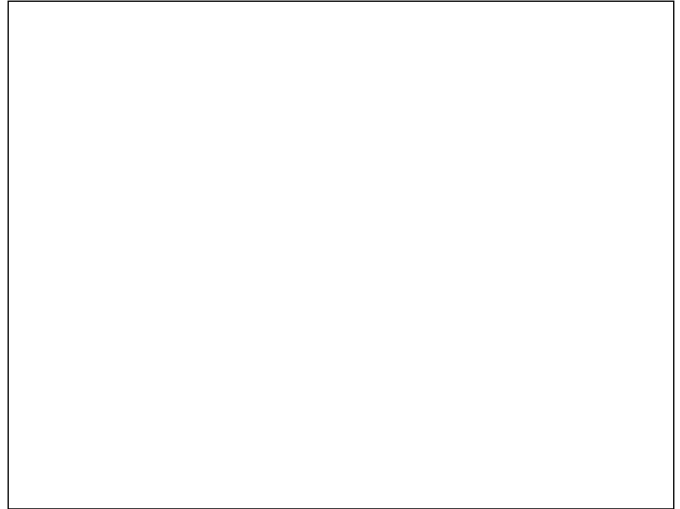
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What is one trait that you have and how do you think it helps you survive?

Do you and the specimen have any traits in common?

What traits make you different from the specimen?

**What differences and likenesses do you observe within the same species?
(E.g., butterflies, Pacific pocket mouse, African clawed frog)**

AMAZEMENT IN THE BASEMENT: SPECIMEN STORYTELLING

GRADE LEVEL: K-5



Objectives

- Students will write a creative narrative or comic imagining the life story of a specimen, from discovery to display
- Students will develop an appreciation for the role of museum collections in preserving natural history

Preparation

- Provide examples of a creative narrative or comic to inspire students' work
- Print or gather optional photos of collection specimens for students who may not select one during the visit
- Prepare writing and/or drawing materials for the post-visit activity

Materials

- Pencils
- Two worksheet printouts: one with sentence frames and another with open response lines to support different learning approaches.
- Paper
- [Comic book template](#) printouts

INSTRUCTIONS

We recommend completing the Introduction section in the classroom or as a group before entering the Museum.

Introduction (10 minutes)

- Begin by asking students:
 - Why do you think museums keep collections of plants, animals, fossils, and more?
 - How do you think scientists learn from specimens that were collected many years ago?
 - What could we discover about nature by studying natural history collections?
 - What kinds of stories do you think specimens would have if they could “talk?”
- Introduce the assignment – each student will select a specimen from the exhibit and create a narrative or comic about its journey from discovery to display.

Exploration (30 minutes, during exhibit visit)

- Distribute a worksheet and pencil to each student.
- Instruct students to explore the exhibit and select one specimen that captures their interest.
- Encourage them to take notes, sketch and record details about the specimen’s features, the habitat where they would find it, and why they chose it on the first page of their worksheet.

Post-Visit Activity (in classroom)

- Guide students to start transforming their notes from the worksheet into a creative story or comic. Provide them with either plain paper or comic strip template printouts. *If a student did not select a specimen, you can provide them with any photos you took of specimens while on the visit or pair them with another student to work together.*
- Encourage them to think about story elements when filling out page 2 of the worksheet:
 - Characters: Who or what is a part of your specimen’s journey? (Scientists, community members, the specimen itself, other organisms in the habitat)
 - Setting: Where did the specimen come from? Where was it studied? How did it end up in the museum?
 - Plot: What key events happened to the specimen along its journey?
 - Conflict or Challenge: Did the specimen face obstacles, changes, or threats in its environment?
 - Resolution: How does the specimen’s story end with it preserved in the museum? What is that specimen teaching visitors that come to the museum?

Wrap-up

- Have students share their story or comic with the class.
- If time, host an “open mic” event where you invite other classes to come to your classroom to hear students sharing their stories/comics.

Extension Ideas

- Compile stories/comics into a “Specimen Storybook” and share with other classes at your school.
- Connect their stories/comics to conservation issues by having them research threats to threatened or endangered species that are similar to their specimen or live in a similar habitat or area of the world.

Name _____

Date _____

AMAZEMENT IN THE BASEMENT: SPECIMEN STORYTELLING

Directions: All of our specimens tell a story of a particular plant or animal. Today, you'll be the storyteller. Choose a specimen and share its story.

Draw and name specimen:

About My Specimen: What does it look like? What type of habitat would it live in? Why did you choose it?

My specimen is _____ (color/size) and has a

_____ (trait) that helps it _____

_____. It lives in the _____ (habitat).

I chose it because _____

Story Framework: Imagine your specimen's journey by answering the questions below.

Characters: Who or what is a part of your specimen's journey?

The characters in my story are _____

_____. My specimen met _____ on its journey.

Setting: Where did the specimen come from? How did it end up in the museum?

It came from _____ and was brought
to The Nat by _____.

Plot: What key events happened to the specimen along its journey?

First, the specimen _____.
Then, it _____.
Lastly, the specimen _____.

Conflict or Challenge: Did the specimen face obstacles, changes, or threats in its environment?

One problem it faced was _____. It had
to survive by _____.

Resolution: How does the specimen's story end with it preserved in the museum? What is that specimen teaching visitors that come to the museum?

Now, the specimen is in the museum and _____.
Visitors can learn _____ from it.

Name _____

Date _____

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