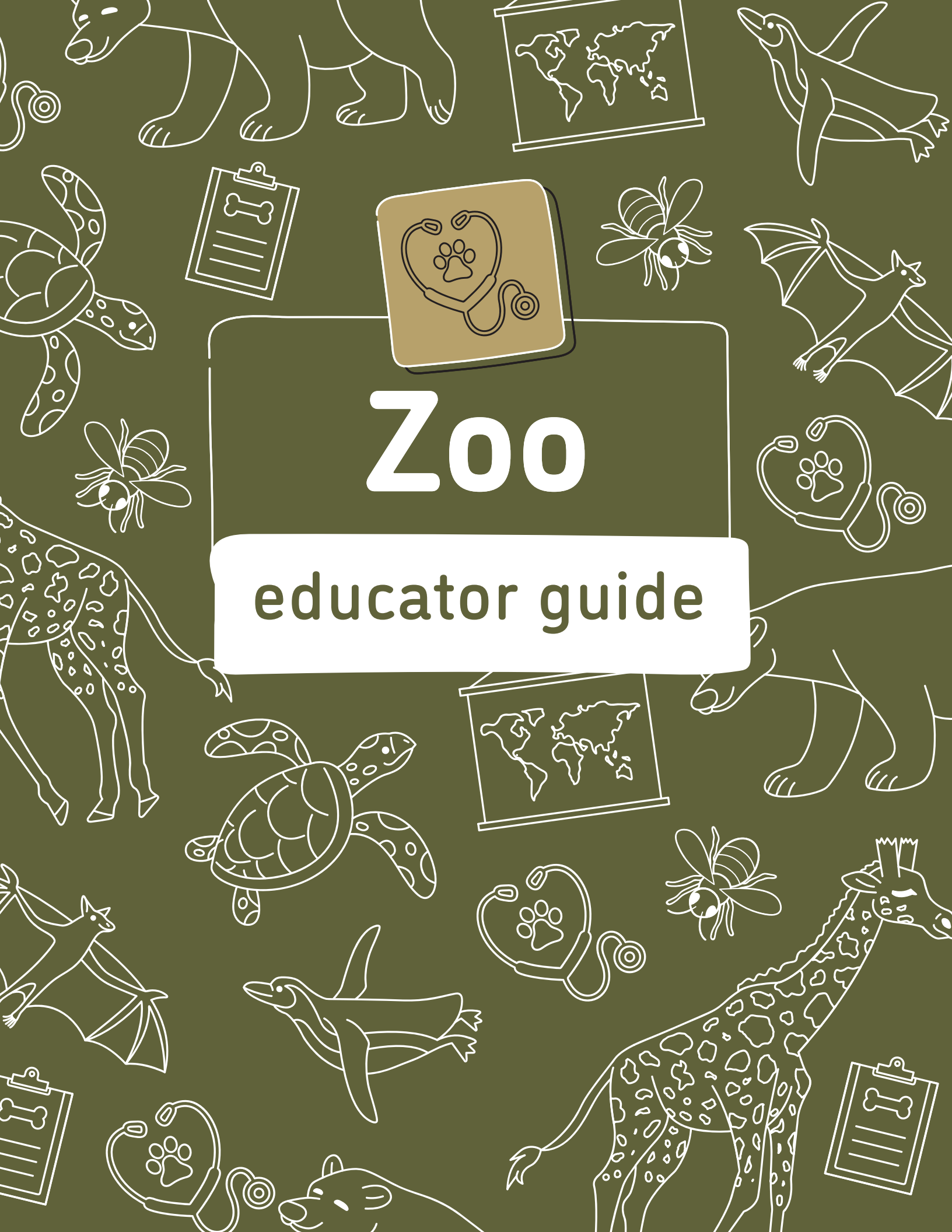

Zoo

educator guide

ZOO Educator Guide!

In this Educator Guide, you'll find Grade Banded Learning Standards aligning to each of the activities. You will also find a QR Code linking you to COSI Connects, an online universe of science through videos, activities and so much more! COSI Connects also includes a section called Community Connects, a digital hub for online and in-person resources from museums, cultural institutions, and other nonprofits.

COSI Connects

For additional resources, including book recommendations, and video instructions for completing each of the activities inside your box be sure to check out **cosi.org/connects/kits/**.

For questions regarding the content inside this educator guide, please email ScienceQuestions@cosi.org.

Table of Contents

Facilitating STEAM Learning with Kits

Kits Overview

COSI Connects Kits contain carefully designed hands-on STEAM activities that support fun, engaging learning about a topic or theme. Each box comes with:

- **Supplies**: Materials for activities are in the box
- **Activity book:** This guide provides directions for setting up and completing activities, explains relevant STEAM content knowledge and skills, and offers discussion prompts to deepen the learning experience.
- **Instructional videos:** Each kit has a QR code linking you to short videos demonstrating how to complete different steps of the activities. If you cannot scan the QR code, you can find the videos online at **cosi.org/connects/kits**. Click on your kit, then click the "Parent/Educator Resources" tab.

Goals for Using Kits

At COSI, we know science is everywhere and for everyone. To reinforce this message, we've designed our kits to do so much more than just teach STEAM content knowledge. Every kit, regardless of the content or topic, also provides important non-content learning opportunities such as:

- Engaging with STEAM in fun, inspiring, and creative ways
- Making sense of scientific observations
- Seeing oneself as a capable, welcome, and valued STEAM community member
- Practicing a growth mindset by valuing effort and learning over ease and knowing
- Bonding with peers, family, and educators over shared experiences and excitement

Techniques for Facilitating COSI Connects Kits

Decades of research show that learning is rarely as straightforward as receiving information. This is especially true when the goal is to *understand* and *apply* information, not simply recognize and repeat it. Learning and understanding requires the student to make sense of the information for themselves: Have they heard anything like that before? Does it make sense? Does it support or contradict something they already know? Is it useful or interesting enough to warrant the effort to learn and remember it?

When helping your learners accomplish the goals of using a COSI Connects kit, you'll want to ask more questions than you answer (unless they're practical or logistical questions about the directions).

Why? For a few reasons:

1) If learners have a question in mind before doing an activity, or before doing a step of the activity, they'll be primed to notice information that is useful for sense-making or question-asking.
2) This technique helps you model the process of science for your learners. Instead of assuming what they do or don't know and thus what you need to tell them, you are being curious, collecting data (their knowledge and ideas) and interpreting those data to decide how to most effectively help them.
3) This invites critical thinking: you can follow most questions with things like, "Why do you think that?" or "What did you observe during your activity that makes you think that?"
4) It shows your learners that you are interested in their experiences, and that you find them valuable and interesting to know.
5) If something isn't working, it can help you troubleshoot the issue: Did they skip a step? Use a different material? Was the reaction really fast or really subtle and they missed it?

Make sure you ask your questions with curiosity and openness: you are asking the question because you want to learn your learners' answers, not because you will try to change their minds (even if you do want to!). This will help them feel more comfortable sharing, which will deepen and sustain their conversations and learning.

Technique	Examples of Effective Questions
Model the scientific method before, during & after Model the scientific method before, during & after Scientists work together to collect information (evidence) they can use to answer questions about how things work, why things happen, or even if/when things *will* happen! They collect this evidence by learning from their peers, making observations, and conducting experiments. Additionally, scientists are never "done" learning: experiments often leave scientists with more questions than answers, which is exciting!	· What questions could we answer by doing this activity? · What information could we collect to answer that question? What changes or results could we look for? · What do you think will happen? Why? · What information or knowledge did you use to come up with your answer? · What new questions do you have? What about those questions is interesting to you? How would you collect evidence to answer your questions?
Focus on ideas rather than terminology If a learner is having a hard time with a particular word or phrase (pronouncing, understanding – anything!), help them find other words to use instead. It's more important for learners to learn by making sense of ideas and practicing skills than it is for them to use terminology correctly.	· What are other words that mean the same thing? · How would you explain it to a younger sibling? · Can you act out the word, or draw the word? · Is there a similar word that means something different, and that's making this feel confusing? · How can you remember the information/skill even if you forget the specific word(s)?

Help learners see themselves as scientists by challenging negative misconceptions Importantly, "science" is a *process*, not a product - science is not simply a collection of information or facts. Science is a process of asking questions, making observations to collect information, and thinking carefully to make sense of the information. The goal of science is not to "prove" that a certain idea is "right," or to get "the correct result" from doing an experiment. If an experiment produces an outcome that suggests a scientist's idea was wrong, that's great because there is something new to be learned! A "good" scientist is not somebody who is already very smart, works all by themselves without any help, and never makes mistakes. A "good" scientist is curious, collaborative, and learns from their mistakes.	· What does the word "science" mean to you? · Do you think science is interesting? Fun? Exciting? Scary? Boring? Why? · How do we use science to learn about things? · How does science help us understand things? · How do you use science to understand things? · What does the word "scientist" mean to you? · What does a scientist do? · What makes somebody a "good scientist" or "good at science"? · Do you think you can be a scientist? · How are you like a scientist every day? · What attributes make you a good scientist? · Why do you think it's more important for a scientist to learn from mistakes than to never make mistakes? · Have you ever made a mistake that helped you learn something really useful?
Invite sense-making and peer discussion It's great for learners to have questions because that means they're curious, and they have the opportunity to learn something new! Ask your learners to share what kit activity information and experiences they're curious or confused about and want to understand better. Ask other learners in your group to share how they figured something out. This is especially helpful when you have learners who want to work more quickly than others: capitalize on their energy and help them engage more deeply!	· Was any part of the kit activity surprising, strange, or even counterintuitive to what you expected? · Why do you think that was surprising/strange/counterintuitive – what made you think that something else would happen? · Did any part of the kit activity not make sense? · Did you see or try anything in the kit activity that helped something make sense? · Do you have any other information or experiences from before the kit activity that helped something make sense?
Explore real-world connections Learners are more likely to value the effort required to learn or complete a task if they believe the results will provide something useful and relevant. Personal connections can also help learners see themselves as capable STEAM community members and practitioners.	· Is this something you've ever wondered about? · Would a friend or family member find this interesting? · How could you use something you learned from this activity in your own life? · How could you use something you learned from this activity to help someone else?
Reflect on progress and experiences At the end of each activity, or even after a step within an activity, ask your learners questions that help them see things like: · They learned a new fact or skill · They had a fun/cool/interesting experience · They overcame an obstacle and achieved success · They are scientists and they're doing science · They changed their mind with new information · They turned a "mistake" into a learning opportunity · They wondered new and interesting questions	· What is the most interesting thing you learned? · Was anything confusing at first, but now you understand it better? · Was anything frustrating at first, but it helped you learn something? · Why was it confusing at first? How did you get to understand it better? · What is something you learned that you want to tell a friend or family member? · What is something you learned that you want to use in your everyday life?

Kit Accessibility Tips

This is an additional resource to support the success of learners. Below are tips and tools from COSI's accessibility experts that can be used when adapting for learners.

Fine Motor Adaptations

- Get creative! When completing a movement required activity, think of different ways to accomplish it, like moving an object by attaching it to a wheelchair.
- If an object is too small to handle, swap for similar but larger objects, like switching a bouncy ball for a basketball. You can also attach the smaller object to a larger one to make it easier to hold.
- Use hand over hand to support students when completing fine motor tasks.
- For the writing portions, provide notepaper to give extra space for writing.

Blind and Low Vision Adaptations

- Use puffy paint on the activity book images to create additional tactile images.
- Use manipulatives (objects) for students to touch when explaining how something works to help students process what is happening.
- Use the camera on a phone or tablet to magnify the words and images in the activity book.

Deaf Adaptations

- Utilize COSI's demonstration videos with closed captioning when completing an activity.
- Visually demonstrate the activity steps.

Cognitive Adaptations

- Break the activity into smaller steps to make processing easier.
- For harder to understand concepts use manipulatives (objects) to explain or relate to a practical process.
- Model the steps for the child to follow and complete at the same time.
- Ask leading questions to help students problem solve. For example: "How could you change the shape of the wings to make it fly better?"

Speech Adaptations

- Have students present in alternate ways, like with drawings or by demonstrating what they did.

Standards Alignment and Extension Questions

The following pages will include Ohio Learning Standards and Next Generation Science Standards that are aligned with each activity in the kit. In addition to these standards, you will find extension questions to scale up or scale down the content of each activity according to your students' abilities or grade level. These extension questions are arranged in grade level bands of Kindergarten – Second Grade, Third – Fifth Grade, and Sixth – Eighth Grade. Each set of these questions are also aligned with both Ohio Learning Standards and Next Generation Science Standards.

Throughout the kit activities, your students will find opportunities to write down their scientific findings and connect to digital learning resources through COSI Connects. This will allow them to fulfill the Ohio English Language Arts, Technology, and Digital Literacy Learning standards listed below.

Kindergarten – 2nd Grade

- K-2.KC.3.a: With guidance, students use digital tools and resources, contained within a classroom platform or otherwise provided, to find information on topics of interest.
- W.K.2: Use a combination of drawing, dictating, and writing to compose informative/explanatory texts that name what is being written about and supply some information about the topic.
- W.1.8: With guidance and support from adults, recall information from experiences or gather information from provided sources to answer a question.
- W.2.8: Recall information from experiences or gather information from provided sources to answer a question.
- K-2.CC.6.c.: With guidance from an educator, students share ideas in multiple ways — visual, audio, etc.

Third Grade – Fifth Grade

- 3-5.EL.1.a.: Students develop learning goals in collaboration with an educator, select the technology tools to achieve them, and reflect on and revise the learning process as needed to achieve goals.
- W.3-5.10: Write routinely over extended time frames (time for research, reflection, and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences.

Sixth Grade – Eighth Grade

- 6-8.CC.6.a: Students select appropriate platforms and tools to create, share, and communicate their work effectively.

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Zoo

ACTIVITY 1: Make a Reusable Bag

Help the hawksbill sea turtle by making your own reusable bag that can take the place of single-use plastic bags.

Ohio Learning Standards

1st Grade Science 1.LS.1: Living things have basic needs, which are met by obtaining materials from the physical environment.

Second Grade Math 2.MD.1: Measure the length of an object by selecting and using appropriate tools such as rulers, yardsticks, meter sticks, and measuring tapes.

Fourth Grade Science 4.LS.1: Changes in an organism's environment are sometimes beneficial to its survival and sometimes harmful.

Next Generation Science Standards

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

3-LS4-4: Make a claim about the merit of a solution to a problem caused when the environment changes and the types of plants and animals that live there may change.

GRADES K–2

Extended Learning Questions:

1) Where do sea turtles live? What other animals live there? Look at a picture of a sea turtle in its habitat – what do you see?
2) What body parts help sea turtles swim and find food in the ocean?
3) Can you act like a sea turtle?
4) Look at a picture of a sea turtle and a picture of a land turtle. What is the same? What is different? Would you rather be a turtle that lives in the ocean or on land?
5) Draw a picture of a sea turtle. What is it doing? Get together with a partner and share your art. Talk about what is similar between your drawings and what is different.

Ohio Learning Standards:

Kindergarten Science K.LS.1: Living things have specific characteristics and traits.

Kindergarten Science K.LS.2: Living things have physical traits and behaviors, which influence their survival.

Kindergarten Physical Education K.1PE: Imitate movements, voices, and feelings of people, animals and objects through dramatic play.

First Grade Science 1.LS.2: Living things survive only in environments that meet their needs.

Second Grade Art 2.1RE Compare works of art using descriptive language.

Next Generation Science Standards:

2-LS4-1: Make observations of plants and animals to compare the diversity of life in different habitats.

Zoo

ACTIVITY 1: Make a Reusable Bag

Help the hawksbill sea turtle by making your own reusable bag that can take the place of single-use plastic bags.

GRADES 3–5

Extended Learning Questions:

1) What are some threats to sea turtles in the ocean? How many of these threats are caused by humans? How can individuals and communities work together to reduce these threats to help sea turtles survive? Look online at reliable sources to learn more.
2) Think of the things that have a reusable version and a version that is only used once. Water bottles, plates, and straws are three examples. Write a list of at least 4 examples. Is it always better to use the reusable option? Discuss.
3) What are some differences between sea turtles and land turtles? How do those differences help the turtles survive and thrive in the places they live (sea or land)? What similarities help them in each location? Research and share your findings with a partner. Be sure to share where you found your information.
4) How do sea turtles grow and change during their life cycle?
5) What do baby sea turtles do to survive after hatching?
6) Look at a map of the world. Find where you live. Then, find Australia. Is Australia close to your home, or far away? In what direction would you travel to go from your home to Australia the fastest?

Ohio Learning Standards:

3rd – 5th Grade Technology 3-5. KC.3.a. Students collaborate with a teacher to employ appropriate research techniques to locate digital resources that will help them in their learning process.

5th Grade ELA W.5.7 Conduct short research projects that use several sources to build knowledge through investigation of different aspects of a topic.

3rd – 5th Grade Technology 3-5. DC.2.c. Students learn about, demonstrate, and encourage respect for intellectual property with both print and digital media when using and sharing the work of others.

3rd Grade Social Studies 3.SS.4: Physical and political maps have distinctive characteristics and purposes. Places can be located on a map by using the title, key, alphanumeric grid and cardinal directions.

3rd Grade Science 3.LS.3: Plants and animals have life cycles that are part of their adaptations for survival in their natural environments.

Next Generation Science Standards:

5-ESS3-1 Earth and Human Activity – Obtain and combine information about ways individual communities use science ideas to protect the Earth's resources and environment.

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Zoo

ACTIVITY 1: Make a Reusable Bag

Help the hawksbill sea turtle by making your own reusable bag that can take the place of single-use plastic bags.

GRADES 6–8

Extended Learning Questions:

1) How has climate change affected life on coral reefs? How have sea turtles been affected by climate change?
2) Besides eating plastic bags, how else does plastic pollution affect sea turtle populations? How can humans work to reduce plastic pollution in marine environments?
3) Research how oceans have changed in the past ten, hundred, and thousand years. How do changing ocean conditions affect sea turtle survival?
4) Sea turtles have been around for over a hundred million years. Research what adaptations have helped sea turtles survive for millions of years and write a short essay describing what you learned. Cite your sources.

Ohio Learning Standards:

6th-8th Grade Technology 6-8. KC.3.a. Students demonstrate and practice the ability to effectively use research strategies to locate appropriate digital resources in support of their learning.

7th Grade Science 7.LS.2: In any particular biome, the number, growth and survival of organisms and populations depend on biotic and abiotic factors.

8th Grade ELA W.8.7: Conduct short research projects to answer a question (including a self-generated question), drawing on several sources and generating additional related, focused questions that allow for multiple avenues of exploration.

Next Generation Science Standards:

MS-LS2-4. Construct an argument supported by empirical evidence that changes to physical or biological components of an ecosystem affect populations.

MS-ESS3-3. Apply scientific principles to design a method for monitoring and minimizing a human impact on the environment.

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ACTIVITY 2: Play Hungry, Hungry Humboldts

Grab some friends and learn about Humboldt penguins with a penguin board game. Explore how sustainable choices help them have enough fish to eat.

Ohio Learning Standards

Kindergarten Math K.OA.1 Understand addition as putting together and adding to, and understand subtraction as taking apart and taking from.

First Grade Science 1.LS.2 Living things survive only in environments that meet their needs.

Fourth Grade Science 4.LS.1 Changes in an organism's environment are sometimes beneficial to its survival and sometimes harmful.

Fifth Grade Science 5.LS.2 All of the processes that take place within organisms require energy.

Seventh Grade Science 7.LS.2 In any particular biome, the number, growth and survival of organisms and populations depend on biotic and abiotic factors.

Next Generation Science Standards

K-ESS3-1 Use a model to represent the relationship between the needs of different plants or animals (including humans) and the places they live.

3-LS4-4 Make a claim about the merit of a solution to a problem caused when the environment changes and the types of plants and animals that live there may change.

MS-LS2-2 Construct an explanation that predicts patterns of interactions among organisms across multiple ecosystems.

GRADES K–2

Extended Learning Questions:

1) Penguins can't fly, but they are very fast swimmers. What body parts do you think help penguins swim?
2) Pretend to swim around your room like a penguin. What other animals swim around near penguins?
3) Look at pictures of different kinds of penguins (Emperor, Chinstrap, King, Gentoo, Macaroni, Galapagos, Little, etc.) What differences do you see? What similarities?
4) Draw a picture of a penguin. Share your art with a partner. Talk about what is similar between your drawings and what is different.
5) Look at a map of the world. Find where you live. Then, find South America. In what direction would you travel to go from your home to South America?

Ohio Learning Standards:

Kindergarten Physical Education K.1PE Imitate movements, voices, and feelings of people, animals and objects through dramatic play.

Kindergarten Science K.LS.1. Living things have specific characteristics and traits.

Kindergarten Science K.LS.2. Living things have physical traits and behaviors, which influence their survival.

Kindergarten Fine Arts K.3RE Observe and describe works of art.

Second Grade Fine Arts 2.1RE Compare works of art using descriptive language

First Grade Social Studies 1.SS.4 Maps can be used to locate and identify places.

Second Grade Social Studies 2.SS.5 Maps and their symbols, including cardinal directions, can be interpreted to answer questions about location of places.

Next Generation Science Standards:

2-LS4-1 Make observations of plants and animals to compare the diversity of life in different habitats.

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ACTIVITY 2: Play Hungry, Hungry Humboldts

Grab some friends and learn about Humboldt penguins with a penguin board game. Explore how sustainable choices help them have enough fish to eat.

GRADES 3–5

Extended Learning Questions:

1) Research different types of penguins. Based on your research, write a short essay on why you think some penguins swim faster than other penguins. Why is it important for penguins to swim fast? Cite your sources.
2) Research ecosystems or habitats that penguins live in. Choose one and create a food web that includes one type of penguin that lives in that region. What does that penguin prey on? What predators does that penguin fear?
3) What could happen if the ocean supply of fish gets too low to support both penguins and humans? How can humans work together to keep this from happening? Get together with a partner or small team and brainstorm your ideas, then present them to the class.
4) What is special about penguin feathers? How do their feathers help them survive in the ocean? Research and write a short essay detailing your answer with appropriate sources cited.

Ohio Learning Standards:

Fourth Grade Science 4.LS.1. Changes in an organism's environment are sometimes beneficial to its survival and sometimes harmful.

Fifth Grade Science 5.LS.1 Organisms perform a variety of roles in an ecosystem.

3rd – 5th Grade Technology 3-5. KC.3.a. Students collaborate with a teacher to employ appropriate research techniques to locate digital resources that will help them in their learning process.

5th Grade ELA W.5.7 Conduct short research projects that use several sources to build knowledge through investigation of different aspects of a topic.

3rd – 5th Grade Technology 3-5. DC.2.c. Students learn about, demonstrate, and encourage respect for intellectual property with both print and digital media when using and sharing the work of others.

Next Generation Science Standards:

4-LS1-1. Construct an argument that plants and animals have internal and external structures that function to support survival, growth, behavior, and reproduction.

Zoo

ACTIVITY 2: Play Hungry, Hungry Humboldts

Grab some friends and learn about Humboldt penguins with a penguin board game. Explore how sustainable choices help them have enough fish to eat.

GRADES 6–8

Extended Learning Questions:

1) Why is sustainable seafood important for penguins and people? What would happen to penguin populations if sustainability was not important to fisherpeople?
2) Use Seafoodwatch.org and other online resources to plan a meal using sustainably sourced food. Share your meal with a small group or with your family.
3) Research how zoos help protect food sources for the animals in their care and animals in the wild. Write a short paragraph about one you find interesting. Be sure to cite your sources, and share with the class or a partner.
4) Research scientifically proven ways that humans can reduce the impact of fishing on marine animals like penguins. Can you find matches between how humans have changed their environments and what is being done to solve current issues?

Ohio Learning Standards:

Seventh Grade Science 7.LS.2 In any particular biome, the number, growth and survival of organisms and populations depend on biotic and abiotic factors.

6th-8th Grade Technology 6-8. KC.3.a. Students demonstrate and practice the ability to effectively use research strategies to locate appropriate digital resources in support of their learning.

8th Grade ELA W.8.7 Conduct short research projects to answer a question, drawing on several sources and generating additional related, focused questions that allow for multiple avenues of exploration.

Next Generation Science Standards:

MS-LS2-1. Analyze and interpret data to provide evidence for the effects of resource availability on organisms and populations of organisms in an ecosystem.

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ACTIVITY 3 : Make a Bee Hotel

Learn about the Malayan flying fox, a large bat that is also a pollinator. Then, build a Bee Hotel to help pollinators in your area.

Ohio Learning Standards

Third Grade Science 3.LS.3 Plants and animals have life cycles that are part of their adaptations for survival in their natural environments.

Fifth Grade Science 5.LS.1 Organisms perform a variety of roles in an ecosystem.

Next Generation Science Standards

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

2.LS.2-2a Plants depend on animals for pollination or to move their seeds around.

GRADES K–2

Extended Learning Questions:

1) Go outside and find a flower. Do you see any bees or insects on it? Why do you think those animals are there?
2) Are bees' wings big or small compared to their bodies? Why do you think that is?
3) Pretend to fly around like a bee! How else can you act like a bee?
4) Are there any other pollinators that live by your house or school? Do you know what types of plants they help? How can you help them?
5) Draw a picture of the flower you would visit if you were a bee, then share it with the class or a partner. What colors did you use on your flower?

Ohio Learning Standards:

Kindergarten Physical Education K.1PE Imitate movements, voices, and feelings of people, animals and objects through dramatic play.

Kindergarten Science K.LS.1. Living things have specific characteristics and traits.

Kindergarten Science K.LS.2. Living things have physical traits and behaviors, which influence their survival.

First Grade Science 1.LS.1 Living things have basic needs, which are met by obtaining materials from the physical environment

Kindergarten Fine Arts K.3RE Observe and describe works of art.

Second Grade Fine Arts 2.1RE Compare works of art using descriptive language.

Next Generation Science Standards:

K-ESS3-3 Earth and Human Activity – Communicate solutions that will reduce the impact of humans on the land, water, air, and/or other living things in the local environment.

2-LS4-1 Make observations of plants and animals to compare the diversity of life in different habitats.

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ACTIVITY 3 : Make a Bee Hotel

Learn about the Malayan flying fox, a large bat that is also a pollinator. Then, build a Bee Hotel to help pollinators in your area.

GRADES 3–5

Extended Learning Questions:

1) Bats are very helpful to our world. Some people are afraid of bats. Why do you think that is? Research bats online, and tell a partner what you would share with someone to help them stop being afraid.
2) What body parts do bees and bats have that help them collect nectar?
3) Research one food that you like to eat that needs pollinators. Share with the class how pollinators make that possible.
4) Write a short story or comic about a journey taken by a bee. What did the bee do? What challenges did it face?
5) Graph the number of bees using your Bee Hotel over 4 weeks. Look for patterns. Which days had the most visits? Combine your data with the class to make a large graph. How do the patterns change or stay the same?

Ohio Learning Standards:

3rd – 5th Grade Technology 3-5. KC.3.a. Students collaborate with a teacher to employ appropriate research techniques to locate digital resources that will help them in their learning process.

5th Grade ELA W.5.7 Conduct short research projects that use several sources to build knowledge through investigation of different aspects of a topic.

3rd – 5th Grade Technology 3-5. DC.2.c. Students learn about, demonstrate, and encourage respect for intellectual property with both print and digital media when using and sharing the work of others.

Third Grade Math 3.MD.3 Represent and Interpret Data.

Next Generation Science Standards:

4-LS1-1: Construct an argument that animals have internal and external structures that function to support survival, growth, behavior, and reproduction.

Zoo

ACTIVITY 3 : Make a Bee Hotel

Learn about the Malayan flying fox, a large bat that is also a pollinator. Then, build a Bee Hotel to help pollinators in your area.

GRADES 6–8

Extended Learning Questions:

1) What do you think would happen if there were no pollinators? Research some causes and effects of pollinator population decline. Talk as a small group or class about what human efforts could help save pollinators.
2) Research flying foxes and solitary bees. They can both act as pollinators. How are they similar? How are they different? Write a short essay comparing and contrasting them. Be sure to cite your sources.
3) Research one native pollinator in your area. Create a guide for the pollinator that describes or illustrates its appearance, behavior, habitat, and other facts you find interesting.
4) Debate: Should more urban spaces be reserved for pollinator gardens? Why or why not?
5) Work with a partner to create a plan for how you can make your school or park more friendly to pollinators.

Ohio Learning Standards:

Seventh Grade Science 7.LS.2 In any particular biome, the number, growth and survival of organisms and populations depend on biotic and abiotic factors.

6th-8th Grade Technology 6-8. KC.3.a. Students demonstrate and practice the ability to effectively use research strategies to locate appropriate digital resources in support of their learning.

8th Grade ELA W.8.7 Conduct short research projects to answer a question , drawing on several sources and generating additional related, focused questions that allow for multiple avenues of exploration.

Next Generation Science Standards:

MS-LS2-1. Analyze and interpret data to provide evidence for the effects of resource availability on organisms and populations of organisms in an ecosystem.

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ACTIVITY 4 : Giraffe Check-Up

Become a wildlife veterinarian as you diagnose and help a wild giraffe.

Ohio Learning Standards

Kindergarten Science K.LS.1 Living things have specific characteristics and traits.

Third – Fifth Grade Technology 3-5.DT.3.b Explore and document connections between technology and other fields of study.

Next Generation Science Standards

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

GRADES K–2

Extended Learning Questions:

1) Where do giraffes live? What other types of animals live near them? What do they eat?
2) Giraffes have long necks and four legs. Walk around like a giraffe, then try to run like one. Was it easy or hard?
3) What do you think it would feel like to be a giraffe with a sore foot?
4) Draw a picture of a giraffe. Get together with a partner and share your art. Look at details like the length of the neck and the spots. What is similar? What is different?
5) Look at a map of the world or a globe. Find where you live. Then, find Africa. In what direction would you travel to go from your home to Africa?

Ohio Learning Standards:

Kindergarten Physical Education K.1PE Imitate movements, voices, and feelings of people, animals and objects through dramatic play.

Kindergarten Science K.LS.1. Living things have specific characteristics and traits.

Kindergarten Science K.LS.2. Living things have physical traits and behaviors, which influence their survival.

First Grade Science 1.LS.1 Living things have basic needs, which are met by obtaining materials from the physical environment.

Kindergarten Fine Arts K.3RE Observe and describe works of art.

Kindergarten Social Studies K.SS.5 Terms related to direction and distance, as well as symbols and landmarks, can be used to talk about the relative location of familiar places.

First Grade Social Studies 1.SS.4 Maps can be used to locate and identify places.

Second Grade Social Studies 2.SS.5 Maps and their symbols, including cardinal directions, can be interpreted to answer questions about location of places.

Next Generation Science Standards:

2-LS4-1 Make observations of plants and animals to compare the diversity of life in different habitats.

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Zoo

ACTIVITY 4 : Giraffe Check-Up

Become a wildlife veterinarian as you diagnose and help a wild giraffe.

GRADES 3–5

Extended Learning Questions:

1) What tools did you use in this activity as a wildlife veterinarian? Research what other tools wildlife veterinarians might use. If you could create a tool to help veterinarians diagnose animals faster, what would it be? Draw and describe your invention. Then share it with the class.
2) What is one way veterinarians and zoos help animals in zoos? What is one way they help animals in the wild?
3) Would you rather be a veterinarian who works with animals in a zoo or one who works with animals in the wild? Talk with a partner and explain why you chose that one.
4) Go online and research one type of giraffe. Create a poster that highlights that giraffe. Where it lives, what its spots look like, what it eats, etc. Share your poster with the class.
5) Research how big one type of giraffe is. Find out how big their hooves are and how tall they are. Then, measure the length of your foot and your height. How much bigger is a giraffe than you? Create a graph to share your data.

Ohio Learning Standards:

Third Grade Math 3.MD.4 Represent and Interpret Data.

3rd – 5th Grade Technology 3-5. KC.3.a. Students collaborate with a teacher to employ appropriate research techniques to locate digital resources that will help them in their learning process.

5th Grade ELA W.5.7 Conduct short research projects that use several sources to build knowledge through investigation of different aspects of a topic.

3rd – 5th Grade Technology 3-5. DC.2.c. Students learn about, demonstrate, and encourage respect for intellectual property with both print and digital media when using and sharing the work of others.

Next Generation Science Standards:

5-ESS3-1. Obtain and combine information about ways individual communities use science ideas to protect the Earth's resources and environment.

Zoo

ACTIVITY 4 : Giraffe Check-Up

Become a wildlife veterinarian as you diagnose and help a wild giraffe.

GRADES 6–8

Extended Learning Questions:

1) Research how giraffe habitats have changed over time. What are some factors that made these changes? Is the area they inhabit smaller or larger now than it was 10, 50, or even 100 years ago? Write a short essay on your findings and cite your sources.
2) Research how wildlife veterinarians help animal conservation. Choose one wildlife veterinarian and create a biography about them. This could be a poster, illustration, or essay. Share your subject with the class and explain what they do and what animals they help.
3) Research how veterinarians take care of animals. Then design a field kit for veterinarians working in remote areas like Africa. What tools would you include and why? If you could invent a new tool to include, what would it do? Share your field kit with a small group.
4) www.Zooniverse.org is a platform that hosts citizen science projects (science studies that anyone can participate in). As a class, choose a citizen science project you can do to understand how real research works, and how it can help animals.
5) Veterinarians need to do a lot of watching or observing before deciding on a course of action. What traits do you think a person who is a good veterinarian would have? What other jobs would someone with those traits be good at? Discuss with a small group.

Ohio Learning Standards:

Seventh Grade Science 7.LS.2 In any particular biome, the number, growth and survival of organisms and populations depend on biotic and abiotic factors.

6th-8th Grade Technology 6-8. KC.3.a. Students demonstrate and practice the ability to effectively use research strategies to locate appropriate digital resources in support of their learning.

Eighth Grade ELA W.8.7 Conduct short research projects to answer a question, drawing on several sources and generating additional related, focused questions that allow for multiple avenues of exploration.

Next Generation Science Standards:

MS-LS1-5 From Molecules to Organisms: Structures and Processes Construct a scientific explanation based on evidence for how environmental and genetic factors influence the growth of organisms.

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Zoo

ACTIVITY 5 : Climate Impact

Build your own miniature greenhouse to explore the greenhouse effect and its impact on polar bears.

Ohio Learning Standards

First Grade Science 1.ESS.1 The sun is the principal source of energy.

Second Grade Social Studies 2.GS.7 Human activities alter the physical environment, both positively and negatively.

Next Generation Science Standards

K-PS3-1 Make observations to determine the effect of sunlight on Earth's surface.

K-ESS3.3 Communicate solutions that will reduce the impact of humans on the land, water, air, and/or other living things in the local environment.

GRADES K–2

Extended Learning Questions:

1) Pretend you are a polar bear. Practice swimming around the room like a polar bear and walking on ice. What other animals are around you?
2) What does a polar bear look like? Draw a picture. Can you show what its paws look like too? Share your drawing with a partner. How are your drawings similar? How are they different? What do you like about each drawing? Why do polar bears live in cold climates? How does their habitat help them survive? Do you think it would be easy or hard for them to move to a new place? Why or why not?
3) Imagine you are a polar bear. How would you feel if you couldn't find food? What would you tell people to help them care about polar bears?
4) Think of one way you can help polar bears by helping the Earth. Work with a partner to come up with an idea, then share your idea with the class.

Ohio Learning Standards:

Kindergarten Physical Education K.1PE Imitate movements, voices, and feelings of people, animals and objects through dramatic play.

Kindergarten Science K.LS.2. Living things have physical traits and behaviors, which influence their survival.

First Grade Science 1.LS.1 Living things have basic needs, which are met by obtaining materials from the physical environment.

Kindergarten Fine Arts K.3RE Observe and describe works of art.

Second Grade Fine Arts 2.1RE Compare works of art using descriptive language.

Next Generation Science Standards:

2-LS4-1 Make observations of plants and animals to compare the diversity of life in different habitats.

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Zoo

ACTIVITY 5 : Climate Impact

Build your own miniature greenhouse to explore the greenhouse effect and its impact on polar bears.

GRADES 3–5

Extended Learning Questions:

1) Polar bears need ice to help them hunt for food. What do you think will happen to polar bears if the ice keeps melting? Do you think they would have to hunt somewhere else? What kinds of animals might be affected by global warming besides polar bears?
2) Choose one action from the list of ways to reduce your carbon footprint. Try it for a week and record what you did each day. Share with the class on the last day.
3) One of the ways we can help the Earth is by planting trees. Research trees near you. If you could plant one type of tree, which tree would you pick? Share with the class.
4) Research one animal or plant that lives by you and is affected by climate change. Write a report on the animal or plant with pictures or drawings, the name of the animal or plant, and how climate change is affecting it. List your sources and share with your class.

Ohio Learning Standards:

Third Grade Science 3.ESS.3. Some of Earth's resources are limited.

Fourth Grade Science 4.LS.1. Changes in an organism's environment are sometimes beneficial to its survival and sometimes harmful.

3rd – 5th Grade Technology 3-5. KC.3.a. Students collaborate with a teacher to employ appropriate research techniques to locate digital resources that will help them in their learning process.

5th Grade ELA W.5.7 Conduct short research projects that use several sources to build knowledge through investigation of different aspects of a topic.

3rd – 5th Grade Technology 3-5. DC.2.c. Students learn about, demonstrate, and encourage respect for intellectual property with both print and digital media when using and sharing the work of others.

Next Generation Science Standards:

5-ESS3-1: Obtain and combine information about ways individual communities use science ideas to protect the Earth's resources and environment.

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Zoo

ACTIVITY 5 : Climate Impact

Build your own miniature greenhouse to explore the greenhouse effect and its impact on polar bears.

GRADES 6–8

Extended Learning Questions:

1) Research the Greenhouse Effect. The greenhouse effect is a natural process that makes life possible on Earth. What is changing about the greenhouse effect today?
2) Research online to find two major human activities that increase greenhouse gases today. What can we, as a society, do to help our atmosphere?
3) Research and write a short essay on the difference between weather and climate. What causes changes in weather and what causes changes in climate?
4) Go online and research what laws have been made to reduce greenhouse gases in the atmosphere. Choose one and explain why it matters in a short essay. Be sure to cite your sources.
5) If you had the ability to make one law to help climate change slow down, what would it be and why? Share with a partner or the class.

Ohio Learning Standards:

Sixth Grade Science 6.ESS.3: Some of Earth's resources are renewable, some are not.

Eighth Grade Science 8.ESS.3: Human activities can cause global climate change.

6th-8th Grade Technology 6-8. KC.3.a. Students demonstrate and practice the ability to effectively use research strategies to locate appropriate digital resources in support of their learning.

8th Grade ELA W.8.7 Conduct short research projects to answer a question, drawing on several sources and generating additional related, focused questions that allow for multiple avenues of exploration.

Next Generation Science Standards:

MS-ESS3-5: Ask questions to clarify evidence of the factors that have caused climate change over the past century.

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Zoo

ACTIVITY 6 : Build a Habitat

Imagine you work for the zoo as you build a model animal habitat!

Ohio Learning Standards

First Grade Science 1.LS.1 Living things have basic needs, which are met by obtaining materials from the physical environment.

First Grade Science 1.LS.2 Living things survive only in environments that meet their needs.

Fifth Grade Fine Arts 5.4.PR Select and use the elements and principles of art and design to communicate understanding of an interdisciplinary concept.

Sixth Grade Fine Arts 6.6.PR Integrate elements of art and design to solve interdisciplinary problem.

Next Generation Science Standards

K-ESS3-1 Use a model to represent the relationship between the needs of different plants or animals (including humans) and the places they live.

GRADES K–2

Extended Learning Questions:

1) Write a list of all the animals each student made. What is different between all the animals? What is the same?
2) Have each student pretend to walk, swim, run, or fly around the room like the animal they created. How many different ways are people moving? Are most of the animals walking, running, swimming, flying, or crawling?
3) Imagine you are an animal in the wild. Then imagine you were moved to a zoo. Write down three things that you would need to be happy in your new habitat.
4) If you found a real animal in the wild that needed help, who could you call to come help it?

Ohio Learning Standards:

Kindergarten Physical Education K.1PE Imitate movements, voices, and feelings of people, animals and objects through dramatic play

Kindergarten Science K.LS.1. Living things have specific characteristics and traits.

Kindergarten Science K.LS.2. Living things have physical traits and behaviors, which influence their survival.

First Grade Science 1.LS.1 Living things have basic needs, which are met by obtaining materials from the physical environment.

Kindergarten Fine Arts K.3RE Observe and describe works of art.

Second Grade Fine Arts 2.1RE Compare works of art using descriptive language.

Next Generation Science Standards:

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

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Zoo

ACTIVITY 6 : Build a Habitat

Imagine you work for the zoo as you build a model animal habitat!

GRADES 3–5

Extended Learning Questions:

1) Make a poster that describes and illustrates your animal. What does it look like? Where does it live? What does it eat? Give fun and interesting facts about your animal and then share your poster with the class.
2) Imagine you are a zookeeper. Write a plan for how you would care for the animal from this activity. Your plan should include a daily schedule of what and when to eat and play. It can include special things you might need to do every week or year. How often would it see a vet? How often would you clean its enclosure?
3) Why is it important for zoos to study animals before taking them in? What do you think would happen if the animal didn't have the right kind of habitat or food in the zoo? Discuss with a partner.
4) Draw the life cycle of your animal. What does it look like as a baby, when it is a child, a teenager, a young adult, and an older adult? Does it give birth to live young or lay eggs?

Ohio Learning Standards:

Third Grade Science 3.LS.3: Plants and animals have life cycles that are part of their adaptations for survival in their natural environments.

Next Generation Science Standards:

3-LS4-3: Construct an argument with evidence that in a particular habitat some organisms can survive well, some survive less well, and some cannot survive at all.

3-LS1-1. Develop models to describe that organisms have unique and diverse life cycles but all have in common birth, growth, reproduction, and death.

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Zoo

ACTIVITY 6 : Build a Habitat

Imagine you work for the zoo as you build a model animal habitat!

GRADES 6–8

Extended Learning Questions:

1) Design a brochure for your animal. It should teach visitors about your animal, what makes it special, and why it is at your zoo.
2) Imagine you are in charge of deciding if you will bring an animal from the wild into the zoo. What things are important to think about when deciding to house a wild animal in a zoo? Is there anything that would immediately make you say yes or no? Think about things like safety of zoo staff, money, and wellbeing of all the animals.
3) Research an endangered or critically endangered animal at a zoo. How does its zoo habitat support its survival and species recovery?
4) Choose a country in the world that starts with the first letter of your first or last name. What adaptations would your animal need to survive in that country? Research an animal species that humans have interacted with for years. How has the species changed over the time it has interacted with humans? In what ways have humans' influence changed the species or how it lives?

Ohio Learning Standards:

6th-8th Grade Technology 6-8. KC.3.a. Students demonstrate and practice the ability to effectively use research strategies to locate appropriate digital resources in support of their learning.

8th Grade ELA W.8.7 Conduct short research projects to answer a question , drawing on several sources and generating additional related, focused questions that allow for multiple avenues of exploration.

Next Generation Science Standards:

MS-LS4-5: Gather and synthesize information about technologies that have changed the way humans influence the inheritance of desired traits in organisms.

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Glossary:

Adaptation – a body part or behavior that helps a living organism survive in its environment.

Animal Care Specialist – someone who takes care of animals at a zoo.

Endangered – an animal seriously at risk of becoming extinct.

Extinct – when there are no more animals of that species (type) alive.

Greenhouse effect – when light enters the Earth's atmosphere and the gases in the atmosphere trap the energy as heat

Habitat – the place where an organism lives and gets its food, water, and shelter..

Nectar – a sugary liquid made by flowers used as a food source by pollinators like bees and bats.

Pollinator – an animal that helps plants make seeds by moving pollen from one flower to another.

Sustainable choice – a way of living, behaving, and making choices that helps the environment and things living in it.