CLIMATE GENERATION

2023 EDITION

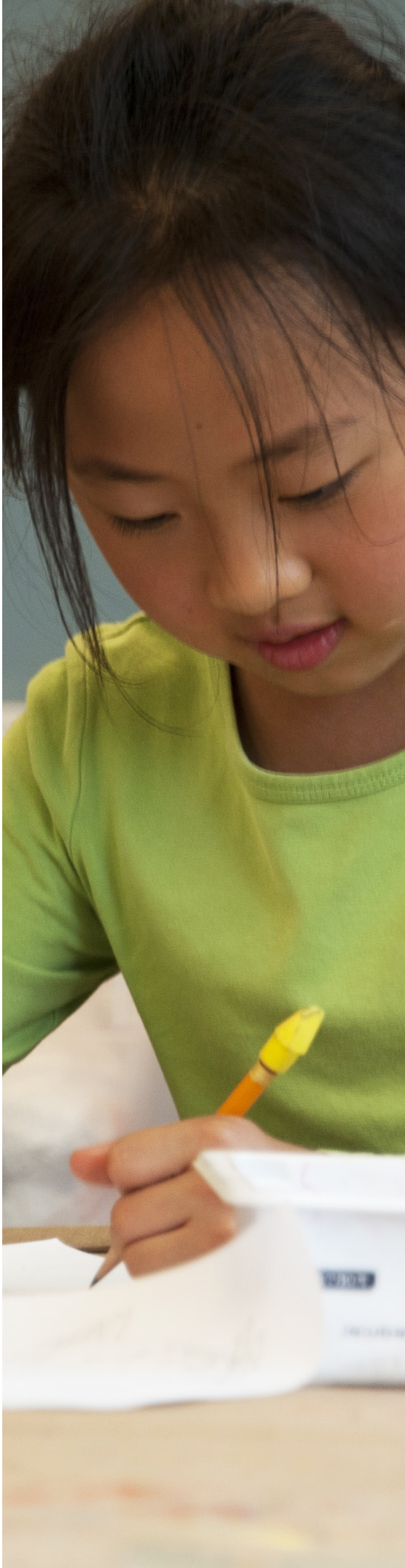
HEALTHY HABITATS: CLIMATE CHANGE ACTION FOR K-2

Educator Letter

Dear educator,

It is necessary to introduce climate change in elementary grades if we are to prepare our students for a changing world. Climate change education looks slightly different in younger grades, but is nevertheless essential to fostering caring, engaged students who understand the importance of climate action. There are many ways elementary educators can help students navigate climate change issues with age-appropriate vocabulary and activities. Early elementary educators can support students during times of fear and uncertainty; develop students' foundational skills that will lead to future climate literacy; and take age-appropriate actions to be part of creating climate resilient communities.

Most likely, your students have already heard about climate change from their caregivers or friends, on the news, or on the internet; many have already experienced climate change impacts, such as severe weather or wildfires. But mis- and dis-information can be prevalent in these spaces, and without guidance, the information students have about climate change could be overwhelming and terrifying. Climate grief and anxiety affect young students too, and they need trusted adults to help them learn about climate change in a supportive and motivational environment so that they can process the emotions they experience and have reassurance that positive actions are being taken by adults to address climate issues. Acknowledging your community's lived experiences, such as a hurricane or air pollution, and asking simple questions such as "have you heard the words 'climate change' before? What have you heard about it?" can spark rich conversations and help you dispel incorrect information, understand your students' emotions, fears, and concerns, and take action to address them together.



When students work together to make their community a better place, they feel empowered to be part of climate solutions without feeling like they alone must save the world. Collective action is especially important in elementary school so that young students, who often have little control over their household's decisions, don't feel responsible for changing their caregiver's behaviors. Working collectively to address local climate change impacts also shows students where they have capacity to make change, rather than focusing on individual actions like turning off lights or abstract concepts like conserving water. Local, place-based actions such as a litter clean-up or planting a vegetable garden are things that young students can do as a group to see tangible, positive changes in their community. Many actions can help schools and communities adapt to climate change and become more resilient to climate impacts.

K-2 climate change education can provide foundational concepts that will support students' climate literacy in future years! You can talk about climate change without using complex terms like the greenhouse effect. Activities like making observations, collecting data, and understanding weather and seasons are necessary building blocks for students to later explore climate change in depth. And the scaffolding goes beyond science and math concepts; socio-emotional learning skills are also foundational to climate literacy. Students need to develop empathy for living beings, practice caring for others, and recognize that there is unfairness in how people live and are treated in order to develop a complex systems-level view of climate justice and to understand the issues on local, national, and global scales.

This lesson plan uses habitats as a starting place to discuss climate change; however, there are endless ways to approach climate change, and we encourage you to expand beyond this lesson into other topics. You can use aspects of the format, questions, and concepts presented here as a springboard for climate conversations in any subject area.

Thank you for your commitment to climate change education!

Climate Generation Education Team

Acknowledgements

This resource was a collaboration between Climate Generation staff and three elementary educators from the Teach Climate Network.

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About Climate Generation

Climate Generation is a nationally connected and trusted nonprofit centering climate justice in climate literacy, climate change education, youth leadership, and community engagement to accelerate action on the climate crisis. Urgent and rapid action on climate change is needed to ensure a habitable world for generations to come, and education and engagement are effective and critical tools for empowering action. Our organization was founded by polar explorer, Will Steger, based on his powerful eyewitness to climate change and his history of inspiring educators and classrooms to engage in adventure learning. Climate Generation empowers individuals and communities to engage in solutions to climate change, and we do this by igniting and sustaining the ability of educators, youth, and communities to act on the systems perpetuating the climate crisis. Climate change is a highly complex issue, and just and equitable solutions cannot be found if we proceed with the climate science and policy lens alone. By overcoming disinformation, centering anti-racism and equity in education, and personalizing and localizing climate change action we can activate individuals, as well as build resilient communities. Climate Generation is committed to addressing the intersection of climate change and economic, social, and racial disparities, and working closely with partners who understand this interface.

Climate Change Education Program Mission

Quality climate change education requires a holistic approach, one that speaks to the complexity of the climate system and investigates how political, economic, and social systems influence the impacts and solutions of climate change. Our education program integrates Western science and Indigenous ways of knowing, centers justice and anti-racism, supports the leadership of youth and frontline communities, and doesn't rely on fear, but rather focuses on solutions.

We recognize educators are critical messengers of climate literacy, and schools and non-formal organizations are the foundation through which climate change education and action can take place. We aim to:

- Build confident and empowered climate-literate educators that take action on the systems perpetuating the climate crisis through their work and personal lives.
- Lead a network of formal and non-formal educators that share interdisciplinary resources, pedagogical tips, and inspiration across North America.
- Create new instructional and curricular resources that support educators teaching intersectional and interdisciplinary climate change education.
- Support an anti-racist educator community by connecting educators to stories of leadership and climate change solutions from racially, economically, and socially marginalized communities, including youth, communities of color, and low-income communities.

We accomplish this by developing interdisciplinary curricula and instructional resources that support state and national education standards, create virtual and in-person professional development opportunities featuring resources and pedagogy from leading experts in climate change education, and develop education partnerships across disciplines and institutions that lead to deep structural changes in practice.

Instructional Curricular Resources

Climate Generation offers a variety of instructional resources to aid both formal and non-formal educators in teaching interdisciplinary climate change education, including curriculum, videos, and toolkits. Climate Generation's suite of Grades 3-12 curriculum resources support national and Minnesota state standards, the Next Generation Science Standards (July 2014), and the climate and energy literacy principles. The curricula have been reviewed by scientists, professional educators, and organizations. All lessons have online connections in the form of videos, articles, and other content. Each of these resources are interdisciplinary and can be used across the curriculum, including in science (especially Earth science, geography, biology, ecology, and environmental science), math, history, social studies, English Language Arts, media, and art classes.

Our toolkits are an excellent source of information and resources on an array of sociopolitical, environmental, climate justice, and personal reflection topics. Each toolkit is uniquely structured based on the topic. Toolkits provide background information around a timely issue, resources such as articles and videos to share with students, and a template or activity guide for actionable steps in the classroom and beyond. Toolkits can be used as preparatory work for an educator to explore a given topic; as a collection of trusted supplemental resources for a science, English Language Arts, social studies, or history classroom; and as a guide for extracurricular clubs and organizations looking to take climate action. Download our curriculum suite and toolkits for free at: climategen.org/curricula-resources

Professional Development Opportunities

Teach Climate Network & the Summer Institute for Climate Change Education

Climate Generation coordinates a North American network of educators dedicated to teaching climate change. The Teach Climate Network provides teaching tips, resources, inspiration, and community networking with educators from all disciplines, grade levels, and educational settings through e-newsletters, monthly virtual webinars, and regular professional development opportunities. Educators can sign up to join the Teach Climate Network to stay connected with us. Teach Climate Network workshops are archived and accessible via our YouTube channel. Learn more and join us: go.climategen.org/teachclimatenetwork

The Summer Institute for Climate Change Education, hosted annually since 2006, is the Teach Climate Network's cornerstone education conference that provides educators with tools to communicate climate justice-centered climate change education in the classroom. The Institute features training to address and teach emerging current topics and networking opportunities to build a community of mentors dedicated to climate change education. Regional cohorts facilitated by climate change education leaders from across North America develop the framework, themes, and workshops of the Institute annually, as well as host a day dedicated to place-based climate change education and ongoing support throughout the year. Central to the goals of the Summer Institute are providing educators with workshops that feature climate change solutions, interdisciplinary education, intergenerational exchange and justice-centered lessons. Learn more about the Summer Institute: go.climategen.org/summerinstitute

Curriculum Development & Coaching

We offer curriculum development and coaching workshops for schools, districts, and other educational settings seeking to integrate climate change and climate justice into their curriculum and programming. Curriculum coaching workshops are tailored to each situation, including planning meetings and listening sessions to help assess the needs of the group, as well as collaborative, discussion-centered workshops and optional one-on-one support. Climate Generation facilitates interactive virtual or in-person workshops where educators explore climate change education foundations, develop climate change-centered lesson plans, and edit or update existing curriculum. Contact us to set up a listening call at education@climategen.org.

Custom Workshops

Climate Generation staff would love to work with your school, school district, or other educational setting to design a workshop focused on a variety of topics related to climate change, climate justice, or misinformation. Email us to set up a listening call at education@climategen.org.

About this Resource

This resource project began in response to elementary educators telling Climate Generation staff that they want to teach about climate change, but feel they don't have the knowledge or resources to do so effectively. After reviewing numerous resource hubs, we found that climate change resources for kindergarten through second grade (K-2) were minimal, and that fewer still addressed climate or environmental justice.

We wanted a resource that reflected elementary educators' and students' needs; and who better to connect with than those working in the classroom? We put out a call to find elementary educators with an interest in climate change education. Climate Generation selected three stellar educators working in different parts of the US to collaborate in developing and writing our resource. Educators attended four group meetings, led by Climate Generation staff and partners, in which they explored various key considerations for early childhood climate change education and worked together to design an outline for the resource. After weeks of planning, writing, and editing, *Healthy Habitats: Climate Change Action for K-2* is ready to share!

The resource development team chose habitats as our main topic for several reasons:

- A habitat theme supports the practice of nature journaling, which is a great entry point to climate change. Through regular nature journaling, students can watch their habitat change over time as they make observations about weather, climate, and seasons. Noticing daily and seasonal changes is a natural bridge to talking about which changes are expected and which are unexpected (i.e. caused by climate change). A nature journaling practice can be easily incorporated into a daily or weekly routine as a 5-10 minute activity; students can even do their journaling through the window if needed.

- K-2 students are typically curious about plants and animals around them; looking at living beings is an accessible way to connect them to their local place. Students at this age typically have personal and local circles of awareness and care, and so staying in a well-known locale (their school) helps students both develop a sense of agency and connect a complex concept like climate change to their known world.

- A habitat theme can be a starting place to incorporate Indigenous knowledge and Traditional Ecological Knowledge, as it lends itself to emphasis on observation, incorporating lived experience and community-based concerns, recognizing humans as part of nature, and considering human relationships to other living beings. In addition to these general approaches, you could build relationships with local tribal members to incorporate vocabulary in local tribal languages and share their perspectives. Integrating Indigenous ways of knowing and learning supports a more culturally sustaining learning environment for all students.

- Focusing on both human and animal habitats allowed us to create a lesson that can be used anywhere, from a school forest to a paved playground. Every place is a habitat, and if you look closely, you'll find life!

- The focus on both built and natural habitats also provides opportunities to introduce climate justice issues to students through observation and questioning. For example, many marginalized communities experience disproportionately high air temperatures due to the heat island effect. Asking students questions such as, "why is it so hot on the concrete and not on the grass?" Or, "why doesn't our schoolyard have any trees like other schools?" can help them identify areas of unfairness and begin to consider solutions to the issues that impact them.

- Conversations of weather, seasons, and climate often come up when thinking about habitat needs such as food, water, shelter, and space. Students will naturally have questions about whether animals had shelter during an unprecedented storm, or how people get water during a drought. Following students' lines of questioning based on observation is a great way to introduce climate change in a way that meets K-2 students where they are.

- Students' observations are an excellent resource for determining an age-appropriate climate action project. By following students' interests and concerns, students feel empowered to make positive changes as a group, and can address habitat needs and climate change impacts in tangible ways.

A key component of studying habitats and climate change is getting outside. First-hand observations and deep personal connections to place help students understand their place in the world and develop curiosity and empathy for all living beings, making them more likely to feel a sense of responsibility toward keeping their habitat healthy. We understand that outdoor education is not something all educators are familiar or comfortable with; please see Appendix B for tips for teaching outside!

How to Use this Resource

This resource is made up of three lessons which are designed to build off of one another. You will need to complete all three lessons in order to cover how habitats and climate change are connected in a way that is cohesive and supportive of students' mental health. The lessons should be taught sequentially. Lessons 1, 2, and the first part of Lesson 3 can be done in 3-4 back-to-back class periods. To implement your class' action plan in Lesson 3, you will likely need to set aside additional time outside of the activities to prepare, depending on whether you need administrator approval, supplies, volunteers, etc.

The resource follows the NGSS 5E model of instruction. However, in Lesson 3 you will notice a slight deviation from this model, as students are focused less on exploring a phenomenon and more on planning and implementing an action project to make their school space a healthier habitat for all living beings.

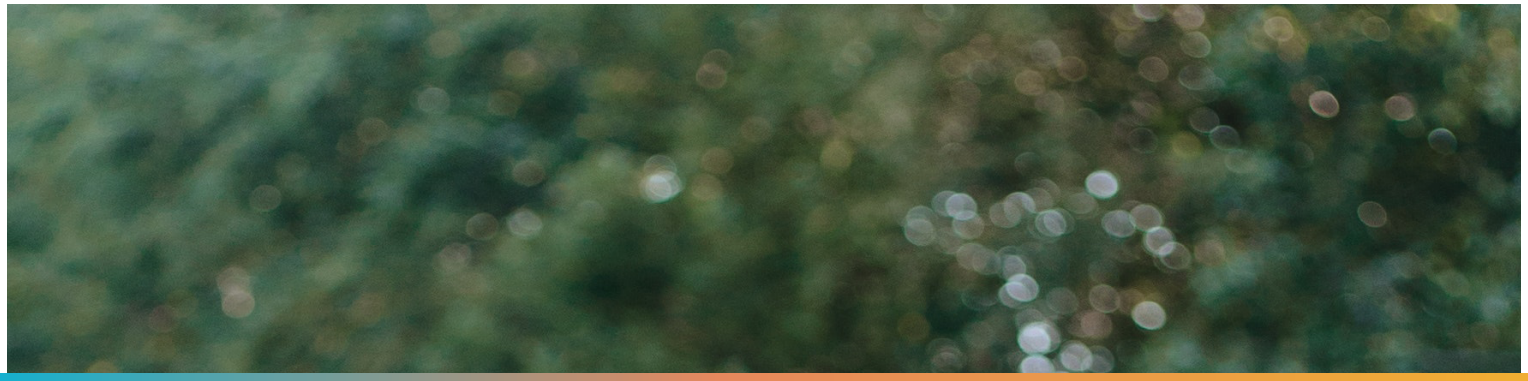
Learning about climate change can be a stressful experience for students, and it's important that we are supporting students. One way to do this is to teach them coping strategies and mindfulness practices that can help them regulate their emotions and deal with discomfort. We have included a few mindfulness exercises in Appendix D, and recommend that you weave them into your lessons, particularly in Lesson 2 when climate change is a big discussion point.

Standards

Academic Content Standards	LESSON 1	LESSON 2	LESSON 3
SOCIAL JUSTICE STANDARDS (LEARNING FOR JUSTICE)			
Justice			
JU.K-2.14 I know that life is easier for some people and harder for others and that reasons for that are not always fair.		X	
Action			
AC.K-2.17 I can and will do something when I see unfairness–this includes telling an adult.			X
AC.K-2.20 I will join with classmates to make our classroom fair for everyone.			X
NGSS PRACTICES			
1) Asking questions (for science) and defining problems (for engineering)	X		
2) Developing and using models	X	X	
3) Planning and carrying out investigations	X		
4) Analyzing and interpreting data	X	X	
7) Engaging in argument from evidence			X
8) Obtaining, evaluating, and communicating information			X
NGSS CROSS-CUTTING CONCEPTS			
1) Patterns	X	X	
2) Cause and effect	X	X	X
3) Scale, proportion, and quantity	X	X	
4) Systems and system models	X	X	
5) Energy and matter	X		
8) Influence of engineering, technology, and science on society and the natural world		X	X

Academic Content Standards	LESSON 1	LESSON 2	LESSON 3
NGSS DISCIPLINARY CORE IDEAS			
Life Sciences Disciplinary Core Ideas			
LS1C: Organizations for matter and energy flow in organisms	X		
LS1D: Information processing			X
LS2A: Interdependent relationships in ecosystems	X		
LS2B: Cycles of matter and energy transfer in ecosystems	X		
LS4C: Adaptation	X	X	
LS4D: Biodiversity and humans	X	X	
Earth and Space Sciences Disciplinary Core Ideas			
ESS2D: Weather and climate		X	X
ESS2E: Biogeology		X	X
ESS3A: Natural resources		X	
ESS3C: Human impacts on Earth's systems		X	X
NGSS PERFORMANCE EXPECTATIONS			
Life Science			
K-LS1-1 From Molecules to Organisms: Structures and Processes: Use observations to describe patterns of what plants and animals (including humans) need to survive.	X	X	X
1-LS1-1 From Molecules to Organisms: Structures and Processes: Use materials to design a solution to a human problem by mimicking how plants and/or animals use their external parts to help them survive, grow, and meet their needs.		X	X
2-LS4-1 Biological Evolution: Unity and Diversity: Make observations of plants and animals to compare the diversity of life in different habitats.	X	X	

Academic Content Standards	LESSON 1	LESSON 2	LESSON 3
Earth and Space Sciences			
K-ESS2-2 Earth's Systems: Construct an argument supported by evidence for how plants and animals (including humans) can change the environment to meet their needs.		X	X
K-ESS3-1 Earth and Human Activity: Use a model to represent the relationship between the needs of different plants and animals (including humans) and the places they live.	X	X	
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.		X	X
1-ESS1-1 Earth's Place in the Universe: Make observations at different times of year to relate the amount of daylight to the time of year.	X		
2-ESS1-1 Earth's Place in the Universe: Use information from several sources to provide evidence that Earth events can occur quickly or slowly.		X	



Lesson 1

WHAT IS A HABITAT?

AGE LEVEL:	Grades K-2
TIME NEEDED:	1 class period
MATERIALS:	• Pencil for each student • Nature journal or clipboard with paper (see Appendix A for a T-chart template) • Colored pencils or crayons • Cotton string or yarn • Hand lenses or pocket microscopes • Ball of yarn • Chart paper and markers
VOCABULARY:	**Animal** - a living being that can move and eat and react to the world through its senses. **Food web** - a complex interlocking series of food chains. **Habitat** - an area that is home to living beings. Habitats have food, water, shelter, and living space for the organisms that live there. **Living** - to be considered a living being the following must exist: movement, breathing or respiration, excretion, growth, sensitivity and reproduction. **Non-living** - A non-living thing in biology means any form without a life; it does not grow, reproduce, adapt, or respond to stimuli; for example, rocks. **Plant** - a living being that grows in soil, in water, or on other plants, usually has a stem, leaves, roots, and flowers, and produces seeds.

STUDENT LEARNING OUTCOMES:	By the end of the lesson, students will be able to... • Define what a habitat is and describe patterns they notice of what all plants and animals (including humans) need to thrive in a healthy habitat. • Observe and record the habitat components found in their local natural and built environments.
EDUCATOR PREP:	• Plan where to take students on a walking field trip to observe the habitat(s) near the school. See Appendix B for suggestions on planning for your outdoor activity. • Print T-charts, if needed (you can also just have students free-write in their nature journals). • You may wish to have students create a simple nature journal prior to the start of this lesson. See Appendix C for details.

What is a habitat?

Background: In this lesson students will be introduced to their local **habitat**(s). Consider inviting local naturalists, community members, and tribal leaders (if you've built a trusted relationship with them) to talk with and guide students through learning about the habitats around them. Even urban spaces are habitats; you can use whatever space you have around your school.

In general, habitats are places that **plants** and **animals** (including humans) make their home. In order for these living beings to survive, a habitat must have **shelter**, water, food, and enough space. If these things do not exist, the plants and animals will die, adapt, or move to a new location. There are many different types of habitats. Different organisms live in different types of places like mountains, oceans, grasslands, forests, and freshwater lakes and streams.

Focusing on your local habitats and the organisms that live there will give students opportunities to connect to their place and the living beings in it. Localizing your area of study will later help students think about how climate change affects them personally and take positive actions that will benefit their school community.

Activities:

Engage (5 min)

Begin with a mindfulness activity from Appendix D to prepare everyone for learning. Then, on a piece of chart paper, create a classroom T-chart to introduce ***living*** and ***non-living beings***. Have students play a version of "I Spy" to identify living and non-living beings in the classroom. Have a brief discussion of what makes something "living" or "non-living".

Explore (15 min)

1. Take students on a walking field trip to the habitat area you will be studying. Give students time to observe the area and talk with a buddy about what they see, hear, feel, and smell (no tasting). Give students time to write and draw their observations in their nature journals. See Appendix C for more information about nature journaling.
2. Then, bring students together to share their observations. Ask students questions like, "Did you observe different kinds of plants? Animals? What did they look like? How did you know which were plants and which were animals?" and "What did you notice that was living here? What was non-living?" If possible, add to the class T-chart things that they discovered were ***living*** and ***non-living*** in the habitat. Encourage students to identify human or built characteristics of their environment as well. How are they interacting with the natural environment? In first grade particularly, you may want to have students note where the sun is in the sky and the patterns in plant and animal features to support NGSS standards.
3. Take a deeper look at a small part of the habitat. Give each pair of students a loop of string. Stretch the loop out to form a square or circle on the ground. Give each student a hand lens and instruct them to take a closer look at the area defined by the string. Encourage them to look carefully under leaves and rocks that might be within the string circle (putting the leaves and rocks back where they found them). Check in with students to get a sense of what they're excited about and what they're thinking. Give students time to record their learning/ observations in their nature journal. You may also wish to use the T-chart below in addition to nature journaling.

Explain (5 min)

1. Bring students back together in the classroom, or gather them in a comfortable place outside. Explain that they just explored a **habitat**. Ask if anyone knows what a habitat is. After taking one or two answers, confirm that a habitat is a home. All habitats have four big things that all living beings need to survive. They are the same things that we need to survive! Let students have table talks to generate some ideas of what all beings need to survive. Write their ideas on the board or large poster paper, even if some are incorrect. Note: Space is usually a trickier concept. You can prompt students to think about this by saying, "what if I told you that we were all going to stay in this classroom for the rest of our lives? Does that seem like a good idea?" Students will conclude that there isn't enough space for that many people to live happily in a small room. The same is true for animals–they each have different requirements, but they need enough space between them to live well!

2. Have students answer the following questions as a whole group, writing the answers down on a whiteboard or large poster paper under the habitat component ideas students have just generated.

    - What kinds of places did you see where an animal could hide or be protected from the rain? (Explain that this is called a **shelter**).
    - What are some examples of food that animals could eat?
    - Where do you think the living beings get water?
    - Do the animals and plants have enough space to happily live in?

Wrap up by asking again, "What is a habitat? What do all plants and animals need to have a healthy habitat?" Guide students to conclude that a habitat is a place where living beings make their home. It has food, water, shelter, and enough space for organisms to survive and thrive in.

Elaborate (10 min)

1. To help students make a connection between the living and the non-living parts of a habitat, create a living "web" using a ball of yarn. Gather all of the students in a circle (this also works well as a carpet activity). Hold the starting piece of the ball of yarn. Then gently toss the ball to another student across the circle. Keep doing this until all students are holding a piece of the string. For a deeper dive, have each student share a plant or animal that eats whatever the previous person said (for example, a bee eats from a flower). You can also incorporate non-living beings like water to help move things forward. Then, you can introduce the concept of a **food web** throughout the activity, emphasizing how living beings are connected to one another by what they eat.
2. When all students have a piece of the string, ask them to pull back on the string gently only if they feel a tug on the string they're holding. Lightly pull on the string and wait until everyone has pulled on the string and is holding it taught. Explain that all the things in a habitat are connected and dependent on each other.

3. Ask students, "what would happen if we removed rocks from the habitat? How would the animals feel?" (*Some of the animals would lose their shelter and could die; they might feel scared or nervous*). Choose a student to let go of their string so that students see the pieces of the web relax.
4. Then ask, "what would happen if there was no longer water in the habitat? How would the plants and animals feel?" (*The plants in the area would probably die. The animals that eat the plants would need to find something else to eat and somewhere else to get water. They might feel sad or scared or confused.)* Choose one student to release their string for the water, another to represent the plants that disappeared, and another for the animals that would need to find something else to eat or will need to move out of the habitat.
5. Wonder aloud, "what is happening to the web?" (*Students should recognize that the web is very weak, and cannot support the things in the habitat. Habitats need all of their living and non-living parts to work well.*)
6. Ask everyone remaining to drop the string on the count of three so that you can roll it up easily.

Evaluate (5 min):

Option 1: Have students share aloud to the class or in small groups, answering the question, "what can we do to protect what we have observed in our school habitat?" Chart responses for future investigations or action projects.

Option 2: *Is it Living*? This science assessment probe has students separate the living and non-living beings. Then students explain how they decide something is living. This could be done as a pre- and post- assessment. See Appendix A for printable copies.

Wrap up with a mindfulness exercise from Appendix D.

Extend:

Science Connections:

Is It An Animal? This probe has students identify the animals presented in a list. Then they explain how they decide something is an animal. This could be used as a pre- and post-test. See Appendix A for printable copies.

Literacy Connections:

- ☐ The Salamander Room by Anne Mazer https://www.youtube.com/watch?v=hZrtzCA9pmY
- ☐ When the Wolves Returned by Dorothy Hinshaw Patent https://www.youtube.com/watch?v=YCdLdQdIxgw

Math Connections:

- ☐ Graph the different types of plants and animals found in your habitat.
- ☐ Bird count.
- ☐ Record weather
  - Rain amounts
  - Temperature
  - Sunny and cloudy days
  - Second graders can calculate elapsed time and graph the increase or decrease in daylight hours. This is an interesting way to observe seasonal changes. Try it for the entire year.

Name: _____

School Yard Habitat

Directions: Draw pictures or write about the living and non-living beings you observed in the school yard habitat.

LIVING BEINGS	NON - LIVING BEINGS

Name: _____

Is It Living?

Directions: Put an "X" next to the things that are living.

_____ **tree** _____ **rock** _____ **rabbit** _____ **butterfly** _____ **seed**

_____ **Sun** _____ **potato** _____ **wind** _____ **feather** _____ **water**

Explain your thinking. What is your "rule" that helps you decide if something is to be considered a living being?

Adapted from *Uncovering Student Ideas in Science* By Page Keeley, Francis Eberle, and Lynn Farrin, p. 123

Name: _____

Is It An Animal?

Directions: Put an "X" next to each thing you think is an animal.

_____ **cow** _____ **tree** _____ **person** _____ **worm** _____ **frog**

_____ **spider** _____ **snail** _____ **flower** _____ **beetle** _____ **mineral**

Explain your thinking. Write a "rule" to describe how you decide something is an animal.

Adapted from *Uncovering Student Ideas in Science* By Page Keeley, Francis Eberle, and Lynn Farrin, p. 117

Lesson 2

WHAT WOULD A HEALTHY HABITAT LOOK LIKE?

LESSON 2 - WHAT WOULD A HEALTHY HABITAT LOOK LIKE?

AGE LEVEL:	Grades K-2
TIME NEEDED:	1 40-minute class period, plus time for diorama construction
MATERIALS:	• Book *The Great Kapok Tree* by Lynne Cherry or Youtube reading of *The Great Kapok Tree* (https://youtu.be/AHk0gkaeCig), or another book of your choosing related to changing habitats and human impacts on the environment • Pencil for each student • Student Nature Notebooks • Know, Want to Know, Learned (KWL) Chart • Suggested materials for the diorama: • Shoe box or similar sized-box–1 per student • Bottles of glue--enough for every student • Trays to put supplies in (such as microwave dinner trays)--1 per student if possible • Art supplies, such as markers and crayons • Art materials–for example: ○ Clay, pipe cleaners, craft foam, construction paper, toothpicks, streamers, googly eyes, small shells, sand, feathers, small styrofoam balls, pinecones, popsicle sticks, small clothespins, tiny pinecones, cotton balls, felt, yarn. • Optional: Small toy animal figurines–focus on local animals!
VOCABULARY:	**Animal** - a living being that can move and eat and react to the world through its senses. **Climate** - what we can predict the weather to be like based on observed weather patterns over time; what we expect to happen. **Climate Change** - a long-term change in the average weather patterns that have defined Earth's local, regional and global climates for generations.

VOCABULARY CONTINUED:	**Climate solutions** - ways to deal with or fix a problem caused by climate change or to keep climate change from getting worse. Helping habitats in any way is a climate solution because it helps our human and natural systems be more resilient to change! **Deforestation** - the permanent replacement of forests by non-forest uses such as, building, farming, and housing developments. **Habitat** - an area that is home to living beings. Habitats have food, water, shelter, and living space for the organisms that live there. **Plant** - a living being that grows in soil, in water, or on other plants, usually has a stem, leaves, roots, and flowers, and produces seeds. **Temperature** - degree of hotness or coldness measured by a thermometer. **Weather** - what is happening outside today–it could be rainy, snowy, windy, sunny, etc. Weather is what you get no matter what you expect to happen.
STUDENT LEARNING OUTCOMES:	By the end of the lesson, students will be able to... • Identify both positive and negative impacts that humans have on local habitats (including impacts connected to climate change such as increased temperatures or rainfall and air pollution). • Discuss what they've heard about climate change and recognize that the impacts of climate change are unfairly distributed among people's communities and natural habitats.
EDUCATOR PREP:	• Prepare materials for the diorama if students are completing this project in class. • Consider writing a letter to students' caregivers to ask for donations of some diorama materials. • Print out KWL charts for each student or plan to make a large KWL chart for the whole class. • Determine which book you would like to share.

What would a healthy habitat look like?

Background:

In this lesson, students will analyze thriving habitats and the harmful effects of **climate change** on their local school habitat. Climate change conversations with grades K-2 can gloss over the causes of climate change, such as greenhouse gas emissions, and focus more on the observable impacts and climate solutions. Discuss with your students what they've heard about climate change and help them recognize the impacts within your community. **Weather** impacts are likely something they've personally experienced or heard someone talk about, and can be a foundation for understanding **climate** and climate change. Carefully guide your discussions to avoid focusing on "gloom and doom", and instead emphasize the positive solutions that are already taking place. However, be sure to validate your students' emotions as well; it's okay to feel scared or sad, and to need a break from taking climate action. At the same time, it's important to know that everyone can make a positive difference, especially when working together.

Integrating children's literature is another way to gently introduce students to the topic of climate change. "The Great Kapok Tree" by Lynne Cherry is one excellent literary choice used in this lesson. The story takes place in the Amazon rainforest in which **animals**, **plants**, and Indigenous tribes are threatened by human **deforestation**. This book was chosen because deforestation is a key contributor to global **habitat** loss and climate change, and it depicts a person recognizing that trees are cornerstones of a habitat and serve multiple functions. The book should be used to compare and contrast elements of habitat in the rainforest (which is an area commonly associated with climate change impacts) and your own local area. However, you may instead wish to find a book that represents your local habitat. You can find suggested climate fiction and nonfiction picture books for grades K-2 in Climate Generation's Climate Fiction and Nonfiction Reading Guide.

Activities:

Part 1: Climate Change in our Habitats

Engage (5 min)

1. Have students gather together. Start with a mindfulness exercise from Appendix D. Then ask students if they've ever heard the words "**climate change**". Find out what they've heard about climate change and record responses on a KWL chart (see Appendix A), filling out the "Know" and "Want to Know" columns. This chart will serve as an indicator throughout the lesson where you can add new student inquiries or new information learned. If students aren't familiar with the term, they have likely still been impacted by climate change; you may need to prompt students to talk about the weather, **temperatures** in warm and cold months and how it affects them, etc. For example, students may have been told by adults that it rains more or less or that ice melts earlier in the year; remember days they couldn't play outside due to heat waves; or have even lived through a climate event like a wildfire or a hurricane. You can then connect their experiences to climate change by explaining that these weather conditions are happening more often due to climate change. This is also an opportunity to acknowledge unfairness or injustice that students notice; for instance, students may talk about living near busier roads than their peers, or it being really hot in their neighborhood because they don't have shade trees. Invite those students to share their experiences and recognize that environmental and climate impacts aren't spread fairly across all people. Students may also have questions; write them down to refer back to later.
2. Take time to ask students how they feel about what they've heard or noticed, and validate their feelings. For example, you might say, "I felt sad too when we had that big storm and the trees fell down"; or "thank you for sharing that; it makes sense that you might feel angry when you hear that climate change is happening." If needed, try out another mindfulness activity here.
3. Ask students, "what do you think a healthy habitat looks like at our school? One where we aren't worried about climate change and all living beings are doing well?" Tell students they are going to get to work on an art project called a diorama to show others the healthy habitats they're imagining.

Climate Change

WHAT WE KNOW	WHAT WE WANT TO KNOW	WHAT WE LEARNED

Explore (10 min)

1. Students will begin plans for constructing a diorama to create and demonstrate a thriving habitat in which humans, animals and plants coexist. This assignment may be taken home and finished there, or you can set aside more time to complete these in class.
2. Give students the main purpose of the diorama: to show what they imagine a really healthy habitat would look like at their school. Students should include the four components that all healthy habitats need. They should also think about what they saw during their outdoor exploration in Lesson 1 and what specifically the local living beings might need to survive and thrive (including humans!).
3. Have students draw a model of what they want to include in their diorama.

Explain (10 min)

1. Read or listen to "The Great Kapok Tree" and ask students how different elements of habitat (food, water, shelter, and space) show up in your location versus in the rainforest. For example, ask "what types of food does the rainforest give the animals? What kinds of food are available in our habitat?" "Where does water come from in the rainforest? In our habitat?" (Note: If you are reading a different book about your local habitat type, ask students to point out the elements of habitat they notice and how those habitats may be impacted by human actions [for example, leaving trash on the ground or driving cars]).
2. Connect your questions back to what students shared about their knowledge of and experience with climate change. For example, students may know that driving cars causes air pollution/climate change, or that cutting down trees makes climate change worse, even if they can't explain how it works. Keep the conversation within the realm of what students already shared, rather than diving into details.
3. At the end of the book, have students reflect on what happened. Ask, "What would have happened to the plants and animals if the man had cut down the Kapok tree? Would it have helped or hurt the habitat?" Then have them think about their own area. "What would happen if we cut down one of our trees at school? Two trees? Ten? All of the trees?" (If you don't have many trees at school, you could pick something else, like "if we removed all the flowers or shrubs, or covered all the grass with pavement").

Elaborate (5 min)

Give students time to add one more element to their habitat diorama drawing. What was missing before that they want to include? What else did they learn that they want to share with others about healthy, resilient habitats?

Evaluate (5 min)

Review the Climate Change KWL Chart and add new information to the "Learned" section, and write students' additional questions in the "Want to Know" section. Guide students to understand that what makes a healthy habitat also helps protect us from climate change. Ex: Trees are important because they give us all clean air and shelter and keep us cool when it's really hot outside; that also helps us lessen how much climate change affects us. End with a short mindfulness activity from Appendix D.

Deeper Dive: Reflect on the benefits of trees:

After you read your book, you can fill out the graphic organizer below as a class. Ask students to think-pair-share about how plants, animals, and humans are helped by trees. Think about trees within your own school or community. You could also choose cacti, prairie grasses, or another type of plant that fits your locale. Encourage students to use the vocabulary from lesson 1, discussing food, water, shelter, and space, as well as thinking about how trees keep other living beings safe and protected from climate change impacts like storms, wildfires, or high temperatures. Write out and record responses on a graphic organizer (also available in Appendix A).

Name: _____

How Trees Help Us

How plants are helped by trees	How animals are helped by trees	How humans are helped by trees
Ex: some plants get shelter from trees (shade, growing on branches, etc.)	Ex: Woodpeckers eat insects that live in trees.	Ex: Humans get clean air to breathe.

Part 2: Healthy Habitat Diorama Creation (at home or 20-40 min in class)

Depending on your time frame, have students create their dioramas as a homework assignment or during part or all of your next class period.

1. Review concepts from Lesson 2 using the KWL chart. Have students look at their drawing of their diorama plan and imagine again what a healthy, safe habitat looks like near their school. For example: How could we give animals more shelter, give plants more space, reduce flooding, and/or cool the school playground?
2. Depending on your materials and your typical process, either have students gather their personal art supplies, hand out trays to each student with pre-prepped supplies, and/or leave bins of materials (puff balls, pipe cleaners, etc) on a table for students to select what they need (putting quantity limits on items as needed). Give students lots of time to create.
3. At the end of the work time, students can set up their dioramas to present to the class. Have students walk around in a "gallery" style, looking at others' examples with their hands behind their backs (so that they look and do not change anything about someone else's work).
4. Once students return to their seats, give them a few minutes to share compliments about their tablemates' dioramas. Then have them share their ideas with their tablemates or a partner for what makes their local habitat healthy and what reduces the climate change impacts they shared in the previous class.
5. If possible, display the student dioramas so that their visions for the future can support their action project planning in Lesson 3.

Extend:

Literacy Connections:

- ☐ Amara and the Bats by Emma Reynolds https://www.youtube.com/watch?v=QOtz-u9gzZU
- ☐ Saving American Beach by Heidi Tyline King https://www.youtube.com/watch?v=z-_KHNVmbwM
- ☐ Time to Roar by Olivia A. Cole https://www.youtube.com/watch?v=pni02PLF83k
- ☐ Above and Below by Hanako Clulow https://www.youtube.com/watch?v=7V8opRioOGg or https://www.youtube.com/watch?v=ikMZfFT1o1I

Math Connections:

- ☐ Record weather data to watch changes over time.
  - Rain amounts
  - Temperature
  - Sunny and cloudy days
  - Second graders can graph rain amounts, temperature, and cloud cover data. Try it for the entire year to look for patterns and change over time.

Lesson 3

HOW CAN WE CARE FOR AND PROTECT OUR HABITAT?

LESSON 3 - HOW CAN WE CARE FOR AND PROTECT OUR HABITAT?

AGE LEVEL:	Grades K-2
TIME NEEDED:	1 40-minute class period, plus time for implementing an action project
MATERIALS:	• Nature journal or clipboard with living/non-living beings T-chart • Nature journal or clipboard with problems/solutions T-chart • Venn Diagram: Titled School Habitat for ___ (template below) • Pencils • We are water protectors by Carole Lindstrom • The Mess that we made by Michelle Lord • Earth Steward and Water Protector Pledge • Anchor Charts of T-charts and Venn Diagram
VOCABULARY:	**Climate Change** - a long-term change in the average weather patterns that have defined Earth's local, regional and global climates for generations. **Climate solutions** - ways to deal with or fix a problem caused by climate change or to keep climate change from getting worse. Helping habitats in any way is a climate solution because it helps our human and natural systems be more resilient to change! **Habitat** - an area that is home to living beings. Habitats have food, water, shelter, and living space for the organisms that live there. **Oil Pipeline** - a long, especially underground, pipe used to transport petroleum over long distances.
STUDENT LEARNING OUTCOMES:	By the end of the lesson, students will be able to... • Work as a class to design and implement a solution to a local problem they've identified to help humans, animals, and plants thrive together at their school.

EDUCATOR PREP:	• Think about the problems your students have noticed and brainstorm some solutions they might suggest. • Read over the action project plan in Part 2 to think about how to facilitate the planning process with your students.

How can we care for and protect our habitat?

Background:

This is the culminating lesson in helping our **habitats** or creating solutions to climate change in our elementary school habitats. In this lesson, students will synthesize what they have learned about habitats to take action and create solutions to the problems they observe in the habitats around them.

Students can take positive action together that both improves the quality of their local habitat and is a **climate change solution**. They do not need to have a detailed understanding of how climate change works or all the ways it impacts the Earth to know that they are doing something kind and meaningful for other living beings. At this grade level, it is enough to highlight the value in being good stewards together and helping to keep habitats healthy within the context that it is a good thing for slowing **climate change**, too.

Based on what your students have observed in their school habitat, imagine some problems they may have noticed in that habitat. Brainstorm some **climate solutions** your students might identify and be ready to prepare materials for those solutions. Please see Part 2 of this lesson for more information on how to plan and prepare for an action project.

For example, if your school habitat experiences poor air quality, can you plant indoor or outdoor plants that specifically improve the air quality and/or could you start a campaign to encourage students to bike to school, carpool, or take public transportation?

If your school habitat has very few trees to provide shade for students, homes for birds and insects, or oxygen for all of the humans and animals, what would you need to do to plant a few trees at your school site?

If your school habitat experiences flooding, could you create systems to collect and reuse rainwater in a school garden?

Let your students guide your class's climate action.

Activities:

Part 1: Identifying problems and solutions

Engage (10 min)

1. Read *We are water protectors* by Carole Lindstrom or *The Mess that We Made* by Michelle Lord aloud to the students. Alternatively, you can show them the YouTube reading (links are in the Materials section).
2. Take a moment to do a short mindfulness activity from Appendix D. Discuss how the living beings and the water are connected and how they were threatened by human activity. Then discuss how people worked together to create solutions to these problems.
3. If you read *We are Water Protectors*, consider making the pledge at the back of the book with your class to be stewards of the earth and the water. Discuss with them what that will look like, sound like, and feel like. Perhaps, create a chart with the pledge written and adjust to meet the needs of your students and the habitat they are focused on.

Explore (20 min)

1. If possible, take students outside again to observe the school yard and refresh their memories on what is happening around their school; if not, have them look out windows. Then, ask them to bring their nature journals or T-chart from lesson 1 on living and non-living beings to your meeting space. Invite them to look at their dioramas as well.
2. Invite them to share the living beings they observed in the school habitat. As they share the living beings they observed, add them to the title of your Venn Diagram.
3. Ask students to create their own Venn Diagram in their nature journals or use the template.
4. Students can turn to a partner to discuss what these living beings need to survive in their habitat.
5. Have students share their ideas for what the living beings need with the whole group. Record their responses in the class Venn Diagram. As you record the responses, discuss whether the things they need are available in your school area habitat to determine whether you will record that need in the intersecting circle (“Both”) or in the outer circle (“Needs”).
6. Have students talk with their partner about which elements their school’s habitat has. Follow the same steps as you did for the previous question, filling in the “Has” and “Both” circles.
7. Draw students’ attention to the things that are written in the outer circles: the needs that are not being met or the elements in the habitat that are not needed.

Explain and Elaborate (10 min)

1. Send students to work in table groups to add to their Venn diagram and to identify a problem that they observed in the school habitat. For example, a need that is not being met or an overabundance of something in the habitat. Remind them of what they learned about deforestation in *The Great Kapok Tree*, the poisoning of the waters by the oil pipeline in *We are Water Protectors*, or of the trash buildup in the oceans in *The Mess that We Made*.
2. Invite students back together to share the problems they observed.
3. Record the problems they observed on a Problems/Solutions T-chart. On the first row of the T-chart, you could show the examples from one or more of the books you read. For example, under "Problems" you could write: poor air quality, flooding, lack of insects in local habitats.
4. Students can record their responses in their nature journal or on the T-chart provided below.
5. Once students have shared the problems, work together to discuss possible solutions to these problems. Explain that a solution is a way to deal with or fix a problem. In this case, we are looking for **climate solutions**, or ways to deal with or fix problems caused by climate change. Under "Solutions" you could write: planting trees, creating rainwater capture systems, planting a pollinator garden, etc.
6. Choose one problem and one solution to tackle first. Have students vote to choose which one they will work on first. Be sure it is a problem that students can realistically address with the resources, adult support, and timeframe available. The action ideas provided below are organized in order from the least to more time, resource, and capacity-intensive.

Some examples of K-2 friendly, actionable climate solutions are:

- Cleaning up trash on the school grounds (and finding ways to reduce trash!)
- Starting a poster campaign to encourage students to bike to school, carpool, or take public transportation
- Monitoring your habitat and reporting scientific data as a community science project (using nature journals!)--programs like GLOBE, US Phenology Network, and CoCoRaHS have elementary-friendly projects
- Researching indoor plants that improve air quality and potting them in your classroom
- Starting a composting or recycling system at your school
- Planting an insect/pollinator garden
- Planting trees and native plants
- Creating a school garden
- Building a rain garden

Part 2: Taking action

Elaborate (25+ min)

Before you begin your action project with students, you will need to do some pre-planning work. Once your students have voted on their action project, you need to ensure that their project fits the *S.M.A.R.T.I.E* criteria. When appropriate, include your students as much as possible in determining whether their project idea meets the following criteria:

It is *Specific* (it can be easily defined and understood). It is *Measurable* (it is clear if it is obtainable and when it has been achieved). It is *Achievable* (it can be achieved within the current context). It is *Realistic* (it can be achieved given the resources and timeframe available). It has a *Timetable* (it is limited by a timeframe). It is *Inclusive* (everyone has access and shares power in decision making). It is *Equitable* (it enables everyone to participate and benefit in ways that meet their needs).

Once you confirm that the project can meet these criteria, you can begin the planning work with your students.

1. Invite students to brainstorm what they already have and what they need to achieve this action project or solution to the problem they observed in their habitat. You can use the Action Plan Document below or create something similar on a large chart so that students can engage with the document throughout the project.
2. Begin by recording what the goal of the action project is and what supplies, materials, or equipment are necessary to do this project. Encourage and support students to be as specific as possible about what they will need. If the project requires space on the school campus or permission to use a specific facility, include that permission as part of the needs. Next, encourage students to think about resources or supplies that they already have that can be used for this project.
3. Have students think about who will participate in and support this project (who is the team for this project?). Do they want to include other students, teachers, custodial staff, administration, families, and/or community members? For example, extra adult volunteers can be helpful for any planting or minor construction work! Remember that some projects (like gardens) will require long-term maintenance, which needs to be factored in.
4. Invite students to think through any challenges they foresee in accomplishing this project, whether it is obtaining the supplies and permissions they need or engaging and inspiring others to participate in this project.
5. Finally, plan a timeline for how you will implement the project, breaking it into clear steps and deciding when exactly your class will accomplish those steps.
6. Now that you have a plan, start implementing your plan to meet your goal!

Evaluate (15-40 min)

When you meet your goal, make sure you celebrate this significant accomplishment. Give students time to reflect on their experience. What went well? What was challenging? What would they do differently next time? What do they want to keep working on in relation to this project? Perhaps you will then move onto the next goal on your list of problems to solve in your local habitat!

Extend

Math and Literacy Connections:

- ☐ Record phenology data in daily or weekly nature journals; students can write, draw, tally, and graph their observations.
  - When certain plants and animals are first seen each season (ex: first dandelion, first budburst on a tree, first robin returning in spring)
  - Weather events (ex: first frost, ice covers the pond, first thunderstorm, first 80 degree day)
  - Length of daylight and where the sun is in the sky
- ☐ Read *The Tantrum that Saved the World* by Megan Herbert and Dr. Michael E. Mann https://www.youtube.com/watch?v=J4itoghVlkg

Phenology is the study of seasonal and cyclical changes, especially in weather and plant and animal life. Making phenology observations is an interesting way to observe change over time. Try it for the entire year!

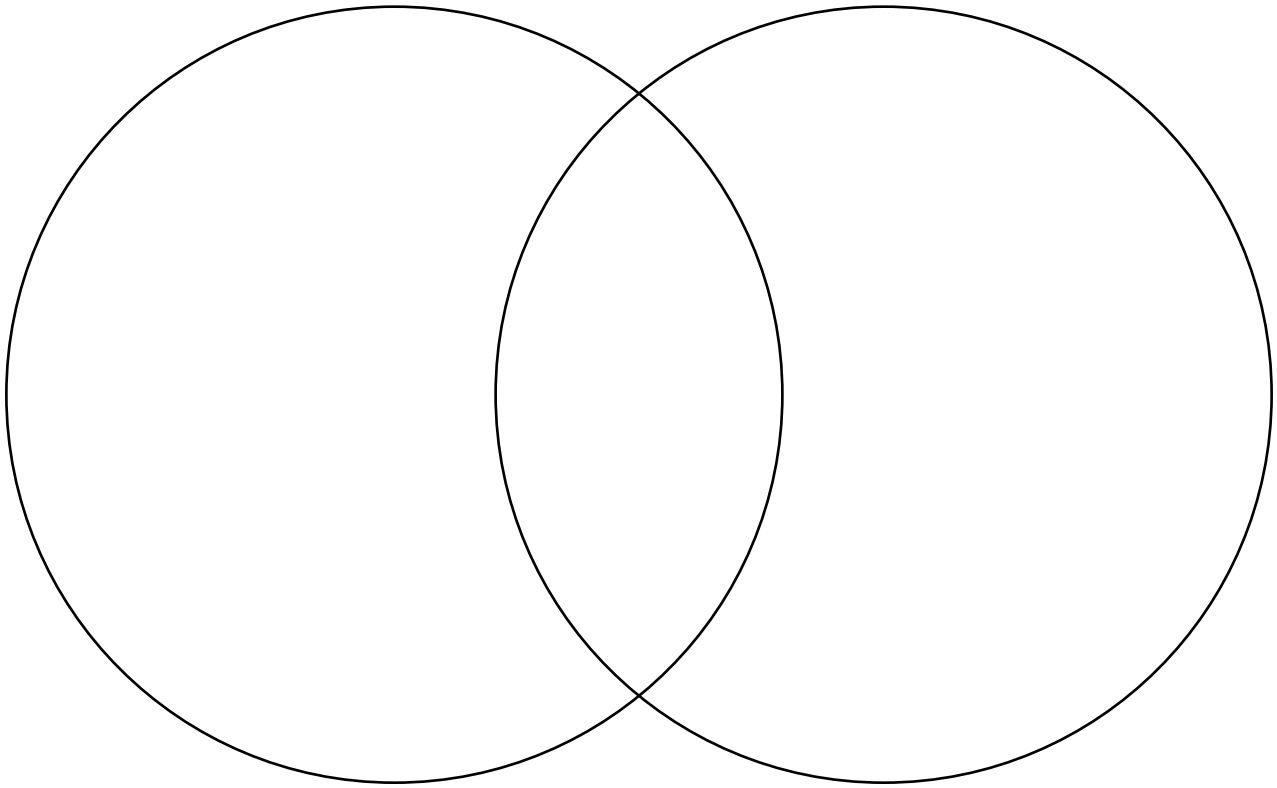
Name: _____

School Yard Habitat For _____

HAS

NEEDS

BOTH



Name: _____

School Yard Habitat

Directions: Draw pictures or write about the problems you observed in the school yard habitat. Then brainstorm possible actions we can take to solve those problems.

PROBLEMS	POSSIBLE SOLUTIONS

Action Plan Document

Problem Observed in Local Habitat: _____

Possible Solution: _____

Goals	Needs / Supplies	Resources / Support	Team	Obstacles / Challenges	Timeline / Steps

Appendix A: Student Worksheet/Notebook Pages

Lesson 1: What is a Habitat?

School Yard Habitat
Is It Living?
Is It An Animal?

Lesson 2: What would a healthy habitat look like?

KWL Chart
Graphic Organizer

Lesson 3: How can we care for and protect our habitat?

School yard habitat Venn Diagram
Problems and Solutions T-chart
Action plan document

Appendix B: Tips for Teaching Outside

Learning outside the classroom has numerous benefits for students! Outdoor activity can improve students' physical and mental health, which can positively impact their learning. To reap the greatest benefits, it's important to prepare yourself and your students for your outdoor space. A few considerations:

Pre-Activity Preparation

- Consider how climate and environmental injustice may be felt and noticed by your students, and how you can talk about it with them in age-appropriate ways. This curriculum from EcoRise can help introduce young students to the concepts of environmental justice: https://www.ecorise.org/product/intro-to-ej/
- Get to know your school grounds. Walk around the area and learn what resources are available. If you have trails, walk them to make sure you know how to navigate back to the building.

- Time how long it takes you to get from the place you want to visit (such as a pond, trail, or open field) back to your classroom, walking at a leisurely pace. You can generally assume that you will need an additional 5-10 minutes to walk with a group of K-2 students.
- Though on many school grounds, dangerous plants and animals are eradicated, it's still smart to know which kinds of plants or animals might pose a risk to your students in your region. In some areas, plants like poison ivy and poison oak may be alongside trails. In some parts of the US, there are species of spiders or snakes to watch out for.However, these animals are typically wary of humans and are usually scared away by loud children. Bring a knowledgeable staff member or identification guides to help you check for animal dens or poisonous plants.
- Set up a backpack to help you carry personal medical supplies (like epi pens), a first aid kit, a radio or cell phone, and extra outdoor clothes if needed. You can also use it to carry students' journals and writing utensils so that they don't get lost in transit.
- See if you can get an additional staff member to accompany your class during your activity.
- If needed, let your administrator or co-teachers know where you will be.

Weather

- It is safe to bring students outside in nearly all kinds of weather as long as they are dressed for it. This can be a challenge for many schools, and you may need to determine whether the conditions are acceptable given your students' attire. You can also make some small adjustments to keep your students comfortable, such as:
    - Lead activities under a built shelter or trees on rainy days if they do not have waterproof gear.
    - On hot days, stay in shady areas like under a shelter, the shady side of a building, or under trees. You could also bring a spray bottle or spray fan to mist students. Have students bring water bottles or take frequent water breaks at a nearby water fountain.
    - Teach your students ways to keep warm, such as staying dry (no mittens in the mouth!); shrugging their shoulders and dancing to keep blood flowing to their extremities, tucking their hands into their armpits, and finding shelter to block the wind (a great habitat connection!).
    - See if your school can set up a program to keep clean hats, boots, mittens, raincoats, etc. available for outdoor excursions. There may be grants for this, or you can use clean lost and found items.
    - Shorten your trips outside if there is extreme heat, cold, or rain.
- Make sure you have proper clothes for the weather too! You will be a better teacher if you are comfortable.

Expectations

- Create community agreements about outside behavior before going outside. Using a large piece of paper posted on the wall, document students' suggestions for rules they agree to follow when outside. This is a great resource to build upon after several trips outside and can be a great reflection tool when returning from an outdoor trip. See our suggestions for expectations below.
- Give students boundaries. You can use obvious outdoor markers, like "please stay between the big tree and the orange slide", or "please stay on the blacktop"; or you can set out cones to mark boundaries for exploration.
- Give students time updates so they know when they have 5 minutes left outside, 1 minute, etc. This can be a hand signal and/or you calling out. This can help students prepare so that they're ready to come back to you when you call!
- Have a callback sound and signal when it is time for students to return to you. For example, you could raise your arm in the air and blow a whistle, or agree on something that you call out, such as "1,2,3, return to me!" Students can then call "1, 2, return to you!" so that anyone who missed your signal has another chance to hear that the activity is over.
- Set up a buddy system. Pair students up and tell them they should always be able to see each other. They are in charge of letting you know if their buddy has returned at the end of the activity.
- If your students are investigating water (for example, a school pond), prepare them with firm expectations about what is safe and unsafe. If they are on a dock, for instance, they should lie on their bellies if they are going to look over the edge or collect water samples. If possible, provide students with waders and go into a shallow area to ensure that no one falls overboard! The expectation then is that water shouldn't come over the edge of their boots. Have multiple staff and a life preserver on hand as additional safety precautions.
- Tell students they are not allowed to eat anything they find outside. Some berries look like ones we like to eat but are actually poisonous. Children typically understand this. If there are any poisonous plants or animal dens in your area, keep them out of your boundaries or point out where they are and why it's important to keep a respectful distance.
- Encourage students to be respectful of nature by leaving nature as good or better than they found it. This includes not picking flowers or pulling leaves off of trees, turning rocks back over once you've looked under them, picking up trash, etc. You can set this expectation by explaining that everything we see in nature is part of the habitat. Consider having a trash bag handy in your backpack in case students find any trash; tell them to leave things that aren't safe to touch (such as sharp items).

During the activity

- Go over the community agreements while inside, and then remind them of key expectations once outside.
- Travel to your chosen area. Depending on your comfort level, you can have an adult in the front and back of the line, ask students to hold onto a rope, or be clear about a marker (like a tree) they can run to and then stop for further directions (hint: if you make running ahead a game, students are less likely to run ahead when they're not meant to!).
- Watch your students for signs of hypothermia (in cold weather), heat exhaustion (in warm weather), frostbite, and sunburn.
- If you need to talk through an activity before students begin, invite them to sit down so they are comfortable.
- Make sure you are facing the sun so that your students aren't distracted by squinting at you.
- Trust your students. Give them space to explore and find their own special hideouts (even if you can't see them!). Students who struggle to follow directions in a classroom often feel more relaxed outside and engage more in outdoor activities. Remember, students don't want to get lost or be left behind by the class!

Appendix C: Observation and Nature Journaling

Naturalists, scientists, poets, artists, and others use nature journaling as a way to appreciate the natural world, notice change over time, and to record data that they can share with others. Nature journals typically display information in multiple formats, whether it is writing, drawing or painting, or recording tables of data such as temperature or number of birds sighted. Nature journals are different from science journals in that they are focused specifically on recording natural observations over time; they are not meant as a space for solving problems or answering reflection questions (although a nature journalist might choose to reflect on something they see).

One great thing about nature journaling is that it is personal and unique to the observer! Especially early on, let students record their observations in ways that work best for them, whether this is writing notes in any language, drawing, or making leaf shadings. Once students have journaled a few times, you can encourage them to try a new method of recording information and remind them that this is a chance to practice a skill they may not be as comfortable with yet.

The main point of nature journaling is to remind the journalist of what they observed. However, journals can be an excellent assessment of students' understanding as well.

Step 1: Create a Nature Journal

Though you could have students use an existing notebook for their nature journals, it gives the activity special meaning and greater engagement if students can create their own. The simplest way to do this is to fold a piece of 8.5x11" construction paper over 8-10 pieces of printer paper (hamburger style) and staple the bound edge.

Give students time to choose the color of their journal cover and decorate it. They will need their name on the cover for easy identification, but otherwise can decorate it however they'd like using markers, crayons, stamps, stickers, or anything else they have. You may wish to suggest that students draw what they think they might see outside as an initial assessment.

You can show students examples of nature journals as inspiration. There are examples online, or you can use the examples available in Climate Generation's Minnesota's Changing Climate curriculum.

Step 2: Make Observations!

- Children instinctively observe the natural world. However, for a nature journaling activity it can be helpful to focus their explorations. Here are some suggestions:
- Choose an open-ended prompt to help guide students' observations. This could be the same question to create a common thread throughout their nature journaling unit, or it could be different each time, depending on the outcomes you're looking for. The Beetles Project model of "I Notice, I Wonder, It Reminds me of" is a helpful set of prompts to increase your students' curiosity and build their observation skills.
- Encourage students to use four of their five senses (except taste). Practice this together as a group first, asking them to name what they see, hear, smell, and feel from where they are standing.
- Let each student choose a "sit spot" (a special place they return to for each journaling session).
- Try full-circle observations. Students stay in one spot and slowly rotate 360 degrees, stopping to take notes about their observations, and stop when they reach the place they started.

Please see Appendix B for more information on teaching students outside and setting expectations for outdoor learning.

Step 3: Reflect and Repeat!

Once students have been outside to make observations, make sure to give them some time to share out. They will all most likely have many stories they want to share! Nature journals are most effective when students can make multiple trips outside to make observations over the course of a week, a season, or even an entire school year. This can help them understand NGSS cross-cutting concepts such as patterns and change and stability. See if you can set aside time for your class to write a nature in their journal regularly!

Appendix D: Coping Strategies and Mindfulness Exercises

These exercises were adapted from *All the Feelings Under the Sun: How to Deal with Climate Change* by Leslie Davenport. Weave them into the beginning, middle, and end of your lessons to help students navigate their emotions.

Internal Weather Report

1. Have students check in with themselves about how they are feeling.
2. Invite students to think of what that feeling would be if it were a type of weather. For example, they might feel sunny, cloudy, foggy, stormy, etc.
3. Have students either draw that type of weather on a piece of paper or give them printed clip art images to choose from.
4. Have students share with the class, a partner, with you, or reflect for themselves on how they're feeling. If students are sharing more privately, find a way for students to share their weather report with you so that you can validate their feelings and give them support as needed.
5. Consider doing this as a pre-post activity during an emotionally intense lesson.

Butterfly Hug

1. Thinking to yourself, rate your current stress level on a scale of 0-5, 0 being not stressed at all and 5 being very stressed.
2. Cross your arms over your chest, resting your fingers on either side of your collarbone.
3. Cross your thumbs so that you create a butterfly shape, with your thumbs being the body of the butterfly and your hands its wings. If you wish, you can close your eyes or let your gaze fall to the ground.
4. Lift each wing, one at a time, and gently tap your left collarbone, then your right. Leave the butterfly body on your chest. Keep going back and forth.
5. Take a deep breath into your belly, and slowly release. Take three or four more deep breaths.
6. Think about a place that's special to you, where you feel calm and safe. Picture what it's like to be in that place–sights, sounds, smells, etc. Imagine yourself there as you keep gently flapping your butterfly wings and breathing deeply.
7. Spend 2 minutes or so doing this, and then open your eyes (if closed) and observe the space around you. Rate your stress level again. Did it change?
8. Thank students for trying the Butterfly Hug.

Bubble Blowing Breathing

1. Close your eyes if you feel comfortable, or let your gaze rest toward the ground.
2. Take a deep breath in through your nose, filling up your belly.
3. When you blow out, purse your lips as though you're blowing bubbles through a straw. Blow all the air out of your belly and lungs.
4. Begin again.
5. If you want, you can add a calming phrase to think to yourself. For example, when you breathe in you could think, "Breathing in, I am safe." When you breathe out, think, "Breathing out, I am safe." You could choose anything that you like, such as, "I feel calm", or "I relax my mind".
6. Spend about a minute or so on this exercise, then ask students to open their eyes and look back to you so that you can begin your next activity.

Appendix E: Additional Resources

- www.johnmuirlaws.com: register and download their book for ideas and lessons for the classroom.
- https://www.nature.org/en-us/: Great source for short clip nature videos.
- https://www.nationalgeographic.org/society/: Shares many of the latest up-to-date resources in environmental issues.

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