

2021-22 GWE Outdoor Curriculum Guide

by The Global Warming Express Curriculum Committee, 2021-22

Unit 1 - Introductions

(Sections in **red** indicate optional activities with additional supplies needed.
Sections in **purple** indicate links to videos and music)

Supplies needed- snack for 15, small gloves, hand sanitizer, paper, folders, name tags, holders, crayons, colored pencils, colored markers, container for compost, GWE Banner, Global Warming Express books, laptop, book Common Ground, MP3 of GWE video, phone with camera or camera.

(Note: Throughout the program, the children will be creating a lot of artwork and projects, most of which will go home with them. It will be helpful to get photos of their wonderful works, which we can display on the website and keep in our archives. If you have a co-mentor, please consider taking turns taking photos week-to-week. If you do not have a co-mentor, yet, consider allowing some of the children to take photos. Typically, kids know a lot about phones and those who are thoughtful in their behavior will likely do a great job of photographing for you. To this end, please bring a phone or camera to each session, if possible.)

Section 1 Introductions: Children and mentors have the opportunity to introduce themselves. Begin to build relationships, establish routines, and share expectations.

Remember that you have plenty of time. Developing relationships is important...do not rush through this section.

1. Ideally children will meet you outside on a playground. Have them check in with you, explain the boundaries of where they should play and give them an approximate amount of time for playing. At the end of that time or when all children have checked in, ring a bell/timer to let children know it is time to gather.
2. When children have gathered, ask that they stand (or sit) in a circle and explain that you are going to play a movement game to help learn everyone's name. Beginning with mentors, each person gives their name and makes a movement. The rest of the group imitates the movement. Once everyone has introduced themselves, explain that you will all be going inside to wash hands and then returning to the designated area for snack. (Or pass around hand sanitizer if you are meeting a distance from the school. Keep in mind that we are connecting with water though so, at least sometimes, have the children go inside to wash their hands. There is a script for mindful handwashing on page 6 of this curriculum that you can use after completing unit 2.)
3. Present but do not immediately distribute snacks. Explain that before eating, we will be expressing our gratitude for the food. We won't have time today to thank everything and everyone that is responsible for bringing this food to us but we can begin a list and add to our list each week until we have included everyone. Keep a running record over time. List will eventually include entities closely involved (e.g. you for bringing the food, farmers, worms, sun, rain) and those more removed (e.g. animals that died to make up the soil, people in the farmers' lives that support them to grow food).
4. After each student has had the opportunity to add 1 or 2 recipients of gratitude to the list, distribute snacks (organic fruit). You can have a conversation about the meaning of the word "organic." Make sure to let students know that it costs money for foods to be labeled 'certified organic' and that some small local farms may be using organic practices even though they cannot afford to pay for certification. Include in your discussion other factors important to sustainability such as how much and what type of packaging is used and how far food has traveled to get to point of purchase. (You can also postpone this conversation for later in the semester if needed - depending on the attention/interests/comfort of your students.)

5. Children and mentors engage in unstructured conversation while eating. Collect leftovers in a bucket and ask children what they think should be done with them. Allow space for children to share what they know about compost and then fill in gaps and/or paraphrase/simplify/summarize for children who did not have the same background knowledge. If the school composts you can visit it as a group to drop off the scraps.
6. Discussion - Children take turns sharing why they are here (in the GWE meeting), what they know/how they feel about global warming, climate change, environmental issues. Mentor then introduces the GWE program with video. Distribute copies of The Global Warming Express by Marina Weber-Stevens. Invite questions/comments/further discussion. Introduce and demonstrate GWE Online Curriculum App.

Optional

- If there is time, you can read and discuss the book: Common Ground by Molly Bang.
- If there is time, you can hand out folders/name-tags for children to decorate.
- If there is time and interest, children can come up with a group chant or handshake.

Section 2 - What is Nature/the Natural World?

Supplies needed (for 12-15) snack, gloves for small hands, hand sanitizer, paper, folders, name tags, tag holders, crayons, colored pencils, colored markers, container for compost, GWE Banner, laptop (optional), book You Are Stardust, **phone or camera for photos**

This section may be broken up into 2 days if necessary. A good place to break would be after collecting items and before sorting them.

1. Follow the routine established last week for greeting children, allowing them time to run around/play while peers check in, calling them to gather.
2. Outdoor Observation (see explanation)**
- 3) Follow the routine established last week to wash hands, express gratitude, snack, and unstructured conversation.
- 4) Discussion: "What is nature?" Let children share their ideas. If you can - write them down.
- 5) Explain that they will be going on a 'treasure hunt' to collect items and or pictures of items - anything that they can find outside of their school. They can collect objects that are lying around on the ground e.g. litter (trash), fallen leaves, sticks, stones. They can ask mentors to take pictures of anything that is living (insects, plants), attached to something living (green leaves, flowers), or that would be too big or dangerous to pick up. Go over safety rules and distribute gloves.
- 6) Children collect items/photos of items
- 7) Introduce categories for children to sort items into: living, natural non-living, human-created non-living. Have children sort their items. If there are items that they do not know how to sort, set those aside for now. If this section takes 2 days and you are able to print the photos in between they can sort the photos. If not, show the photos and either draw a quick sketch of the item and/or decide on a verbal label for the item and write it on an index card. They can sort the sketch/description.
- 8) Discuss the objects that were difficult to sort. Which categories could they fit in? Are there any other objects in those categories that could also fit into other categories? Discuss the validity, usefulness of these categories. Provide lots of space for children to share their thoughts, ideas, questions. Interject for the purpose of moving the conversation forward rather than to 'teach' them something.

Some examples of ideas/questions for discussion: Fallen leaves were living but aren't any longer. Anything human-made from wood or paper used to be a tree which was "natural" and living. Plastic comes from oil which came from plants that were once living. Aren't humans part of the natural world?

When you are finished with this discussion, re-sort objects according to how they should be disposed of. Encourage discussion.

(One important goal of this activity is for students to 'discover' that these categories are not really clear cut and thus increase their sense of connection to and respect for the more-than-human world. Living things are made up of non-living things and other living things and they (we) return to the earth. Human-made things are made up of natural non-living things, many of which used to be living things. In the end, sorting materials by how they should be disposed of, is meant to increase understanding that even though all these things came from the earth, some of them (e.g. plastic) are still harmful to life on earth.)

- 9) Read and discuss the book: You Are Stardust by Elin Kelsey

10) Art Activity - Drawing. Children are invited to create a drawing to illustrate ideas discussed. If they express a preference to write a poem or song or to create movement they are welcome to do so. They can work individually, in small groups, or altogether.

****Outdoor Observation**

In order to develop a relationship with their space, children are offered the opportunity to mindfully experience it for a few minutes each time they gather: to notice how it feels to be in their body in this space. There is no pressure for children to experience this in any particular way but there is an expectation that they do not interfere with the experience of others.

Below are some suggested scripts/invitations to explore. Feel free to use whichever seems the most comfortable for the group of children that you are working with. Or, if you have experience with mindfulness activities such as mindful walking, nature bathing, etc. feel free to swap in prompts/activities keeping in mind the intention that children are to connect to the space.

Five-Senses Mindfulness Script - a long version:

Instruct the children to find a comfortable place to sit - or stand if they prefer. They can close their eyes if they want to but it is not required. Be sure to go through this script slowly. Pausing between questions.

Begin with three deep breaths. Breathe in through your nose as if you are smelling a flower...and now out through your mouth as if you are blowing bubbles or the seeds off a dandelion. You might feel your breath all the way deep in your belly. Or notice if there are other parts of your body where you feel your breathing. Breathe in....and out. In.....and out.

Now notice how your body feels in this space. What is the temperature?
Without looking can you feel where the sun is in the sky?
Do you feel a breeze? Can you feel which direction it is coming from?
What does the ground feel like under your bottom? Or under your feet if you are standing?
(Pause for a silent count to 10.)

Now shift attention to what you can hear. Do you hear the wind? Birds chirping? Do you hear the sound of other people? Of cars? Can you tell what direction these sounds are coming from?
(Pause for a silent count to 10.)

Do you notice any smells? (Pause for a silent count to 10.)
Any tastes? (Pause for a silent count to 10.)

Now if your eyes are closed go ahead and open them. What do you see in this space? Try not to name what you see and move on. Instead pretend you know nothing about these things. Notice colors... shapes... textures... movement... lighting... shadow....
(Pause for a silent count of 15-30 seconds.)

You can end this activity by ringing a bell or just verbally introduce the next activity.

Five-Senses Mindfulness Activity - Simple version

Explain to children that they are going to be detectives and see if they can find out anything new about their space.

- First, notice 5 things that you can see. Look around you and become aware of your environment. Try to pick out something that you don't usually notice.
- Second, notice 4 things you can feel. Bring attention to the things that you're currently feeling, such as the temperature, the wind blowing. What does the dirt/grass feel like? What else can you feel?
- Third, notice 3 things that you can hear. Listen for sounds in the background that you don't normally notice.
- Fourth, notice 2 things you can smell. Bring attention to scents that you usually ignore either pleasant or unpleasant.
- Finally, put your attention on your mouth and your tongue. Notice what you can taste.

Go on a “Safari”

Instruct students to walk around the space and notice as many different animals and plants as they can. Challenge them to use as many senses as they can to find them. Can their sense of hearing help them? How about their sense of smell?

Mindful Handwashing

Before you even turn on the tap, think about how each drop of water has always existed on this planet.

Think about the water cycle and how water moves around the earth.

Think about the many possible adventures each drop of water has had.

The water about to come through your tap comes to you most recently either from a river or from an underground aquifer. It is treated and then travels through pipes until it reaches your tap.

When you turn on the tap, listen to the sound the water makes as it pours into the basin.

How does it smell?

Notice how it looks as it pours from the faucet.

How does the flow change when you put your hands beneath it?

As you are washing your hands, notice how the water feels on your fingers. Is it warm or cool? What does the pressure feel like? Where on your hands can you feel contact with the water?

When you are finished, turn off the tap and think about the water continuing on its journey. It will travel through pipes to a waste-water treatment plant where it will be cleaned and then returned to the river.

Where will it go next?

Unit 2 - Water: Where Can We Find It?

Supplies needed- snack for 15, small gloves, hand sanitizer, plastic cups, paper, folders, name tags, holders, crayons, colored pencils, colored markers, container for compost, GWE Banner, books Rivers of Sunlight and One Well, large jar of drinking water.

Section 1 -

1. Follow the established routine for greeting children, allowing them time to run around/play while peers check in, calling them to gather.
2. Outdoor Observation (see explanation).
- 3) Follow the routine established to wash hands, express gratitude, snack, and unstructured conversation.
- 4) Pose question: "Where can we find water?" Explain that before they answer you'd like them to spend 5 minutes looking around to see where they might find water in this space. When 5 minutes have passed, call them back and invite discussion. Write down their ideas.
- 5) Read Rivers of Sunlight up to "And I also cycle water in the seas."
 - Before you begin reading, pour each child a small amount of water from a jar. Have children take a sip of water when prompted by the book.
 - Check for understanding that H₂O = water. Point out the illustration of water molecules in the book. You might draw a larger illustration or create a model (e.g. out of playdoh) of a water molecule.
- 6) Revisit discussion: "Do you have any new ideas about where to find water?" Write down their ideas. If they haven't spontaneously mentioned: inside of themselves, plants, animals, clouds, underground, see if you can elicit these by asking leading questions or referring to the book.
- 7) Read Section "One Well" from book One Well by Rochelle Strauss. Allow time for child-centered discussion.
- 8) Children are invited to create a drawing to illustrate ideas discussed. If they express a preference to write a poem or song or to create movement they are welcome to do so. They can work individually, in small groups, or altogether.
- 9) At the end of today's section - Pour each child a glass of water from a pitcher. Read Molly Bang's Water Meditation (On the very last page of Rivers of Sunlight book beginning with: "THE NEXT TIME YOU TAKE A DRINK OF WATER REMEMBER THIS..." Have children take a sip of water.

Optional:

Highly Encouraged. This is a good activity for whenever children need a movement break. Ask children if they know the 3 states of water (solid/ice, liquid/water, gas/water vapor). If they are unfamiliar with the term "state" name one and ask them for the other 2. Ask them what causes water to be in one state or another and see if you can elicit why. If they do not already know, explain that the sun's energy in the form of heat causes the water molecules to speed up. Water molecules are attracted to each other like magnets and when they have little energy they slow down enough to attach to each other and form a crystal. When they have a little more energy they move around more, and break their attachments - then they flow like water. When they have a lot of energy they move around a lot and can escape into the air where they turn into water vapor. Have children act out the different states. Play a game where you name a state or call out 'hotter' or 'colder' and they move accordingly.

Section 2 - Water Cycle

Supplies needed- snack for 15, small gloves, hand sanitizer, paper, folders, name tags, holders, crayons, colored pencils, colored markers, container for compost, GWE Banner, books [Rivers of Sunlight](#), [One Well](#).
Supplies for Evaporation Experiment: see *GWE Supplemental Interactive Demonstrations and Experiments*

Advanced option: include a dish with the same amount of fresh water as an experimental control

Supplies for Cloud Demo: see *GWE Supplemental Interactive Demonstrations and Experiments*

- 1) Follow established routine for greeting children, allowing them time to run around/play while peers check in, calling them to gather.
- 2) Outdoor Observation (see explanation).
- 3) Follow the routine established to wash hands, express gratitude, snack, and unstructured conversation.
- 4) Review - last week we talked about all of the different places where water can be found. Let's each share an example.
- 5) "Great! In this book (show [Rivers of Sunlight](#)) we also read a little bit about how the sun moves water around the Earth." Invite children to share what they know/remember: e.g. "Hmmm...How does that work again?"
- 6) Read "Recycling Water in the Well" from book [One Well](#). Use hand gestures while reading to help highlight vocabulary: evaporation, condensation, precipitation. After reading page 8, present hand gestures that you used while reading and ask children if they can remember the vocabulary words. Explain how using your body can help you to remember information and ideas and ask them to try out your gestures or to use their own while you review the water cycle. Review the Water Cycle.
- 7) Discuss - Water doesn't just stay in one place though right? It doesn't evaporate, condense into a cloud, and precipitate or rain in that exact same spot? So how does it move from place to place?
 - Invite children to offer their explanations.
 - If they demonstrate a strong understanding, highlight important points from their explanations to review how water moves through the sky (wind blows water vapor) and on land (snow on Mountains melts and flows to rivers, lakes, eventually to ocean). When discussing wind demonstrate using gestures - one hand is warm air/water vapor rising, second hand is cold air blowing in underneath to take its place. Encourage them to try out gestures.
 - If they aren't sure, either review or reread [Rivers of Sunlight](#) beginning at page on Evaporation (4th 2-page spread) to "And so water cycles round and round." (8th 2-page spread)
- 8) Charades - Have children act out a movement of water. It can be a small movement like a gesture or a large movement with their whole body. They can stay in place or move around but define boundaries of how far they can go. (Provide some demonstrations while explaining this activity). If your group is large enough (at least 6 children) allow them to work in groups of 2 if they would prefer. See if their peers can guess what they are portraying.
And/Or
- 8) Have children act out the water cycle as a group. See water cycle drama in *GWE Supplemental Interactive Demonstrations and Dramas* for ideas to support this.
- 9) Optional
 - Read page 9 in [One Well](#). These are fun facts and help contribute to "wonder." You can fit this in at any place that you find to be appropriate.
 - If you have time: Invite children to draw an illustration of the water cycle.

- Making Clouds Demonstration (see GWE Supplemental Interactive Demonstrations and Dramas)
- Evaporation Experiment (see GWE Supplemental Interactive Demonstrations and Dramas)

Optional Additional Topics:

It's possible that children may demonstrate an interest in a related topic not covered here. You are encouraged to help them explore those interests. At the end of the curriculum you will find some additional resources/activity ideas to address some topics that may come up including:

- Where did Earth's water initially come from?
- How do humans move water around?

You may also include your own (developmentally appropriate) resources/activities that address questions/topics **of interest to the children**. You may also have children that bring in their own resources/activity ideas. You are encouraged to explore these to the extent that they are developmentally appropriate/likely to hold the interest of the group.

Unit 3 - Water: Why is it Important?

Section 1: Water, Plants, Photosynthesis, Transpiration

Supplies needed- snack for 15, small gloves, hand sanitizer, paper, folders, name tags, holders, crayons, colored pencils, colored markers, container for compost, GWE Banner, book One Well, Living Sunlight, phone for playing music, music- "Photosynthesis by "They Might Be Giants", potted plant, water, transparent plastic bag to fit over plant supplies for Photosynthesis Drama: see *GWE Supplemental Interactive Demonstrations and Experiments*

This section will likely require 2 days. A good place to break would be after photosynthesis activities - before reading "Plants at the Well" from the book One Well.

- 1) Follow the established routine for greeting children, allowing them time to run around/play while peers check in, calling them to gather.
- 2) Outdoor Observation (see explanation).
- 3) Follow the routine established to wash hands, express gratitude, snack, and unstructured conversation. This might be a good place to introduce the Mindful Handwashing Script (see page 6 of this curriculum).
- 4) Introduce unit: "So far we've talked about where we can find water and how it moves around. For the next couple of weeks we're going to explore why water is so important. What do you think - why is water important?" Children share ideas. Mentor writes down their ideas. **(If the group expresses a stronger interest in how water is important to animals - skip ahead to section 2 of this unit and return to this section when you are finished.)**
- 5) Transition - "You mentioned some ways water is important to plants" - highlight anything children have shared about how water is important to plants. If students have mentioned photosynthesis already, see how much they can tell you about that (e.g. What is this photosynthesis? Tell me more about that!").

"Are there any ways that plants are important to water?" Provide time for students to share ideas and write them down.

Explain that you are going to read a little more about both how water is important to plants and how plants are important to water.

- 6) Read Living Sunlight. Point out what the illustrations in the book are representing on the pages that explain photosynthesis. You might also draw your own schematic to help children visualize this.
- 7) Optional - Listen to "Photosynthesis by "They Might Be Giants." (Or another song about photosynthesis if you have a different favorite.) They can move/dance if they want. [▶ They Might Be Giants - Photosynthesis \(official video\)](#)
- 8) Explain that photosynthesis means light (photo) + combining (synthesis) and give movement for photosynthesis (credit to Tiffany Cunningham):
 - 1) raise one arm to the sun when you say photo (light)
 - 2) As you say synthesis take the other arm to circle in front of the body (swoosh it so you feel the air to represent carbon dioxide gas)
 - 3) As you complete the word let the circling arm gesture to the ground (water through roots) and then raise it up to meet the arm that is reaching for the sun.
 - 4) After this open the arms to the sides to represent the growth and life of the plant, explaining that this is how plants produce or create energy needed for their life functions. You could go on with this to a deep inhale thanking the plants for the oxygen they release and the food we eat.

Invite children to try out movement. IF the children are really into movement they could adapt this movement or create their own and turn it into a dance. They could dance to the "Photosynthesis" song.

9) Invite discussion- importance of photosynthesis to all life.

10) Photosynthesis Dramatization (See GWE Supplemental Interactive Demonstrations and Dramas).

11) Invite students to create a picture of photosynthesis. It can be as abstract or as concrete as they like. Invite them to share their pictures with peers.

10) Transition - "So now we know that plants use water, carbon dioxide and sunlight to build sugars (which they use to build plant parts some of which we eat). And in the process they release oxygen. I wonder how the water and CO₂ get into the plant and how the Oxygen gets out?" Provide time for children to offer suggestions.

11) Read "Plants at the Well" from book One Well.

12) "Observe" Transpiration: At the beginning of the session, water a potted plant (a Jade or a Spider plant would work well) and then place a clear plastic bag over it. Later when you discuss transpiration, invite students to observe condensation on the inside of the bag. Discuss: How did that get there? Review transpiration - compare to drinking from a straw. Explain stomata and that stomata are also used for breathing. What important gasses do we breathe in and out? And what important gasses do plants breathe in and out? When stomata open to let water vapor out they also let air rich in CO₂ in and air rich in O₂ out.

13) Connect transpiration to water cycle and review other vocab from water cycle with gestures. A new gesture for transpiration - 1 forearm is the ground and your 2nd arm grows out of it into a plant. Then 1st arm becomes water - flows up 'plant arm,' turns into water vapor and evaporates

- If they created representations of the water cycle during unit 2 section 2, invite them to add transpiration. If they did not, they could create these illustrations today.

14) At end of section:

Lying (or sitting or standing) underneath a tree:

Take a deep breath in through your nose. Now slowly breathe out. Carbon dioxide that you breathe out will be taken in by the tree above you. Feel the sun on your skin. The sun also shines on the tree. The tree uses that energy to make sugar from water and from the carbon dioxide you are breathing out. The tree releases oxygen that gives us life. Breathe in the oxygen from the tree.... and breathe out. Think about your connection to the tree. The next time you take a sip of water remember this connection that you have to the trees and the role that water plays.

Optional: Invite children to create art about the connection they have with trees.

Optional activities to tie in with this unit

- Look at stomata of a leaf under microscope (see link for how to prepare slides): <https://www.sciencelessonsthatrock.com/blog/how-to-view-stomata-under-the-microscope>
- Explore capillary action with celery in colored water: <https://www.scienceworld.ca/resource/capillary-action/>
- Have student drink water with a straw. Straws should be either metal or biodegradable. Talk about why.
- Bring in Spider plant to show the roots of the plant in water. If your plant is large enough you can send home shoots with students. Or - regrow green onions in water.

Section 2: Water, Animals, Habitat/Food Web

Supplies needed- snack for 15, small gloves, hand sanitizer, paper, folders, name tags, holders, crayons, colored pencils, colored markers, container for compost, GWE Banner, book One Well, Living Sunlight, phone for playing music, string

- 1) Follow the established routine for greeting children, allowing them time to run around/play while peers check in, calling them to gather.
- 2) Outdoor Observation (see explanation).
- 3) Follow the routine established to wash hands, express gratitude, snack, and unstructured conversation.
- 4) Introduce topic: “So far we’ve talked about why water is important to plants and why plants are important to water. Today we’re going to talk about why water is important to animals. We had some ideas about this already. Review children’s ideas from section 1 discussion. Invite children to offer any additional ideas. “Are animals important to water?”
- 5) Read “Animals at the Well” and “Watery Habitats” pages 12-15 in One Well. Discuss. What is a habitat?
- 6) Invite children to take 10 minutes to find and observe an animal in their learning environment. Then share: How is water an important part of this animal’s habitat? Where is the water?

For most groups you will probably want to choose either a focus on Habitat or a focus on Food Web:

- 7) Habitat Discussion: Let children carry this discussion as much as possible. Write down their ideas. Questions to consider:

- How is water an important part of an animal’s habitat?
- What happens when the water in an animal’s habitat changes? (Change could be to the amount of water, shape/flow of the water, acidity of the water.)
- Consider several different animals and how the answers to these questions are different depending on the animal.
- How do animals help water? Discuss their general role in the water cycle. Other examples might include beavers, tunneling/burrowing animals, role of decomposers in the health of soil and how that is related to plants/water.

- 8) If you have internet access, Listen to the [Habitat Song](https://youtu.be/VVPyjukPxFA). <https://youtu.be/VVPyjukPxFA>
Time for questions/discussion.

9) Habitat Art activity - Invite children to think of a real or imagined animal and make a representation of its habitat. They might draw a picture, create a diorama, or they might create a life-sized habitat for themselves and pretend to be the animal within it. The habitat should include representations of food, water, shelter, space. Allow time for children to present their habitat to their peers and explain the role water plays in it.

10) Food Web Discussion: Children might be more interested in food chains/webs than habitats. Some of the animals they find in their environment are likely to get their water primarily or entirely from their food which could naturally lead into this discussion.

Questions/Ideas to consider:

- What happens when a plant/animal is removed from the web. How might they disappear from the web?
- Are there any plants/animals that aren’t ‘important?’
- Invasive species

11) Food Web activity adapted from “The Web” (Activity 19 - p 281) in The Bosque Education Guide/ “Web of Life” (Activity 45) in Project Learning Tree.

Have students choose an animal or plant commonly found in the Bosque (see additional resources) and answer the following questions about it (help them look up the answers if they don't know).

For animals:

Where within the Bosque does this animal live?

What does this animal eat?

What animal preys on it?

In what ways does this animal depend on other animals and plants?

How does this animal influence its environment?

For plants:

Where within the Bosque does this plant live?

What animal eats this plant?

In what ways does this plant depend on animals and other plants?

How does this plant influence its environment?

Invite students to draw a picture of their organism and then to sit in a circle with their drawing in front of them. Choose a starting plant. Ask that child to hold a ball of string and name another organism in the circle that their plant interacts with. Pass the ball of string to that next child, while the first child holds on to the end. Continue until all 'organisms' are linked to the 'ecosystem' by the string.

Have students move back in the circle until the string is taut. Suggest that the sun is shining down on the first plant and it is soaking up the sun's energy. Invite that child to tug on the string gently. Ask students to hold on tight to the string but to tug gently if they feel the tug. In this way 'energy' is passed through the web.

Ask students if there is an organism that seems less important in this ecosystem. Have that organism drop out. Ask if any other organisms should drop out because it depended on that organism to survive. Invite students to observe what happens to the web.

12) Food Web Art Activity:

Invite students to create art about food chains/webs. Ideas might include group or individual drawings, puppets, food chain mobiles, story books.

Section 3 a. Visit to Rio Grande

Supplies needed- snack for 15, hand sanitizer, small gloves, Permission Forms, first aid kit, phone, contact #s for school admin.

Genie will work with you to arrange a field trip to the river if at all possible. It may not happen at this point in the sequence of the curriculum....adjust as necessary

When you arrive at your location, find a place to have the snack, and follow the established routines to clean hands, express gratitude and eat your snack. Discuss intentions and expectations.

While walking to the river ask that students observe their surroundings carefully. What do they hear, see, smell? Can they recognize any plants? Do they see any animals or signs of animals? Signs of humans? Signs of fire? Invite them to ask questions or to comment on what they see but encourage them to leave discussions about other topics for later. If you think they might need more structure, you might use the Bosque Search Bingo (from Bosque Education Guide - see additional resources) or something similar to give your students an idea of what to look for.

Alternatively, you might use the Bosque Discovery Booklet (also from the Bosque Education Guide - see additional resources) to help guide student explorations. They should be encouraged to spend as much time as they'd like on any given page - there is no expectation that they complete the book.

Encourage children to notice the shape of the river. Notice the level of water - are there signs that it was higher or lower in the past? Which direction does the water flow?

Make sure students have plenty of time for exploration and play on the beach by the river.

Section 3 b.

After your visit, devote a session to processing what students experienced at the river. Keep your usual routines in place then open up discussion and invite students to share what they learned/enjoyed, what surprised them about the trip. What questions do they have?

Follow-up with an activity that fits the interests/experience of your group. For example you might:

- Map the portion of the river/bosque that you explored
- Create puppets, habitats, dioramas to represent animals, plants that you observed (esp. if you did not do this during section 2)
- Create a puppet show or drama about a real/hypothetical visit to the river or about an issue that you talked about while you were there.
- Write a song about the Middle Rio Grande. Here is a song about the Lower Rio Grande that you could share with students:

<https://www.youtube.com/watch?v=u2OIbtQQdJU&feature=youtu.be>

Section 4: Water & Humans

Supplies needed- snack for 15, hand sanitizer, small gloves, paper, folders, name tags, holders, crayons, colored pencils, colored markers, container for compost, GWE Banner, book One Well

This section will transition into the next unit - Threats to Earth's Water.

1) Follow the established routine for greeting children, allowing them time to run around/play while peers check in, calling them to gather.

2) Outdoor Observation (see explanation).

3) Follow the routine established to wash hands, express gratitude, snack, and unstructured conversation.

4) Introduce discussion: We've discussed why water is important to plants and animals. Today we're going to talk about why water is important to humans. We already have discussed some of the examples because they are the same for humans as for plants and animals but there are also a lot of other ways that humans use water. What are some ways that you can think of? Children share ideas; mentor writes them down.

5) Read "People at the Well" pages 16-17 from book One Well.

6) Student centered discussion. It is highly likely that this will lead into discussion of threats to water. Write down any ideas children spontaneously share about this. If you need help getting discussion going you can ask them to add new ideas about how they use water to the list and/or challenge them to think of activities that they engage in that do not require water. You might also read "Demands on the Well" from One Well.

7) Play Charades or if your group is large enough "Lemonade"

How to Play Lemonade:

Split the group into two teams, and have them stand on either side of the playing area.

One team (Team A) begins by quietly talking together, and coming up with an agreed-on occupation. When ready, teams form horizontal lines facing each other. Team A begins by shouting the following:

Team A: "Here we come!"

Team B: "Where are you from?"

Team A: [Place Name] e.g. "Santa Fe!"

Team B: "What's your trade?"

Team A: "Lemonade!"

Team B: "Then Show us some if you're not afraid"

Teams march forward while saying their lines. Team A acts out an occupation (or in this case a reason that water is important for humans), while Team B shouts out attempts to guess. When Team B guesses correctly, Team A must turn around, and race back to their starting point. Anyone who is tagged along the way becomes part of Team B. Then the groups switch roles.

8) Invite students to create art about what was discussed.

Optional: Where does our drinking water come from?

In Albuquerque our water comes from tributaries of the Colorado River Basin

(https://www.abcwua.org/education-21_Colorado2/) and from an aquifer.

- Review description of aquifers in Rivers of Sunlight (6th 2-page spread).
- Discuss the importance of conserving water in an aquifer.
- Create a model of Aquifer. (See instructions from Mystery Science in Additional Resources)
- Explore Albuquerque Water Authority's Virtual Tours: <https://www.abcwua.org/education-virtual-tours/>

Unit 4 - Threats to Earth's Water

Section 1: Global Warming/Climate Change and Why does it Matter?

Supplies needed- snack for 15, hand sanitizer, small gloves, paper, folders, name tags, holders, crayons, colored pencils, colored markers, container for compost, GWE Banner, book Buried Sunlight, and My Light, globe of the earth, 1 thin cloth, enough small blankets for each child, supplies for making Pinwheels and Squashed Plant activity (see: *GWE Supplemental Interactive Demonstrations and Experiments*)

Feel free to take more than a single week to cover this material.

1) Follow the established routine for greeting children, allowing them time to run around/play while peers check in, calling them to gather.

2) Outdoor Observation (see explanation).

3) Follow the routine established to wash hands, express gratitude, snack, and unstructured conversation.

4) Begin Discussion: "Today we're going to talk about threats to our Earth's water. You've brought some of these issues up already but today we're going to focus on a big issue called Global Warming or Climate Change. Our group is called Global Warming Express and maybe you hear a lot about Global Warming or Climate Change in the news or from your parents or teachers. What does it mean - global warming?" Elicit student ideas.

5) Read Buried Sunlight

5) Ask children if they remember why the earth is getting warmer. Start with what they tell you. If they tell you about the atmosphere-blanket, start there. If they tell you about fossil fuels, start there and work the discussion backwards.

6) Present the globe and allow the children to explore it. Let them find where they live. Find North and South Poles and equator. Place the thin cover over the globe to represent the atmosphere and explain that this is what keeps the sun's heat in so that our Earth is just the right temperature for life. Just like our clothing keeps us just the right temperature. What happens when we put on thicker clothing or a thick blanket? Let's try it. Have children put on thick blankets. Talk about how it would feel to wear the thick blanket in the sun on a hot summer. Put the thick blanket on the globe. (See Blanket drama/interactive demonstration in *GWE Supplemental Interactive Demonstrations and Experiments* for more ideas.)

7) Ask children what is causing the Earth's blanket to get thicker. Refer to the book, as needed, to support discussion. Draw illustrations to support children's understanding.

- What is the blanket/atmosphere made of? We use the term "greenhouse gasses." What is a greenhouse for?
- What are the main greenhouse gasses? (CO₂, water vapor, methane). Ask where else they have heard about CO₂ and water vapor. You might introduce methane as 'natural gas' and tell them that one source of methane is cow farts.
- Check for understanding that we need these gasses and we need an atmosphere. These gasses are not a problem and in fact are necessary for life on Earth - as they already learned. The problem is when there is too much of these gasses in the atmosphere.
- Where does the increase in these gasses come from?
- Why are they called fossil fuels? What do we use them for?
- (Optional: See "Squashed Plants" Activity in *GWE Supplemental Interactive Demonstrations and Dramas*)

8) What does Global Warming have to do with water? Child Centered Discussion. You could use the 13th 2-page spread in Buried Sunlight as a starting point for discussion. Reference information they have learned earlier in the year as appropriate.

9) Elicit/Discuss Solutions to the problem of Climate Change/Global Warming: (examples: Sustainable Energy, Use Less Energy, Plant Trees). Allow students to carry this discussion as much as possible. Write down their ideas to keep for future reference. Allow/encourage them to explore their creative solutions even if they don't seem realistic to you.

10) Children create art (visual, written, performing) about their favorite solution.

11) Remind children that they can explore the GWE app to continue to explore this information further. If you have access to wifi, demonstrate the GWE Online Curriculum App. Reintroduce The Global Warming Express book by Marina Weber. Read the chapter entitled "The Greenhouse Effect" pgs. 33-37.

Optional:

Read My Light and make Plastic Water/Wind Turbines (see: *GWE Supplemental Interactive Demonstrations and Dramas*)

Section 2: Indoors Today! Other Threats to Earth's Water

Supplies needed- snack for 15, hand sanitizer, small gloves, paper, folders, name tags, holders, crayons, colored pencils, colored markers, container for compost, GWE Banner, books [One Well](#), and [We are Water Protectors](#), laptop with access to internet, Earth's Water Demonstration(see: *GWE Supplemental Interactive Demonstrations and Experiments*)

This section may take longer than 1 day. Take your time. Hold space for children to talk about how they feel about these issues if needed. Remember that you do not need to fix feelings. Be careful not to tell children how they should feel.

1) Follow the established routine for greeting children, allowing them time to run around/play while peers check in, calling them to gather.

2) Outdoor Observation (see explanation).

3) Follow the routine established to wash hands (you may want to head inside today following outdoor observation as today's section includes a number of short videos and other online resources), express gratitude, snack, unstructured conversation.

4) Review: Last week we talked specifically about climate change and global warming. Invite students to share what they remember: "What is that - Global Warming...?"

5) Discussion: "Today we're going to talk more generally about threats to our Earth's water. We've talked about some of these before. What are some other ways that our water is threatened?" Students share ideas while the mentor writes them down.

*Ideally you will follow student interest to learn more about concerns they already have about water, sharing and discussing relevant resources as appropriate to the conversation. Help them make connections between what they are talking about and what they have experienced/observed outside in their learning space or at the river whenever possible. You can use the book [One Well](#) to structure conversation as described below if needed. This structure is to provide an idea of issues that might be discussed and some resources that might be supportive and to provide support *if/when/where you need it*. There is no expectation that you cover all of the material suggested below and you should definitely not try to cover it all in one week. After you are finished with discussion do follow through with step 9.*

6) Read [One Well](#): "Freshwater in the Well," (pg 19) and "Access to the Well (pgs. 20-21).

Child centered discussion. Pivot to local issues - do all people in the US have equal access to water?

- Earth's Water demonstration (see GWE Supplemental Interactive Demonstrations and Dramas)
- Flint Michigan - video of kids protesting, monitoring water:
 - ▣ [Flint Teenagers Test Water Quality For Thousands Of Homes | NBC Nightly News](#)
 - ▣ [Flint children demand clean water, share effects of water crisis through protest](#)
- Watch news story about Navajo water during the pandemic. (See resources)
 - ▣ [Navajo Nation Battles Water Crisis Amid Coronavirus Pandemic | NBC Nightly News](#)

7) Read "Demands on the Well," (pg 23). Child Centered Discussion.

- How Much Water Does it Take? Activity (see *GWE Supplemental Interactive Demonstrations and Experiments*)
- [Where is Water? - The Water Rooms #2](#)
- Household Water Footprint Calculator (Mentor can demonstrate using their own water consumption or take suggestions from students about data to enter.):
<https://www.watercalculator.org/>

- Watch “Rain Catcher” video by GWE’s own Esha Choicchio:
<https://www.eshaphoto.com/good-earth/rain-catcher>

8) Read “Pollution in the Well,” (pg 24-25). Child Centered discussion. Encourage students to think about pollution that they saw in or around the river. How does that get there?

- Have three clear jars--with children watching, fill with water (or have children fill) and place on floor/table in front of them
 - Place one tablespoon of dirt in one pitcher
 - Place one tablespoon of salt in next pitcher
 - Leave third pitcher pure water
 - Offer a drink to the children and ask which pitcher to pour from.
 - Then, while drinking ask why they chose that water
 - How does water get dirty?
- Where does plastic come from?
 - Watch “Story of Plastic - An Animated Short”:
 [The Story of Plastic \(Animated Short\)](#)
- Discuss fracking and its link to water and plastic. Check for understanding of the link between fracking and climate change.
 - Watch “How does fracking work?” video:
 [How does fracking work? - Mia Nacamulli](#)
 - [Read We are Water Protectors](#)

9) Students choose an issue and create drawings about it. They do not all have to choose the same issue for this activity. They can work together or separately as they like. Art work might be shared as a way of beginning next section’s discussions about solutions/action.

Unit 5 - Solutions and Is there Something We Want to Do?

Supplies needed- snack for 15, hand sanitizer, small gloves, paper, folders, name tags, holders, crayons, colored pencils, colored markers, container for compost, GWE Banner, books One Well, and We are Water Protectors, laptop with access to internet, maps or globe or maps online

This final unit begins with students choosing an issue that they want to work on. They will need to decide on one issue for the whole group to work on together. They will then choose a big goal and a small goal related to that issue. The remainder of the year will be spent working on their goals. Continue to follow routines already established for beginning each session.

1: Introduction:

Begin by reviewing the history of action within GWE.

- Reintroduce The Global Warming Express book by Marina Weber. Read the "Introduction" pgs. 1-5. Allow time for child centered discussion. You are encouraged to continue to read chapters from this book during each session while the children are working on their goals as time permits.
- Share with students about some of the other actions students have taken in the past. Examples include:
 - Designing and distributing canvas bags as part of plastic bag ban campaign in Santa Fe
 - School Solar campaigns
 - Cleaning up trash in the Bosque
 - Planting trees
 - Giving speeches and meeting with legislators to support environmentally friendly regulations/legislation
 - Creating songs, plays, puppet shows to educate peers about climate change

2: Choose an issue to focus on:

- A good way to start might be to have students share their art from the last section. They can explain what their art represents, why they chose this issue, and whether or not and why they think this would be a good issue for the group to work on.
- Once all students have had an opportunity to share, ask each group member which issue(s) they would like to work on or learn more about.
- Ask children to vote for the issues they're most interested in. Perhaps they all agree. If not eliminate any that no-one voted for. Ask students to break into groups based on their interests. They will work together to create a presentation to try to convince their peers that they should work on that interest. Presentations can take any form students choose.
- Students give presentations. Time for discussion.
- Ask children to vote again. Perhaps they all agree now? If not - can issues be easily combined? Would you be able to set a small goal to address one of the issues (e.g. a one-time event to plant trees or do a Bosque/Park clean-up?) and a larger goal to address the other issue? Is additional discussion needed?

3) Set goals and make a plan:

Preparation:

Discussion with students about what different types of action look like.

- Individuals taking Individual Actions
- Large groups of people taking coordinated Individual Actions (Education/Campaigns)
- Policy/System changes

Individual Actions are the easiest actions to take and are important because they make a small difference (small differences add up), because they can make you feel connected to all of the other people who are doing what they can to help the planet, and because they can change minds and hearts and even change culture. What are some individual actions related to (issues chosen by children) that you can take and maybe convince other people to take along with you?

Policy or system changes are also needed in order to ensure that all people now and in the future have a healthy and safe planet to live on. Most of us cannot just make these big changes by ourselves though so we need to convince other people to make them. What are some policy or system changes (related to issues chosen by children) that you would like to see happen? Who are some people we might need to convince to make the changes? What are some ways we might be able to convince them?

This might be a good place to read [We Are Water Protectors](#) if you haven't already. You might point out how this book represents many things: education (what does it teach us?), art (visual and story), references art (singing and drumming), and references another way of showing up in activism (e.g. water protector - rallying to protect water).

How do you know if your action is successful:

Child centered discussion. It is important to emphasize that ultimately you can't know. Even if your specific desired outcome isn't achieved you may have changed someone's mind in the process and that someone might, as a result, make a good decision that has a positive benefit for humans or for our planet.

4) Put your plan into Action!

Help children decide on goal(s) and come up with strategies and a step-by-step plan.

Some areas to cover along the way:

Civics:

A member of Sierra Club may be able to visit your group to present this information. Check in with Genie about this possibility.

- Check in with students about their awareness of which city, state, and country they live in. If this is confusing for them the book [Me on the Map](#) by Joan Sweeney might be a helpful starting place to review this information. **Globe helps**
- Look at a map of the US or a globe and talk about 3 branches of the US government. Attach pictures of the president and our US Senators & Representatives to the map. You could draw 3 circles on the map and place the president in one, the Senators and Representatives in the other and a picture of a courthouse in the 3rd. Next show a map of NM and demonstrate how the state government mirrors the US government. Finally, show a map of your city and talk about the roles of mayor and city council.
- How laws are passed: SchoolHouse Rock video:
 -  [Schoolhouse Rock - I'm Just a Bill](#)

Hopefully students will be able to visit the Round House while the legislative session is in session. Genie will coordinate this with you if it is possible.

Public Speaking:

GWE board member Beverly Williams will visit your group to support speech writing. Check in with Genie about this possibility.

Importance of Art in Activism:

GWE board member and artist Bobbe Besold or other local artists may be available to speak with your group about this and/or to provide support around goal-related art projects. Check in with Genie about this possibility.

Child Centered discussion about art and activism - why are the arts important? You can remind students of art that you have already seen this semester, bring in examples to show them, or ask them to bring in examples. One idea might be to do a mural scavenger hunt - have them take photos of murals that they see around town that celebrate water or encourage care for our environment.

If you would like links to/suggestions of example to share, ask Genie or Theresa

5) Celebrate!

You've made it through the year and it is time to celebrate all that you have accomplished!

Help students plan a celebration. Include an extra special snack and hand out certificates. You might put together a **slideshow including photos/video taken over the course of the year.**

Additional Resources:

Unit 2 - Section 1

Molly Bang's Water Meditation (from [Rivers of Sunlight](#))

"The next time you drink a glass of water remember this:

All those water molecules have been constantly moving, through sea and sky, lakes and streams, through plants and worms, insects and elephants --- giving them life.

Where might these molecules go next as they leave your body and move on? What are ALL the ways these molecules sustain life on Earth and shape the very nature of our blue planet?

Treasure your water; It is your life.

Unit 2 - Section 2

Where Did Earth's Water Initially Come From:

 [Where did Earth's water come from? - Zachary Metz](#)

How do humans move water around:

https://www.abcwua.org/education-education-el_wsd/

Unit 3 - Section 2

Plants and Animals commonly found in the middle Rio Grande Bosque for the "Food Web" Activity.

The "Who lives where" and "Who Grows Where" sections of Bosque Education Guide contain lists, pictures, and information about plants and animals found in the Bosque. You can choose a selection of these for use in the "Food Web Activity." Make sure to include both native (from the Rio Bravo sections) and introduced (from the Rio Manso sections) plants and animals.

Who Lives Where:

https://nmnaturalhistory.org/sites/default/files/2020_BEG_Chapter_04_River_Section%2015_compressed.pdf

Who Grows Where:

https://nmnaturalhistory.org/sites/default/files/2020_BEG_Chapter_04_River_Section%2016_compressed.pdf

Unit 3 - Section 3a.

Bosque Discovery Booklet (from Bosque Education Guide):

https://nmnaturalhistory.org/sites/default/files/documents/education/BosqueEdGuide/Chapter3_2_BosqueDiscoveryBooklet.pdf

Bosque Search Bingo (from Bosque Education Guide):

https://nmnaturalhistory.org/sites/default/files/documents/education/BosqueEdGuide/Chapter3_1_BosqueSearchBingo.pdf

Unit 3 - Section 4

Instructions for creating a model of an aquifer from Mystery Science:

<https://mysteryscience.com/docs/343>