Week 1

Grade level: 1st grade

Driving Question for the unit: Why is it important to keep the lakes and rivers in our community clean?

Specific Lesson Question: What do you notice about lakes and rivers in our community?

<table>
<tr><th colspan="3">Overview</th></tr>
<tr><td colspan="3">For lesson 1, what is the scenario/problem you are using to launch the unit?
● "You went with your family to Lake Monroe for the day and you noticed a lot of trash in the area. Where do you think it came from and why should we care?</td></tr>
<tr><td>Disciplinary Core Idea Addressed in lesson:

● All living things rely on land, water, air, and other natural resources for survival.
● The actions that people do in their daily lives can affect the earth around them. It is up to them to work towards reducing their impacts.
● ESS3.C: Human Impacts on Earth Systems
○ Human activities have significantly altered the biosphere, sometimes damaging or destroying natural habitats and causing the extinction of other species. But changes to Earth's environments can have different impacts (negative and positive) for different living things.
○</td><td>Science and Engineering Practices Addressed in Lesson:

Using and developing models that represent concrete events or design solution (use a model to represent relationships in the natural world)
Communicate with your peers to focus on more details about the scientific ideas that are discussed.

Asking Questions and Defining Problems
● Asking questions and defining problems in grades K–2 builds on prior experiences and progresses to simple descriptive questions that can be tested.
ESS3.C: Human Impacts on Earth Systems
● Things that people do to live comfortably can affect the world around them. But they</td><td>Cross-Cutting Concepts Addressed in Lesson:

Systems in the natural and designed world have parts that work together.
Every event has a cause that creates patterns that can be observed.

Cause and Effect
● Events have causes that generate observable patterns. (K-ESS3-2),(K-ESS3-3)
Patterns
● Patterns in the natural world can be observed, used to describe phenomena, and used as evidence. (K-ESS2-1)</td></tr>
</table>

	can make choices that reduce their impacts on the land, water, air, and other living things. *(secondary to K-ESS2-2)*	

Will another discipline of STEM (other than science) be included in this lesson? [highlight your response]
Yes
No

Learning objectives (outcomes):
"If we don't pick up our trash, it can get into the water."
"We need to take care of our lakes and rivers to keep the water clean."
"Trash can also come from other rivers, not just by people."
"Wind can aslo blow trash into the lake."
"The trash in our lakes and rivers comes from people in the community putting it there or washing up from another water source. This can be harmful to what lives in the water."

Learning Plan
(using the 5E model--Meredith will explain as needed)

In person	Adaptations for Online *(as needed by phase)*

ENGAGE
- We will start by asking the students if they have been to lake Monroe or a surrounding lake.
  - What do they do when they go to lake Monroe?
  - What have they seen?
- We will then go into a brief discussion to allow the students to describe examples of times they have seen trash or litter around the lake/river.
EXPLORE
- We will provide the students with images taken from Lake Monroe. The students will be given time to observe the images.
	ENGAGE
	- To begin, the students will be asked if they have ever been to Lake Monroe or a surrounding lake.
	- Following the first question, we will have the students talk about and describe what they see when they have been there.
	EXPLORE

- These images should include traces of trash and litter found near the lake/river. - "Where do you think the trash near the water came from?" - Students will be taken outside to see the Jordan River to examine what they see near the water. - We will talk with the students about whether these changes occurring around the lake are natural or unnatural. - This will lead to the idea of human impact on our lakes and rivers (how do we impact our lakes and rivers) **EXPLAIN** - Students will give examples of ways in which rivers and lakes can be affected by human activity to review what they have learned about natural and unnatural changes to these systems. - Students will create an action plan of how to prevent negative human impact near lakes and rivers. - Students will share why they chose the actions in their plan and how the actions chosen will prevent negative human impact. **ELABORATING/EXTENDING Understanding** ***(WHOLE CLASS -- last 30mins together -- building your class Content Storyline)*** - Once the whole class is together, we will ask the students to draw what examples of human impact they saw in the video or while outside. - Students will discuss what they drew and how it is an example of human impact. - Students will respond with examples of the ways in which rivers and lakes can be affected by human activity to review what they have learned about natural and unnatural changes to these systems. - We will briefly talk about different ways that we can prevent unnatural changes in lakes and rivers to drive the idea that humans can negatively impact lakes and rivers.	To begin exploring, we will share our screen and show the students images that have been taken at Lake Monroe. We will provide the students with a little bit of time to observe the images. ● Images will include traces of unnatural impacts on the lake. "What changes are occurring near the lake?" - We will ask the students what they notice around the lake and then talk with them about whether these changes are natural or unnatural. - This will then lead to the topic of human impact on our lakes and rivers and more specifically how we impact our lakes and rivers. After this we will show the students a video of the Jordan river. Once the video is finished have the students draw what they say. Once they are done, come together with the in person talk about what they think is included in the ecosystem of the river, what they saw, and what can be/is being impacted.

	- Have students share and explain what they drew - Have students explain each item they added to the surrounding ecosystem and what/why they included it **<u>EXPLAIN</u>** - Students will respond with examples of the ways in which rivers and lakes can be affected by human activity to review what they have learned about natural and unnatural changes to these systems. - Students will create an action plan of how to prevent negative human impact near lakes and rivers. - Students will share why they chose the actions in their plan and how the actions chosen will prevent negative human impact.
Formative Assessment Evidence	

What evidence will you gather to understand if ALL your students met the learning outcome (see green box above)?

- Students are able to identify human impact in the images or in person through a discussion
- Students are able to identify their own actions that can be harmful to our lakes and rivers and how they can positively affect them through a discussion
- Students will compare and contrast a clean lake/river vs a dirty lake/river

Individual Student Accomodations

Required Accommodations/Modifications:

- Unknown at this time.

Additional Modifications for Individual Students:

- Will watch with how students are able follow instructions, and the guided prompts in the drawings, to see if additional supports might be needed for individual students in future weeks.
- Scale up: Introduce the idea of ecosystems and what the ecosystem of a lake is.
- Scale down: Have students explore outside and document/search for various examples of human impact.

Materials

REMEMBER to include Quantity. Also differentiate any materials for in person VS online.

In person	Online
- **Images of Lake Monroe (images should include evidence of human impact such as trash, remains of fire pits, boats, trees that have been cut down)** - **2 pieces of paper per student** - **1 box of colored pencils per student** - **Powerpoint**	- **Images of Lake Monroe (images should include evidence of human impact such as trash, remains of fire pits, boats, trees that have been cut down)** - **Images can be shared on our screen rather than physical pictures.** - **Ability to type notes on word or notepad** - **Powerpoint** - **2 pieces of paper per student** - **1 box of colored pencils per student**

Week 2

Grade level: 1st grade

Driving Question for the unit: How do our actions affect the lakes and rivers in our community?

Specific Lesson Question: What happens when physical objects get into the lakes and rivers?

Overview		
For lesson 2, how will you contribute to answering your overarching unit question? ●		
Disciplinary Core Idea Addressed in lesson: **ESS3.C: Human Impacts on Earth Systems** ● Human activities have significantly altered the biosphere, sometimes damaging or destroying natural habitats and causing the extinction of other species. But changes to Earth's environments can have different impacts (negative and positive) for different living things.	**Science and Engineering Practices Addressed in Lesson:** **Asking Questions and Defining Problems** ● Asking questions and defining problems in grades K–2 builds on prior experiences and progresses to simple descriptive questions that can be tested. **ESS3.C: Human Impacts on Earth Systems** ● Things that people do to live comfortably can affect the world around them. But they can make choices that reduce their impacts on the land, water, air, and other living things. *(secondary to K-ESS2-2)*	**Cross-Cutting Concepts Addressed in Lesson:** **Cause and Effect** ● Events have causes that generate observable patterns. (K-ESS3-2),(K-ESS3-3) **Patterns** ● Patterns in the natural world can be observed, used to describe phenomena, and used as evidence. (K-ESS2-1)

Will another discipline of STEM (other than science) be included in this lesson?
Yes

We will use engineering during our activity. Students will be given items that are often found littered around lakes and rivers (newspaper, water bottles, cans, etc) and they will use these items to create anything of their choosing.

Learning objectives (outcomes):
What do you want students to be able to explain/state in response to the specific lesson question?
Students will be able to explain/state [USE KIDS' WORDS]:

- That recycling is important to help the Earth.
- Littering harms lakes and rivers, as well as the plants and creatures that live within them.
- Students will describe strategies for using resources wisely (reduce, reuse, recycle)
- To explore and understand the threats of plastic waste to our water systems.
- To generate and explore ideas of how to better control discarded trash from entering our water systems

Learning Plan
(using the 5E model--Meredith will explain as needed)

In person	Adaptations for Online *(as needed by phase)*
ENGAGE ● We will ask students for examples of physical waste. ● Reflect on last week's lesson on why physical trash in water causes problems and is bad. ● Ask the students if they can think of long term effects on trash in our water systems ● Introduce the concept of decomposition and show them a chart of how long it takes for garbage to break down in water. We will introduce these items without the years and take a poll of how many students used how many of these items. We will ask students about these objects such as, "How many of you have used these items?" and "When was the last time you used these items?" ○ Plastic bags: 10-20 years ○ Plastic bottles: 450 years ○ Cans: 80-200 years ○ Glass: it doesn't at all ○ Paper waste: 2-6 weeks ○ Foamed Plastic Cups: 50 years ○ Batteries: 100 years **EXPLORE** ● Ask the students if they have ever heard of Reduce, Reuse, and Recycle. Have them come up with their own definitions of the words. ● Talk briefly about how the Three R's can be beneficial to our water systems. ○ Reduce: limit our use of plastic items/ switch over to biodegradable/ compostable items such as	**ENGAGE** ● We will ask students for examples of physical waste. ● Reflect on last week's lesson on why physical trash in water causes problems and is bad. ● Ask the students if they can think of long term effects on trash in our water systems ● Introduce the concept of decomposition and show them a chart of how long it takes for garbage to break down in water. **EXPLORE**

sustainable paper towels, utensils, reusable water bottles, reusable bags, etc. ○ Reuse: Buying second hand clothes to limit fast fashion/ donate your clothes you no longer wear, before throwing something out, think of other possible ways it could be used (cutting up old towels and using them as wash rags) ○ Recycle: cardboard is recycled into paper bags, paperboard (like boxes for detergent, cereal, tissue and shoes), new cardboard, The plastic in milk jug style containers is turned into plastic lumber for decking, buckets, Frisbees, storage tubs, new plastic bottles — and stadium seats! Newspapers are turned into egg cartons, building insulation, paper plates, kitty litter, construction paper, phone books, etc. ● We will provide students with the items listed below. ● We will give students 3 options for their activity: ○ Students will find something in their house that was on the list above and try to find something that they could use instead. ○ Students will draw an example of what they could create with the items listed above. ○ If the students have the materials listed, they can assemble a rough prototype of what they could create. **EXPLAIN** ● Students will identify reasons for recycling certain items vs non-recyclable items.	- Ask the students if they have ever heard of Reduce, Reuse, and Recycle. Have them come up with their own definitions of the words. ● Talk briefly about how the Three R's can be beneficial to our water systems ● Reduce: limit our use of plastic items/ switch over to biodegradable/ compostable items such as sustainable paper towels, utensils, reusable water bottles, reusable bags, etc. ● Reuse: Buying second hand clothes to limit fast fashion/ donate your clothes you no longer wear,

○ How does the environment benefit from our recycling? ● Students will identify and explain how they can reuse items. **<u>ELABORATING/EXTENDING Understanding</u>** ***(WHOLE CLASS -- last 30mins together -- building your class Content Storyline)*** - Once the whole class is together, students will be given the opportunity to present their creations to the class. - Students will explain how their creation can be useful in their everyday life. - Review the Three R's and how they are useful to protect our planet (Allow students to provide examples based on what they've learned throughout the lesson) - Put up questions referring back to how long it takes different items to break down and see if they remember. (this is just for fun, not an actual quiz testing the students' memories) - We will give the students a "challenge sheet" for Sunday-Friday. For this sheet, students will record when they used an item on the list above and when they used an item that relates to the 3 R's. - Next week we will review the challenge sheet and ask the students if it made the students realize how much waste they produce.	before throwing something out, think of other possible ways it could be used (cutting up old towels and using them as wash rags) ● <u>Recycle:</u> cardboard is recycled into paper bags, paperboard (like boxes for detergent, cereal, tissue and shoes), new cardboard, The plastic in milk jug style containers is turned into plastic lumber for decking, buckets, Frisbees, storage tubs, new plastic bottles — and stadium seats! Newspapers are turned into egg cartons, building

	insulation, paper plates, kitty litter, construction paper, phone books, etc. ● We will provide students with the items listed below. ● Students will use these items to create something they use in everyday life. ● **<u>EXPLAIN</u>** - Students will identify reasons for recycling certain items vs. non-recyclable items. - How does the environment benefit from our recycling? - Students will identify and explain how they can reuse items.

Formative Assessment Evidence	
What evidence will you gather to understand if ALL your students met the learning outcome (see green box above)? ● Students will be able to correctly identify trash from recyclable goods. ● Students will show understanding in the importance of recycling or reusing their trash. ● Students will understand the impacts physical trash has on water sources and provide specific examples.	
Individual Student Accomodations	
Required Accommodations/Modifications: ● Unknown at this time.	
Additional Modifications for Individual Students: - Teachers will make sure to monitor students while they are using their scissors to ensure safety.	
Materials **REMEMBER to include Quantity. Also differentiate any materials for in person VS online.** **These need to be emailed (philland@iu.edu) to Andrea each Wednesday by 5:00pm)**	
In person **- 1 box of rubber bands** **- 9 empty water bottles (provided by teachers)** **- 9 Paper plates** **- 9 empty pop cans (provided by teachers)** **- 9 plastic cups**	**Online** **- 5-10 rubber bands per student** **- 3 empty water bottles per student** **- 3 paper plates per student** **- 3 empty pop cans per student** **- 3 plastic cups per student** **- Tape (preferably masking) for each online student**

- **1 roll of masking tape** - **1 pack of markers for each student** - **1 pair of scissors for each student (preferably children's scissors)** - **Construction paper (1 or 2 pages per student)** - **9 straws** - **6 boxes (such as cereal or cheeze-its boxes) (provided by teachers)**	- **1 pack of markers per student** - **1 pair of scissors per student** - **1-2 pages of construction paper per student** - **3 straws per student** - **2 boxes per student (provided by Andrea)**

Week 3 and 4

Driving Question for the unit: How do our actions affect our lakes and rivers?

Specific Lesson Question: How might our lakes and rivers be affected by liquid pollution?

Overview
How does this lesson contribute to your overarching unit question? ● By exploring the negative effects that liquid pollution has on our water systems, it ties into our overarching question of wondering how our actions affect our lakes and rivers. If we pour bad chemicals down the drain, or gas leaks out into our lakes, etc. we are negatively affecting the lives of plant and animal life that rely on the lake/river water for survival.

Disciplinary Core Idea Addressed in lesson: **ESS3.C: Human Impacts on Earth Systems** ● Human activities have significantly altered the biosphere, sometimes damaging or destroying natural habitats and causing the extinction of other species. But changes to Earth's environments can have different impacts (negative and positive) for different living things. **ESS3.C: Human Impacts on Earth Systems** ● Things that people do to live comfortably can affect the world around them. But they can make choices that reduce their impacts on the land, water, air, and other living things. *(secondary to K-ESS2-2)*	**Science and Engineering Practices Addressed in Lesson:** **Asking Questions and Defining Problems** ● Asking questions and defining problems in grades K–2 builds on prior experiences and progresses to simple descriptive questions that can be tested.	**Cross-Cutting Concepts Addressed in Lesson:** **Cause and Effect** ● Events have causes that generate observable patterns. (K-ESS3-2),(K-ESS3-3) **Patterns** ● Patterns in the natural world can be observed, used to describe phenomena, and used as evidence. (K-ESS2-1)

Will another discipline of STEM (other than science) be included in this lesson? [highlight your response]

Yes

No

*If yes, be sure to CLEARLY state in the Learning Plan below **when and how** STEM will be infused.*

Learning objectives (outcomes):
What do you want students to be able to explain/state in response to the specific lesson question?
Students will be able to:

- Understand that salt has a negative impact on freshwater plants and animals
- Types of liquid waste are oil, chemicals, and stormwater.
- Form hypotheses and test them.
- Liquid pollution hurts our lakes and rivers by making plants floppy and hurting the fish.

Learning Plan
(using the 5E model--Meredith will explain as needed)

In person (Class is online for all this week)

ENGAGE

- We will review the take-home worksheet from last week.
  - How often did you use these items?
  - Did this worksheet help you realize how much waste we produce?
  - Did you make any changes to how you use different items?
- Ask students if they remember any examples of plastic waste that we have previously mentioned.
  - Soda cans
  - Plastic bottles
  - straws
- Ask if they are familiar with any type of liquid waste
  - Sewage
  - oil
  - Chemicals

Adaptations for Online

(refer to "In Person" for this week's lesson)

- Students online will perform the experiment at the listed time since they can come back to their projects later in the day.
- The students in person will perform the experiment after the engage section so that at the end of the lesson they can

● How do they think these liquid wastes might get into our lakes and rivers? ○ Oil spill ○ Rain flushing down chemicals into sewers that flow into lakes or rivers. ○ Sewage drains leaking into lakes or rivers ● Ask if they think this is different than when they pour soap or cleaners down the drains in their home. ○ Does it all go to the same place? ■ Outside of home goes straight to the freshwater systems ■ Inside of the home goes through pipes and gets filtered out. ○ How might this be different? ■ Sending chemicals down your drain isn't pollution because it gets filtered out ● Ask students if they can think of long-term impacts of liquid waste. ○ Killing off plant and animal life ○ Affecting our drinking water ● We will introduce the concept of liquid waste. ○ "Can you think of liquids that are harmful to our lakes and rivers?" ■ We anticipate students will mention cleaning supplies, gas, and oil. ● There will be a slideshow to present different forms of liquid waste and their sources. ○ Storm water: When it rains, water runs into drains then ends up in rivers and lakes after a heavy rain.	see if any change is made.

■ "What are some things that are on the ground that might runoff into lakes or rivers?" ■ We anticipate students will recognize that salt is put on the ground when it snows. ■ We anticipate students will recognize that oil is on the ground from cars. ○ Dangerous household liquid that parents use (bleach, cleaning supplies) ■ "Can you think of any liquids that your parents keep away from you to keep you safe?" ○ Sewage Sludge: sewage flows into our water systems and can harm us as well as the lakes and rivers ○ Oils: often drain into water from oil spills **<u>EXPLORE</u>** ● (*In person do this after the engage section to allow time for students to see possible results at the end of lesson*) Students will be asked to get their hypothesis worksheets for the Potato Project. This is where we will be infusing STEM into the lesson. This activity will cover **Science** because they are setting up and creating an experiment, and ties with science by creating hypotheses, observing, and seeing a reaction. We will go through the steps of the experiment (listed in the worksheet) with the students. ○ How does salty water impact our rivers? ■ We anticipate students will say that salty water kills the fish in our lakes and rivers.	

● Once the experiment is fully set up (the potato is soaking in the water) we will go through the two questions on the sheet with them to gather each students' hypotheses. ○ "I think the potato in cup 1 (only water) will…… Because….." ■ We anticipate students will say that this potato will become "mushy" ○ "I think the potato in cup 2 (water and salt) will……. Because….." ■ We anticipate students will say that this potato will either grow or shrink. ■ We anticipate students will say that this potato will become brown and "mushy." **<u>EXPLAIN</u>** ● After students form their hypotheses for what will happen to the potato in each cup, we will show a video clip of the results of one of our own experiments of the project so they can see how the potato changed over time. ● Discuss whether or not their predictions were correct. ○ Why or why not? ● Have students explain what they noticed. ○ We anticipate students will mention how potato 2 became floppy. ● What do the students think the potato represents in this experiment? ○ We anticipate students will think the potato represents plants and animals in lakes and rivers. ● Ask students if they can see how this experiment can relate to liquid waste?	

○ We anticipate students will bring up the salt used in this experiment and relate it to the salt that is placed on our roads when it snows. ● If salt gets into our fresh water, it can damage the plants and make them weak. ● In Indiana we have a lot of limestone, which can add salt to the water. How might we filter out this water at home to make sure our drinking water is clean? ○ Filter on fridge ○ Filter on sink ○ Brita filter **ELABORATING/EXTENDING Understanding** ***(WHOLE CLASS -- last 30mins together -- building your class Content Storyline)*** ● Review what happens when we pour liquids down the drain. ● Review the concept of liquid waste ○ What are some of the forms of liquid waste that we talked about? ○ How does liquid waste impact our lakes and rivers? ■ We anticipate students will mention that liquid waste makes plants “ugly and floppy.” ■ We anticipate students will say that liquid waste hurts or kills fish and other organisms within our lakes and rivers. ○ **Reminder**: salt is not the only type of pollution. ● Now that you see what happens to your salt water potato, place the salt water potato into the freshwater and your freshwater potato into the salt water.	

○ What do you think will happen? ■ We anticipate students to infer that the freshwater potato that was placed into the saltwater will become soggy. ● How can we solve this problem? ○ We anticipate students will recommend different ideas for salting the roads, such as using sand instead of salt to reduce pollution. ● To end the lesson, show a slideshow with a few questions and see what information the students retained from the lesson.	

Formative Assessment Evidence

What evidence will you gather to understand if ALL your students met the learning outcome (see green box above)?

- Students will gather evidence through experimentation and forming hypotheses
- Students will gather evidence through connections
- We will gather evidence through our exit ticket.

Individual Student Accomodations

Required Accommodations/Modifications:

- Students will need a parent present to cut the potato in half.
- Students will need a parent to measure out the salt.

Additional Modifications for Individual Students:

- Scale up: Have the student use three cups and pour 1 tablespoon in cup 2, and 2 tablespoons in cup 3.
- Scale down: Instead of filling out the worksheet, students can discuss their hypotheses.

Materials **REMEMBER to include Quantity. Also differentiate any materials for in person VS online.** **These need to be emailed (philland@iu.edu) to Andrea each Wednesday by 5:00pm)**	
In person: ● **1 raw potato per student (this potato will need to be sliced into 2 french fry shapes by an adult)** ● **knife** ● **1 tablespoon measurement per student** ● **Salt for each student** ● **2 cups of water (separated into two different cups)** ● **Hypothesis worksheet** ● **Small container with lid (2 per student)**	**Online:** ● **2 cups per student** ● **1 raw potato per student (this potato will need to be sliced into a french fry shapes by an adult)** ● **1 tablespoon measurement per student** ● **Salt for each student** ● **2 cups of water (separated into two different cups)** ● **Printed off hypothesis worksheet https://docs.google.com/document/d/1alsWv7V2U5EI7sNEp5L9_0fQDKOH5LWgWhulfVWc9I8/edit** ● **Small container with lid (2 per container)**

Week 5

Grade level: 1st Grade

Driving Question for the unit: How do our actions affect our lakes and rivers?

Specific Lesson Question:

- How do our actions negatively affect different life species in the rivers and lakes?
- How do the impacts we've previously talked about connect to other environments within the community?

Overview
How does this lesson contribute to your overarching unit question? ● By talking about food chains, students can learn about long term effects of pollution in lakes. Students will be able to see the long-term impacts of pollution and will be able to understand how pollution impacts us on a larger scale.

Disciplinary Core Idea Addressed in lesson:	Science and Engineering Practices Addressed in Lesson:	Cross-Cutting Concepts Addressed in Lesson:
ESS3.C: Human Impacts on Earth Systems ● Human activities have significantly altered the biosphere, sometimes damaging or destroying natural habitats and causing the extinction of other species. But changes to Earth's environments can have different impacts (negative and positive) for different living things. **ESS3.C: Human Impacts on Earth Systems** ● Things that people do to live comfortably can affect the world around them. But they can make choices that reduce their impacts on the land, water, air, and other living things. *(secondary to K-ESS2-2)*	**Asking Questions and Defining Problems** ● Asking questions and defining problems in grades K–2 builds on prior experiences and progresses to simple descriptive questions that can be tested.	**Cause and Effect** ● Events have causes that generate observable patterns. (K-ESS3-2),(K-ESS 3-3) **Patterns** ● Patterns in the natural world can be observed, used to describe phenomena, and used as evidence. (K-ESS2-1)

Will another discipline of STEM (other than science) be included in this lesson? [highlight your response]

Yes

No

*If yes, be sure to CLEARLY state in the Learning Plan below **when and how** STEM will be infused.*

Learning objectives (outcomes):

What do you want students to be able to explain/state in response to the specific lesson question?

Students will be able to:

- Describe the effects of pollutants in the water on living organisms
- Explain how the food chain works and how it gets affected by pollutants

Learning Plan

(using the 5E model--Meredith will explain as needed)

In person (Class is online for all this week)

ENGAGE

- We will start our lesson by asking the students what happened to their potatoes from last week.
    - Do you remember why this happened?
        - We anticipate students will say that this happened because of the salt in the water. “Salt makes the plants in our lakes and river floppy.”
    - For Nolan, we will ask what happened to the potatoes that we switched?
- Ask the students what the potatoes represent and what the saltwater represents.
    - We anticipate the students will remember that the potato represents plant life in lakes and rivers and that the saltwater represents contaminated water.
- Ask the students what they think might happen if they drink contaminated water.

Adaptations for Online

(refer to “In Person” for this week’s lesson)

- This week’s lesson has already been adapted to be fit for online and in person students, so there are no adaptations to be made.

○ We anticipate that the students will say it will make the fish sick or that it will kill them. ○ FOLLOW UP: Ask the students if the infected fish can affect us as humans. ■ Students may respond by saying it could make us sick. ● Ask the students if they have ever heard of a food chain. ○ We anticipate they might bring up how we eat something and they eat smaller things (we eat a cow, and a cow eats grass) ● Talk about how a food chain can affect everything that is a part of it. So if a pollutant affects one part of the food chain, it can have an effect on all the members. ○ Ask the students if they can give an example of a food chain → we anticipate students might say that a bunny eats the grass, and then a hawk eats a bunny. ○ Ask the students how they think a pollutant might affect a food chain.	

■ Students may respond by saying that if a fish gets sick by pollutants, a human could get sick if they eat the fish. **EXPLORE** ● For our activity, we will give students the opportunity to see how pollutants impact our food chain and other organisms. ● Each student will be given the Food Chain worksheet. The circles will be labeled “algae”, “insects”, “fish”, and “human.” ● In the circle labeled “algae”, have the students place 2 kidney beans in it (these kidney beans will represent pollutants) and 1 lima bean (these beans will represent healthy bacteria). ● We will give the students scenarios such as “you are an algae in a lake. You have taken up 3 pollutants within the lake that you live in. An insect comes along and eats 5 algae.” ● The students will then place the beans in the circle labeled “algae” into the circle labeled “insect.” The students will use **MATH** to determine how the pollutants have now increased.	

○ “How many pollutants are in the insect now?” ■ We anticipate the students will count the kidney beans to determine that the insect now has 10 pollutants. ● “A fish then swims along and eats 3 insects. How many pollutants are inside the fish?” ○ We anticipate the students will count the kidney beans to determine that the fish now has 30 pollutants within it. ● “You are on a boat fishing with your family. You caught two fish and are going to have them for dinner. How many pollutants are inside you now? ○ We anticipate students will add 30+30 to get 60 pollutants. **EXPLAIN** ● Review what happens to our food chain through the pollution of our lakes and rivers. ● Review the concept of a food chain.	

○ “If we don’t live in the lake, how are we impacted by the pollution?” ■ We anticipate students will say that since we eat fish, we are eating the pollutants.” ● Ask the students: ○ “What did the kidney beans represent?” ■ We anticipate the students will say that the kidney beans represented pollutants ○ “What did the lima beans represent?” ■ We anticipate students will say that the lima beans will represent healthy bacteria ○ “Why did the pollutants increase down the food chain?” ■ We anticipate students will say something along the lines of the amount of pollutants increases when one organism eats another. ○ “How do you think a food chain relates to what we have previously learned about plastic or liquid waste?”	

- We anticipate students will bring up the potato activity and that when the water is toxic it will make the plant toxic and then make the fish toxic.

ELABORATING/EXTENDING Understanding

(WHOLE CLASS -- last 30mins together -- building your class Content Storyline)

- Discuss what students discovered from the bean activity
    - We anticipate students will say:
        - "Each box got more kidney beans"
            - Ask: "Why was each box getting more kidney beans? And what were the kidney beans representing?"
        - "The last box had a lot of beans"
            - Ask: "Okay, so what did this mean?"
- Make connections to previous content
    - Ask students to think back to previous lessons
        - "What did we learn?"

● We anticipate students will say: "we learned about types of waste" ■ "So how do those types of wastes relate to what we are talking about today?" ● We anticipate students will say: "the waste is what animals in the water could be eating" ■ "What is an example of a type of waste we have learned about that organisms in the water can eat and cause them to be filled with pollutants?" ● We anticipate students will say: "oil" ● Making a broader connection ○ Ask students: "what do you think will happen in the long run to the food chain if animals keep eating pollutants? ■ We anticipate students will say: "the animals will get sick and if too many get sick they won't have any food left" ○ Give real life example:	

■ Bald eagles almost went extinct. One factor was contamination of their food source ● Jeopardy game ○ We will play a jeopardy game with students at the end to review everything they just learned ■ Food chain ■ Vocabulary ■ Effects	
Formative Assessment Evidence	
What evidence will you gather to understand if ALL your students met the learning outcome (see green box above)? ● Students will gather evidence through our food chain activity. ● Students will gather evidence through the connections made during the lesson. ● We will gather evidence through our jeopardy game.	
Individual Student Accomodations	

Required Accommodations/Modifications:

- Parents may need to help students online taking the correct number of beans out and moving them to the proper location on the food chain worksheet
- Once the activity requires 10+ beans, have the student write the number 10 on a bean to indicate that it represents 10. So if the circle for fish requires 30 pollutants, there will be three beans in the circle, each with a number 10 on it.

Additional Modifications for Individual Students:

- More review of previous concepts so she is able to understand how it connects to the new content

Materials

REMEMBER to include Quantity. Also differentiate any materials for in person VS online.

In person:	Online:
• **1 bag full of dry kidney beans** • **1 bag full of dry lima beans** • **1 food chain worksheet** • **1 sharpie**	• **1 bag full of dry kidney beans** • **1 bag full of dry lima beans** • **1 food chain worksheet** • **1 sharpie**

Week 6

Grade level: 1st Grade

Driving Question for the unit: How do our actions affect our lakes and rivers?

Specific Lesson Question:

- What can we do in our community to have a better impact on our lakes and rivers?

Overview

How does this lesson contribute to your overarching unit question?

- This lessons will recap what we have learned in the previous weeks, and then tie it all together by creating ways to make a difference.

Disciplinary Core Idea Addressed in lesson:	**Science and Engineering Practices Addressed in Lesson:**	**Cross-Cutting Concepts Addressed in Lesson:**
ESS3.C: Human Impacts on Earth Systems ● Human activities have significantly altered the biosphere, sometimes damaging or destroying natural habitats and causing the extinction of other species. But changes to Earth's environments can have different impacts (negative and positive) for different living things. **ESS3.C: Human Impacts on Earth Systems** ● Things that people do to live comfortably can affect the world around them. But they can make choices that reduce their impacts on the land, water, air, and other living things. *(secondary to K-ESS2-2)*	**Asking Questions and Defining Problems** ● Asking questions and defining problems in grades K–2 builds on prior experiences and progresses to simple descriptive questions that can be tested.	**Cause and Effect** ● Events have causes that generate observable patterns. (K-ESS3-2),(K-ESS 3-3) **Patterns** ● Patterns in the natural world can be observed, used to describe phenomena, and used as evidence. (K-ESS2-1)

Will another discipline of STEM (other than science) be included in this lesson? [highlight your response]

Yes

No

*If yes, be sure to CLEARLY state in the Learning Plan below **when and how** STEM will be infused.*

Learning objectives (outcomes):

What do you want students to be able to explain/state in response to the specific lesson question?

Students will be able to:

- Explain impacts from our actions on the lakes and rivers
- Identify our positive and negative actions that affect the lakes and rivers
- Create solutions to prevent pollution in lakes and rivers

Learning Plan

(using the 5E model--Meredith will explain as needed)

In person (Class is online for all this week)	Adaptations for Online
ENGAGE ● Review content from previous lessons ● "What are some examples of what we talked about throughout our unit." ○ We anticipate students will mention our lessons about solid and liquid pollution. ● Why is it important to need clean water? ○ We anticipate students will say that People, animals and plants need clean water to drink and live in. ● What is pollution? ○ We anticipate that students will say it is when the land, air or water is made dirty by waste, chemicals or other harmful things. ● How is water affected by pollution? ○ We anticipate that students will say that water can get dirty or contaminated and it will make the plants and animals sick.	***(refer to "In Person" for this week's lesson)*** ● This week's lesson has already been modified to suit both in person and online students.

■ They may go further and add the idea of the food chain and how everything can be negatively affected. ● What are the Three R's? ○ We anticipate students will say reduce, reuse, recycle and be able to give examples of what each is. ● How does recycling impact the environment? ○ We anticipate that students might say how It helps save our natural resources. When we reduce, reuse, and recycle, we lessen our negative impact on the earth. **EXPLORE** ● Introduce different ways to help clean lakes/rivers and prevent pollution ○ "What do you think are some ways we can prevent our lakes and rivers from being polluted?" ■ We anticipate students will say "don't put trash in the lake." ○ "What do you think we can do to encourage others to not pollute our lakes and rivers?"	

■ We anticipate students will say “We can tell them how bad it is and put signs up” ● Create action plan posters to prevent pollution ○ Discuss various ways to prevent pollution ■ Give students examples of things that we can do (show videos/pictures) ● We anticipate students will say “we can pick up trash around the lake!” ○ Go through PowerPoint of examples/ideas for students to use to create their own posters ● Give students time to work on their posters. ○ While students are working, ask them about their thinking while making the poster and what their goal that they want to achieve with the poster is. ● Allow students to present their ideas on their poster with the teachers, as they will be presented to the rest of the class later.	

EXPLAIN ● Review different ways to help clean lakes and rivers. ● Review why it is important to have clean lakes and rivers ○ What will happen if we don't try to keep our lakes and rivers clean? ■ We anticipate students will say that our animals will get sick and die ○ Why is it important to create our action plans? ■ We anticipate students will say that it is important so we can tell others about recycling. ○ How can we enforce our action plans? ■ We anticipate students will say we can hang our posters around the lake ● Review the different types of waste we find in lakes and rivers ○ What are some types of waste we have talked about? ■ We anticipate students will say oil and trash	

○ How can we reduce the amount of physical waste, like trash for example, we find in lakes and rivers? ■ We predict students will say we can recycle ○ How can we reduce the amount of liquid waste, like oil for example, in our lakes and rivers? ■ We predict students will say we can have less boats out on the lake ● How do you think cleaner lakes and rivers will affect the life living in it? ○ We anticipate students will say the animals living in it will be more healthy ● Review the idea of the food chain and how pollution can have a negative effect on ecosystems. ○ We anticipate that students will be able to refer back to our previous lesson and say that when one thing in a food chain is infected, it has a larger effect throughout the food chain. ● Will we be affected positively if our lakes and rivers are clean?	

○ We anticipate students will say yes because we're not eating fish that are infected **<u>ELABORATING/EXTENDING Understanding</u>** ***(WHOLE CLASS -- last 30mins together -- building your class Content Storyline)*** ● Have the students share their posters and explain what the goal of their poster is. ● Have the students ask each other questions about their poster to have a deeper understanding. ● Ask the students why it is important to make posters and spread the word about keeping the environment safe. ○ We anticipate that students might say that by telling people to recycle we are reducing the amount of waste we produce and that it is a great way to help the environment. ● Ask the students if they personally can help make a difference in keeping the earth clean from pollutants. ○ Students may respond by saying that You can help stop pollution by always placing your trash in a trash can and never leaving it on the ground.	

● What are some examples in their schools that they can help limit the amount of pollution in the environment? ○ Keep a recycling bin in the classroom ○ Have school clean ups ● Play exit ticket game to reinforce students learning from the unit as a whole.	
Formative Assessment Evidence	
What evidence will you gather to understand if ALL your students met the learning outcome (see green box above)? ● Students will gather evidence through their activity ● We will gather evidence through our exit questions	
Individual Student Accomodations	
Required Accommodations/Modifications: ● Some students may need help writing or spelling for their poster	

<table>
<tr><td colspan="2">

- Write key words up on the board for reference

</td></tr>
<tr><td colspan="2">

Additional Modifications for Individual Students:

</td></tr>
<tr><td colspan="2">

Materials

REMEMBER to include Quantity. Also differentiate any materials for in person VS online.

</td></tr>
<tr><td>

In person:

- **1 piece of Chart paper per student**
- **Markers**

</td><td>

Online:

- **1 sheet of chart paper per student**
- **Markers**

</td></tr>
</table>