**Q405: Saturday Science**

**Lesson Plan 1**

**Lesson Topic: Erosion and How it Affects the Ecosystem**

**Grade level(s): 3rd and 4th**

**Instructor Names:**

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| **Desired Results** |
| **Overarching Focus Question for the Session (***the phenomenon being explored across the 3-weeks***)*** How do environmental factors affect living and nonliving organisms in an ecosystem?
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| **Central Focus/Topic for today:**Students will understand:* How a river flows and what affects a river may have on an ecosystem?
* What erosion is and how it affects its surroundings
* How erosion can be prevented

Therefore, the guiding question for today’s learning is:* How does erosion affect the surrounding (living and nonliving) ecosystem and how can it be prevented?

  | **Relationship that this central focus has to the overarching big idea/question for the unit**· Erosion is an environmental factor in our ecosystem because it can affect plants and animals around the source, but can also change the layout of the land (non-living) around it. This could be from the soil washing away causing a nearby tree to uproot. When a tree is uprooted it can destroy an animal’s home. Erosion indirectly and directly affects its surroundings.  |
| **Student objectives (outcomes):**Students will be able to: * Make observations and/or measurements to provide evidence of the effects of weathering or the rate of erosion by water, ice, wind, or vegetation.
* Make observations and/or measurements to produce data to serve as the basis for evidence for an explanation of a phenomenon.
* Plan and carry out investigations
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| **Timeline of Activities for the Day** |
| \**Provide a breakdown of how long each activity will take, who will lead the segments of the activities, when breaks will occur or other transition points, etc.**\*Identify by highlighting in blue the portion of the lesson your team wants video-recorded each week. This should be ~45 mins*1. **9:30-9:45** Intro Game
2. **9:45-10:00** Classroom Expectations and talk about focus topic- Students in groups come up with expectations and come together as a class to make one big class list of expectations that the students will sign
3. **10:00-10:05** Talk about difference between living and non-living
4. **10:05-10:15** Talk about rivers and different rivers that the students know, and what benefits and drawbacks that rivers have on living and nonliving things, what do you think erosion looks like?
5. **10:15-11:00** Go outside. Identify examples of living and nonliving things (on worksheet) describe what erosion looks like on the jordan river, “Does it look like IU has done anything to prevent erosion on the river?”
6. **11:00-11:15** Restroom and snack break
7. **11:15-11:20** Discussion about what was observed outside
8. **11:20**-End Erosion model
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| **Learning Plan (First three E’s of the 5E model)***Any of these phases can be repeated should you have more than one activity to describe OR a complex activity with multiple iterations of some phases.* |
| **ENGAGE ( )** Intro Game and Classroom expectations and Living vs. Non living and and river talkIntro Game* 9:30-9:45) When the students start arriving we will be handing out get-to-know you scavenger hunts (Shown at the bottom of the page). On the scavenger hunt list there will be different activities such as I went to a museum, I planted a garden, I read a great book, and so on. The students will be tasked to walk around the room and speak with their peers asking them if they have done anything on their list. If they find something they have done that their peer does not have a signature for already, they will sign the space that they have done. A student can only sign another person's sheet once and the goal is to get the entire sheet filled.

Classroom Expectations* (9:45-10:00)Together as a class we will come up with classroom expectations and expectations for going outdoors.
	+ We will start out with the students getting into groups of 2 or 3 and they together will come up with some classroom expectations they believe our class should hold. They will jot them down on a piece of paper their idea. They will have 5 mins too brainstorm and then we will come back together and we will ask them to choose their top two they believe are the most important.
	+ Once they have decided on their top two, we will ask the students to give us their top two to write up on the board. After everyones are on the board we will talk about their expectations and decide if we can add any more or if we can combine any. We will then reword it to put on a flip chart and decide our final expectations.
	+ Moving on from their we will briefly brainstorm what expectations can be the same outside and what we need to add or take away. We will then write a flipchart based on the expectations decided for outside.

Living vs. Non living* (10:00-10:05) The students will watch a video about living vs non-living things to refresh their memories before we go outside to observe living vs. nonliving things.
	+ https://youtu.be/Gy60BqCnTG4

Discuss rivers* The teacher will briefly talk with the students about rivers. The teacher will ask the following questions:
	+ What is a river?
	+ What rivers can you think of?
	+ What is the purpose of a river?
	+ How does a river affect living and nonliving organisms?
	+ What do you think about erosion? What is it?
	+ How does erosion affect living and non-living things?
* After discussing these questions the teacher will let the students know that we will be going outside to explore all of these different factors.

**EXPLORE ( )** Going outside* After our intro activities the teachers will be taking the students outside. We will be headed to the meadow right by balentine to observe the jordan river. When we first get outside, the students and teachers will gather together and learn what they will be doing.
	+ The students will be given the exploration sheet below. Their first task is to identify any living and nonliving organisms. Once the students are told what to do they will be allowed to explore within the teachers sightline to find living and nonliving organisms. They will write down or draw pictures of everything they find.
	+ Once they find their living and non living organisms they will be brought back together to share what they found with each other. After everyone has shared they will move on to task two. Task two is to observe the jordan river and try to find any sights of erosion. If they do find evidence of erosion they will be asked to write down or draw exactly what it looks like. Talking about it characteristics, how much of it their is and then once they find evidence of erosion how it is affecting the living and nonliving organisms around them that they can observe. They will also think about how it is affecting living and nonliving organisms that they can’t see.
	+ After giving the students time to explore this idea they will be given the remaining time to try and find ways that IU is trying to prevent erosion. If they do find something, they will write down what it is and how that helps or if it does help. If they can’t find any they can jot down what they believe might help. The students will come back together, share their ideas, and then head back inside.

**EXPLAIN(** Erosion model (flat, with hills)* (Starting at 11:15) The students will come back together after a small break and start to discuss what was observed outside.
	+ “Where was erosion observed outside at the river?”
	+ “What did the erosion look like?”
	+ “How did the erosion affect the organisms around it?”
		- Think about the living and nonliving, (example could be that the soil was washed away, therefore taking the nutrients and space for a tree, which could then affect a squirrels or birds home as well, etc)
	+ “Did it look like IU has done anything to prevent the erosion from happening?”
* (11:20) Teacher will start to explain that we will be making a model for erosion
	+ “Now that we have seen erosion in a natural environment, we are going to recreate a model for what different types of erosion can look like”
* Teacher will have students stand around one model so that the teacher can explain the set up. This model will help students explain why erosion is happening and how it might affect the living (trees) and nonliving (soil) organisms around it.
	+ “Let’s all go over to this table so I can explain how the model is going to work. We have this tray that is going to hold our small stream, in the tray we have sand, what do you think the sand might represent? (soil) Next we have water coming in, what might that represent? (stream, water source, river) Lastly we have these toothpicks sticking up out of the sand, what might that represent? (trees) Great, so now that we know what everything in the model represents, we need to run the model and see what happens, so when you go back to your tables, first you are going to turn on your water, and I want you to notice what happens to the sand, the river, and the trees and write that down in your observations. After you are done writing your observations, raise your hand and we will have a teacher come over and help you with the next steps.
		- Students will work on their models while teachers float around and help students/ask questions taking informal assessments
			* “What happened to the soil?
			* “What happened to the trees?”
			* “If there were animals living in the trees, what do you think happened to them?”
* When a group of students is finished with the first model, teacher(s) will help the students set up the second model by making different hills and and a deeper terrain in the sand (soil).
	+ “Now I am going to make the soil higher and at different levels with hills in it, what do you think is going to happen? Why do you think that is going to happen? Okay, well write down in your observations if you were correct in your guess and if you weren’t correct, tell us why you think you might have been incorrect?”
	+ Before leaving, the teacher will tell the students to raise their hands when they are done with this step to get instructions for the next step.

**ELABORATING/EXTENDING Understanding**  Preventing erosion (rocks, popsicle sticks, cloth)* (Around 11:45-ish) When students raise their hands for the next step, teacher(s) will then explain that the next step will be preventing erosion using materials that they can choose from a set list, (rocks, popsicle sticks, cloth). This will help students elaborate on how humans can impact the environment in a positive way by stopping/preventing erosion and methods in which that can happen.
	+ “Now that you are done witnessing how erosion can be harmful to an ecosystem, now we are going to think about how erosion can be stopped. Remind me why it might be important to stop erosion? (uprooting trees, takes away soil, etc) I have these three materials that you can use to run your model one more time to stop the erosion from happening. We will see if your method worked and how that might affect the environment if it does work. If your method does work, what do you predict will happen? Why do you think that? Okay, talk amongst yourselves to plan out what you might do. You don’t have to use all the materials, but you are welcome to if you would like, observe what happens and then record that on your sheet.”
* (11:55) Teacher will bring all the students together to briefly talk about what students observed in their models
	+ “Why is it important to stop erosion?” (If this question is too hard ask: “How is erosion harmful to living and nonliving things?)
	+ “What materials did you use to stop the erosion from happening? Did those materials work? Why do you think that they did/didn’t?”
* Teacher will then explain how humans impact the prevention of erosion in a positive way and that in later weeks they will be talking about how humans can have a negative impact on the environment/ecosystem
	+ “Today we talked about erosion because it is something that humans can positively impact our environment by using prevention methods to help the living and nonliving organisms around the river or stream. In the next two weeks we will talk about how humans can also have a negative impact on the environment.”
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| **Assessment Evidence (\*This is the Evaluation Phase of the 5E approach)** |
| **Performance Task(s):** * Informal assessment by asking the students questions through modelling and discussion
* Students will demonstrate understanding through making interactive models, showing that they can somewhat simulate the real life effects of erosion
* Students will have another opportunity to elaborate on their understanding through discussion and allowing them to ask questions to develop an even deeper understanding of the concept
 | **Other Evidence:** * Students will gather data during the experiment and modelling in order to track and compile their learning
* Teachers will be able to use this data to help students conduct an investigation on their own
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| **Materials + Quantity:*** **Paper x14**
* **Clipboard x14**
* **Something to write with x14**
* **Erosion table x2**
* **Sand (as much as possible)**
* **Watering can x2**
* **Pebbles (as many as possible)**
* **Bowls or buckets that can fit in a sink x2**
* **Toothpicks (as many as possible)**
* **Cloth (as long and as many as possible)**
* **Popsickle stick x50**
* **Flip chart paper x5**
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| **Required Accommodations/Modifications:*** **If any student requires a scribe or alternative to writing using a pencil we can have them partner up with another student and share data**
* **Rain: We will have students come inside and watch an episode of** [**Bill Nye: Erosion**](https://youtu.be/MAHBpgYJhHM)
* **If students have allergies, irritation, or any ailment preventing them from going outside, they will do the above.**
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| **Additional Modifications for Individual Students:*** **Unknown Yet, Will be edited later**
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**Q405: Saturday Science**

**Lesson Plan 2**

**Lesson Topic:** Water Pollution

**Grade level(s):** 3rd and 4th

**Instructor Names:**

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| **Desired Results** |
| **Overarching Focus Question for the Session (***the phenomenon being explored across the 3-weeks***)*** How do environmental factors affect living and nonliving organisms in an ecosystem?
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| **Central Focus/Topic for today:**Students will understand:* Pollution within the Jordan River
* How pollution affects the water and living and nonliving organisms within and surrounding the water

**Therefore, the guiding question for today’s learning is:*** How can pollution affect living and nonliving things within the water and surrounding the water (ecosystem)?

  | **Relationship that this central focus has to the overarching big idea/question for the unit:*** Water pollution is a big environmental factor that affects living and nonliving organisms negatively. If water is polluted it not only affects the organisms living in the water, but it affects the soil around which then affects the plants growing from the soil and the organisms living on those plants. The Jordan river also dumps into a larger body of water, which can affect the living and nonliving organisms there.
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| **Student objectives (outcomes):**Students will be able to: * Identify a macroinvertebrate
* Determine the pollution within the jordan river
* Discuss an action plan we could or may take in the future
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| **Timeline of Activities for the Day** |
| \**Provide a breakdown of how long each activity will take, who will lead the segments of the activities, when breaks will occur or other transition points, etc.**\*Identify by highlighting in blue the portion of the lesson your team wants video-recorded each week. This should be ~45 mins*1. (9:30-9:35) 5 Minute Brain Dump “Talk to your neighbors about your week”
2. (9:35:-9:45) Go over classroom expectations
3. (9:45-10:00) How can we measure pollution in the Jordan River? - Micro-organisms
4. (10:00-10:15) Explain micro-organisms and how it can indicate pollution
5. (10:15-10:20) Bathroom Break **All**
6. (10:20-11:15) Go outside - Complete macroinvertebrate hunt

 **- Intro to Activity; then rotate camera between each teacher’s group)**1. (11:15-11:30) Bathroom and snack break **All**
2. (11:30-11:45) Discuss and compare data
3. (11:45-12:00) Action Plan Brainstorming
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| **Learning Plan (First three E’s of the 5E model)***Any of these phases can be repeated should you have more than one activity to describe OR a complex activity with multiple iterations of some phases.* |
| **ENGAGE** Brain Dump* (9:30-9:35) Teacher will have students take five minutes to talk about what they have done this week to help students talk to their friends and get ready for a classroom setting.
	+ “Before we get started I want to give you guys five minutes to talk to the people at your table or your neighbor about how your week was, after five minutes are up, we will get started on what we will be doing today”

Classroom expectations * (9:35-9:45) Teacher will explain three classroom expectations that the students should try to focus on this week. This will help to ensure that students are engaged in what is happening this week
	+ “This week we are going to be focusing on three classroom expectations that we came up with last week. As a class, most of us were struggling to follow these expectations. Can someone tell me why we have classroom expectations? (student answers) Yeah, we have these expectations to make sure that everyone is being safe and respectful.”
* Teacher will write two things to focus on on the board: Be Respectful to others/the teachers andBe respectful to materials on the board.
	+ “One of the biggest things that we feel that we need to work on this week is being respectful to others. Who can tell me what that looks like? (students answers) One thing that I need you to work on this week is your word choice. We need to make smart choices when we are choosing our words, who can tell me what that means? (student answers) What about being respectful to the teachers when they are talking? I need you to check yourself when a teacher is talking, what should your eyes be doing? What should your ears be doing? What should your mouths be doing? This week we are going to try something new to get your attention, the teacher is going to say ‘1,2,3 all eyes on me’ and all of the students, you are going to yell back as loud as you can ‘1,2 eyes on you.’ When you hear that, you need to be active listeners so that you and the rest of the class can hear what the teacher needs to tell you, and if you can’t do that this week, then you will be asked to sit out, and we have a super cool activity today where we are going to be getting really close to the river.”
	+ “The last thing that we need to work on is respecting our materials. Who can tell me what that looks like? (student answers) exactly, these materials are something that IU is letting us borrow, so we need to make sure that we are handling them with care. So this also means the chairs. Last week I did not see people being respectful to the chairs, they were being rolled around super crazy, is that how a chair should be sat in? How should we be sitting in the chairs? Should they be rolling around like crazy? No, if we see that for the rest of our time together, we will take the chair away and you will stand for five minutes before you get it back. Remember that these chairs are IU’s chairs, and rolling around in the is not using them how they should be.”

Macroinvertebrates and connection from last week* (9:45-10:00) Teacher will explain that we will be talking about water pollution today.
	+ “Now, we are going to transition into what we will be doing this week, but first we need to create your groups on who you will be working with for the rest of the day. You will be handed a paper with ‘1, 2, 3, or 4’ and all the ones will be in a group, all the twos will be in a group and all of the threes will be in a group. This table (point to table) is table number one, if you have a one on your paper please move to this table now. This table (points to table) is the number two table, if you have a number two on your paper, please move to this table now. This table (points to table, is the number three table, if you are a number three please move to that table now. If you are number four, this is the number four table, please get up and move to that table now. We want to make sure that you get to work with different people in this class, that is why we wanted to group you up randomly so that you have a chance to work with different people.”
	+ “Now that everyone is in their groups for the rest of the day, can someone tell me what water pollution is?
	+ “What are some ways that we can measure water pollution?”
	+ “Today we are going to be talking about a different way to measure water pollution without just looking at the surface of the water and looking for trash, we are going to be talking about macroinvertebrates, has anyone ever heard of this term before?
* Teacher will break down the term macroinvertebrates
	+ “Macro means big, or visible, vertebrates means spine or backbone, and in means not or without, basically meaning that macroinvertebrates are visible organisms without spines. Who can guess if these are living or nonliving?”
	+ “These are living organisms that are in the water, and just like last week when we talked about living and nonliving organisms that were affected by erosion, macroinvertebrates are living organisms that are affected by pollution in the water”
	+ “Today we will be going outside and looking for these macroinvertebrates in the water, and depending on which ones that we find, it can tell us if the water is polluted or not, who can guess how we could do that by just looking at the organisms?” (students probably won’t guess this, but good to see them trying to use skills to figure out why)
	+ “There two main groups of macroinvertebrates that we can look at some that are tolerant to pollution and some that are intolerant to pollution, who can tell me what tolerant means? So there are some macroinvertebrates that are tolerant or can be in pollution, if we find a lot of those what might that tell us about jordan river? Now intolerant means the opposite, macroinvertebrates that are intolerant to pollution, means that they will not be there if the water is polluted. So if we find a lot of intolerant macroinvertebrates, what does that mean? What if we find a lot of both?”
* Teacher will show the student the chart on the over head
	+ “These are the types of macroinvertebrates that we will be looking for today in the water, you will be given a sheet with these pictures on it so that you can tally the number that you find of each one, and when we come back inside you can put if they are tolerant or intolerant to pollution.”
	+ “Why might this be important to find out?”
	+ “Do you think think Jordan River is going to be polluted?”
		- What will that look like if it is/isn’t?
* Teacher will explain that everyone is going to head outside after a bathroom break
	+ Alright, we will be heading outside here in a minute and is going to explain to you outside how we are going to find these macroinvertebrates, so that later we can come back inside and will explain to us how we can find out if Jordan RIver is polluted and what we can do if the river is polluted, but before we head outside we are going to have a bathroom break, everyone who needs to go to the bathroom needs to stand up now and get in line, if you don’t need to, just wait in your seats for now.”

**EXPLORE ( )**Macroinvertebrate Hunt* (10:20-10:45) Teacher will lead the students outside of the Jordan River where we will be completing the Macroinvertebrate hunt.
	+ Once we reach the spot in the Jordan River where the hunt will begin the students will line up along the Jordan River and stay within their groups. The teacher will get into the Jordan River and set expectations for the students about how the hunt and how to act within the river.
		- If you pick up a rock or collect a macroinvertebrate it needs to be placed back into the river wherever it is found. If the students are disrespecting the items within the river they will be asked to sit out and watch their peers conduct the hunt.
	+ The teacher will also search for a macroinvertebrate to show to the class. As a class we will identify which macroinvertebrate we found.
	+ The teacher will also discuss where the students should look for the macroinvertebrates and model how the students put back the rocks and leaves they pick up to make sure not to kill the macroinvertebrates.
	+ The teacher will also model how to use the identification sheet and how to record it on the sheet provided.
		- Each group will need to designate a person to be the recorder and to make sure to keep the paper dry.
		- The teacher will explain the importance of our data and why we are trying to identify the macroinvertebrates within the Jordan River
* (10:45-11:15) This will be time for the students to explore. Each teacher will be assigned a group to work with and help. The teacher will be helping identify the macroinvertebrates they find but also managing the group making sure they stay on task and are finding good data.
* (11:15-11:30) Students will go back inside and have a snack and bathroom break

**EXPLAIN ( )*** **(11:30 - 11:45)** Teacher will gather students back into the classroom to Explain and Elaborate
	+ “Now that everyone’s been outside and gotten the chance to explore and identify their macroinvertebrates, using the chart, calculate your pollution score amongst your groups.”
	+ If students need help, teachers will be floating and assisting them
	+ “Now that you have your score, by raise of hand, tell me what you think that means about the pollution of the water.”
	+ Teacher will take hands and have students give their reasoning on the score and what they think it means. Teacher can ask probing questions like:
		- Why do you think some scores are different?
		- Do they differ by area?
		- What does the score say about the whole river ecosystem?
		- Is every part completely shut off from each other or are they connected?

**ELABORATING/EXTENDING Understanding ( )*** **(11:45 - 12:00)** Teacher will relate the sheet and exploration back to the main topic of pollution and why certain macroinvertebrates we found were there, and what it could mean for the entirety of campus as an ecosystem.
	+ Teacher can ask probing questions like:
		- If we found these in the most popular river on campus, what does that tell us about the health and pollution levels of the entire campus?
		- Is this good or bad? Why?
		- Who is affected by this?
		- What should we do?
		- How can we as humans affect the ecosystem and stop pollution in the river?
 |
| **Assessment Evidence (\*This is the Evaluation Phase of the 5E approach)** |
| **Performance Task(s):** * Informal assessment by asking the students questions through modelling and discussion
* Students will demonstrate understanding by identifying macroinvertebrates in the water
* Students will identify if there is pollution in the water by analyzing their data
* Students will start to brainstorm ideas on how to prevent pollution
 | **Other Evidence:** * Students will gather data during the experiment and modelling in order to track and compile their learning
* Teachers will be able to use this data to help students conduct an investigation on their own
* Students will be able to use their data to hypothesize a plan related to combating pollution in the ecosystem
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| **Materials + Quantity:**River dip nets (4)* Black bins, (4)
* Magnifying glasses (14)
* Macroinvertebrate keys (8) (steven will print)
* Clip boards (14)
* Macroinvertebrate Tally Chart (8)(found at bottom) (steven will print)
* Pencils/paper to write with (14)
* Towels (just a couple)
* 3 copies of the lesson plan (Steven will print)
 |
| **Required Accommodations/Modifications:*** **Gear Up:** Giving students the pollution tolerance index sheet to further identify macroinvertebrates in the water
* **Gear Down:** Working with the teacher to identify macro/finding one from each group on their own
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**Q405: Saturday Science**

**Lesson Plan 3**

**Lesson Topic:** Carbon Footprint

**Grade level(s):** 3rd and 4th

**Instructor Names:**

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| **Desired Results** |
| **Overarching Focus Question for the Session (***the phenomenon being explored across the 3-weeks***)*** How do environmental factors affect living and nonliving organisms in an ecosystem?
 |
| **Central Focus/Topic for today:**Students will understand:* What is a carbon footprint
* How do humans produce carbon dioxide
* How carbon dioxide can be eliminated

**Therefore, the guiding question for today’s learning is:*** How does carbon dioxide affect the surrounding (living and nonliving) ecosystems and how it can be prevented

  | **Relationship that this central focus has to the overarching big idea/question for the unit:*** The trees are the central point in this lesson. Erosion affects the trees falling down, water pollution affects the trees growth/water source, and the trees absorb air pollution, trees absorbing air pollution give us a better quality of life connecting back to this lesson.
 |
| **Student objectives (outcomes):**Students will be able to: * Make observations and/or measurements to identify trees outside.
* Make observations and/or measurements to produce data to serve as the basis for evidence for an explanation of a phenomenon.
* Plan and carry out investigations on what trees reduce more carbon dioxide
 |
| **Timeline of Activities for the Day** |
| \**Provide a breakdown of how long each activity will take, who will lead the segments of the activities, when breaks will occur or other transition points, etc.**\*Identify by highlighting in blue the portion of the lesson your team wants video-recorded each week. This should be ~45 mins*1. (9:30 - 9:40) Brain Dump (
2. (9:40 - 10:00) Talk about carbon footprint **( )**
3. (10:00 - 10:15) Carbon Footprint Quiz **( )**
4. (10:15-10:20) Bathroom Break **(All)**
5. (10:20 -10:45) Go outside and measure trees/make observations on carbon emitting factors **( explains but everyone has a group)**
6. (10:45-11:00) Snack and bathroom (**All)**
7. (11:00 - 11:15) Identify how much Carbon Dioxide each tree gives off and then determine which tree is the best to plant to get rid of Carbon dioxide in the air.( **and** )
8. (11:15 - 12:00) Make flyers for carbon footprint awareness **( )**
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| **Learning Plan (First three E’s of the 5E model)***Any of these phases can be repeated should you have more than one activity to describe OR a complex activity with multiple iterations of some phases.* |
| **ENGAGE( )** **(9:40 - 9:45)** Once students get seated, teacher will lead a discussion brain dump with students to recap on last week’s lesson about water pollution and macroinvertebrates. After a good round of hands and topics brought up, teacher will then shift the topic to pollution primarily, and then onto air pollution. * *So now that we’ve talked about pollution in the water and how it’s caused, let’s talk about a different type of pollution called air pollution.*
* *What do you guys know about the pollution in the air?*

**(9:45 - 9:50)** If students catch on, they’ll begin to talk about carbon emissions, if not, teachers will help guide them to this topic. * *What is CO2 or Carbon Dioxide? Is it a good or bad thing? What produces carbon dioxide? Who produces it? Students may begin to talk about trees and how they convert CO2 into oxygen, and how we breathe oxygen. If not, teachers will guide them.*

**(9:50 - 9:55)** Teacher will ask students about the importance of trees and how they help us eliminate what's called a carbon footprint. * *Why are trees important? How do they help the ecosystem? What else do trees do?*

**(9:55 - 10:15)** Teacher will then present students with a quiz to take about how big their individual carbon footprint is. After the quiz, the teacher will discuss their individual scores and how to decrease these scores if they're high, leading into the next portion of the lesson.* *What were your scores? Were they high/low? Why? What can we do to decrease our carbon footprint?*

**EXPLORE** Go Outside* (10:15-10:20) Students will take a short bathroom break
* (10:20-10:25) Teacher will explain what the outside activity is going to be
	+ “Today when we go outside, we are going to classify different types of trees, and measure their diameter, or how wide the tree is, that way when we come back inside, we can figure out together which tree outside is the best tree at absorbing the carbon in the air. Try to pick trees that look around the same diameter. Then, we can also figure out in general which trees are the best trees to plant in order to absorb the carbon in the air. I also want you to take note of the trees surroundings, how close it is to other trees and the river, and also what around it might be giving off carbon.
* (10:25-10:26) Teacher will put students into groups and teachers will be assigned to each group
	+ “Okay, now we are going to get into groups so this group of students (point to group) is going to be with , so stand up at the door with him with all of your things and he will take you outside now. Etc Each group needs to be back inside at 10:45 for snack and a bathroom break”
* (10:26-10:45) Students will go outside with the teacher. Teacher will demonstrate how they are going to classify a tree and also demonstrate how to measure one tree and have students take turns measure 9 different trees or until time runs out. Teacher will also help students fill out the rest of the sheet.
	+ “When we go up to a tree the first thing we are going to do is classify it. One way to do that would be to look it up in a book or on the internet, but for today we have this app that we are going to use to help us figure out which tree is which. After we have classified the tree and have written it down, we are going to use the tape measurer like this to figure out the diameter of the tree. Why do you think it is important to figure out the diameter of the tree for what we are doing? Think about the carbon.
	+ “When we get back inside, we will be able to use a website to figure out exactly how much carbon our trees are absorbing, and that is why we are identifying and classifying the trees.”
	+ “When we are filling out the sheet we need to think about what is around the tree to think about how much carbon that the tree is absorbing.”
* (10:45-11:00) Students will go inside for a bathroom and snack break

**EXPLAIN*** (11:00-11:05) Teacher will have a small debrief with the students about what they found outside
	+ “What are some of the types of trees that you found outside?”
	+ “Why did the diameter of the tree matters?”
* (11:05-11:10) Teachers will work with their assigned group to use the website to find out the amount of carbon each tree they pick absorbed.
* (11:10-11:15) Teacher will discuss as a group each groups tree that absorbed the most carbon and write the type and amount on the board. Teacher will help students come up with a conclusion on which trees are best to plant for absorbing carbon.
	+ “ ’s group, which tree had the most carbon absorbed? How much carbon does it absorb? Ect.”
	+ “Looking at all the trees, can we conclude out of all the trees we samples if there is one that is the best at absorbing carbon?”
	+ “If we were going to plant some trees in the area with the main purpose of absorbing carbon, which tree or trees would we plant?”
	+ “Looking at your own data, which trees would you not plant?”

**ELABORATING/EXTENDING Understanding ( )*** **(11:15-11:30)** The teacher will start a discussion with the class connecting everything together from the past 3 weeks up on the board. We will draw a venn diagram showing how two main impacts in our ecosystem, erosion and water pollution affect the ecosystem.
	+ For example, erosion affects the trees, and trees reduce CO2, which gives us a better quality of life, and that relates to humans. Humans affect the trees, erosion, and water pollution. A way to test water pollution is to search for Macroinveterbrates living in the water. Water pollution also affects the trees.
* **(11:30-12:00)** Once we have walked through the venn diagram on the board and the students are starting to put together all of the connections, they will be asked to take a blank piece of paper and show us what they have learned within the past 3 weeks. The question they will be asked is, “What can humans do moving forward.” The students can take this in any direction they please. They can use the venn diagram to help lead their thoughts but they cannot draw the venn diagram on their paper to show what they have learned. Their options include;
	+ Drawing a picture of how water pollution and erosion affect our ecosystem.
	+ Making an information flyer telling humans how they can reduce water pollution or help prevent erosion
	+ Write a story or a poem about the effects of water pollution and erosion.
	+ Or anything else they can think of to showcase their knowledge.
		- During this time the teachers will be walking around testing the students knowledge and pushing them to include all of the elements within their paper. The students will then be able to take this paper home and show their parents what they have learned within the past 3 weeks.
 |
| **Assessment Evidence (\*This is the Evaluation Phase of the 5E approach)** |
| **Performance Task(s):** * Students will demonstrate an understanding of the three major impacts (erosion, water pollution, and air pollution) on an ecosystem by completing the flyer/diagram showing what they learned
* Informal assessment by asking the students questions through modelling and discussion
* Students will have another opportunity to elaborate on their understanding through discussion and allowing them to ask questions to develop an even deeper understanding of the concept
 | **Other Evidence:** * Students will gather data during the experiment and modelling in order to track and compile their learning
* Teachers will be able to use this data to help students conduct an investigation on their own
* Teachers will walk around assessing and talking through students thought process for the flyer and answering the question, “What can humans do moving forward?”
 |
| **Materials + Quantity:**<http://www.treebenefits.com/calculator/treeinfor.cfm?zip=47407&city=BLOOMINGTON&state=IN&climatezone=Lower%20Midwest&country=US>Measuring Tape (5) (flimsy to wrap around a tree trunk)Clip boards (5)Print-outs of data collection sheet (5)Tree ID App on personal phones Apple App Store -> “PictureThis”Computer paper (20)Markers/colored pencils/crayons (a variety and enough for a class of 14) |
| **Required Accommodations/Modifications:*** **Gear Up:** With the poster we can crank up the difficulty of complexity of the design such as instead of a chart we can have them do a brochure or an infographic. If there’s additional time at the end or a lull in conversation, teachers can talk about the devastating impact the Amazon RainForest being on fire has on the earth
* **Gear Down:** Asking students to “Draw a simple picture of something you learned this week” as their assessment assignment
 |
|  |

**Tree Observations**

**Tree 1:**

Type of Tree \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Tree Measurement \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ cm

\*Carbon Absorbed: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ pounds

**Notes:**

**Tree 2:**

Type of Tree \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Tree Measurement \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ cm

\*Carbon Absorbed: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ pounds

**Notes:**

**Tree 3:**

Type of Tree \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Tree Measurement \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ cm

\*Carbon Absorbed: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ pounds

**Notes:**

**Tree 4:**

Type of Tree \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Tree Measurement \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ cm

\*Carbon Absorbed: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ pounds

**Notes:**

**Tree 5:**

Type of Tree \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Tree Measurement \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ cm

\*Carbon Absorbed: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ pounds

**Notes:**

**Tree 6:**

Type of Tree \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Tree Measurement \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ cm

\*Carbon Absorbed: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ pounds

**Notes:**

**Tree 7:**

Type of Tree \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Tree Measurement \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ cm

\*Carbon Absorbed: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ pounds

**Notes:**

**Tree 8:**

Type of Tree \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Tree Measurement \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ cm

\*Carbon Absorbed: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ pounds

**Notes:**

**Tree 9:**

Type of Tree \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Tree Measurement \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ cm

\*Carbon Absorbed: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ pounds

**Notes:**

**Area Observations:**

Tree Proximity (are the trees close together?):

Are the trees close to the river? How close or far?

What is the area like in general?

**Carbon Emitting Factors**

Name some carbon emitting factors in the area of the trees

Say the type and an estimated amount: *Large, medium, small*

Electricity:

*Example: Buildings - Large amount*

Transportation (gas):

Trash:

Others? (Think of some natural sources):