Sixth Grade Unit Plan/Vocabulary

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Overview: This unit will introduce sixth grade students to past and current environmental dilemmas, factors that change the environment, and the impact that just one person can have on the world. Students will learn that human impacts on the environment can be positive and/or negative. The students will learn how some of the environmental changes in one area can change another area. They will also learn that technology has helped humans immensely but it has also allowed for countless changes to the environment that may end up causing more harm than good.

Rationale: It is important for students to discover the possible impacts that they, as well as all other humans, have on the environment. Knowledge of human impacts gives students a different perspective on their actions, a perspective that allows them to be mindful of the good and bad they can do. Not only do students need to know the initial effects of their actions but they also need to know the long-term effects of their choices and the choices that others make. This unit serves as a turning point in students' learning; they are starting to learn about their roles in the world instead of merely learning about what others have done in the past.

Introduction: This unit informs students of the human impacts on the atmosphere, lithosphere, biosphere, and hydrosphere. Throughout this unit, students will write blog posts about what they are thinking and what they have learned. They will create posters that show their understanding of human impacts and work together in discussion groups to come up with different technologies that have changed earth's landscape.

GLCE (coding and wording) and Verb underlined	6 – G5.1.1 Describe the environmental effects of human action on the atmosphere (air), biosphere (people, animals, and plants), lithosphere (soil), and hydrosphere (water) (e.g., changes in the tropical forest environments in Brazil, Peru, and Costa Rica). (Knowledge)			
Knowledge (K)	**Understand (U)**	**DO: Demonstration of Learning (DOL)**	**Vocabulary**	**I Can**
Students will know that the environment consists of four main parts: the atmosphere (air, and other gases); the biosphere (living things: people, animals, plants); the lithosphere (soil); the hydrosphere (water). On their own, these four components interact with each other. Humans cause positive and negative changes in each of these areas but human effects also result in a chain of events: human's cutting down trees affects the biosphere but	Students will understand that the environment changes as a result of human action.	Students will create foldables, including definitions and at least two examples for each of the four components, displaying examples of the positive and negative human effects on the environment.	Atmosphere Biosphere Lithosphere Hydrosphere Carbon Dioxide Oxygen Interdependence	I can describe the effects of human's interactions within each of the four parts of the environment.

that also causes a change in the atmosphere since trees use photosynthesis to convert carbon dioxide into oxygen for humans. Changing the number of trees (biosphere) leads to changes in how much water is consumed by roots (hydrosphere) and the soil conditions (lithosphere). Another example: Factory farming uses much transportation which affects the atmosphere (pollution) and a large supply of food for animals that depletes the soil (lithosphere).				

***4. Assessment ideas**: a. How will you know they've learned it?*

The students will create a foldable for the four categories of the environment. It's important that this is done as it will be used for the rest of the unit.

b. There will be a checklist to evaluate students' foldables and their understanding of the different topics we cover. They will need to have at least five examples of each category and a definition for each by the end of the unit.

Lesson 1: How will you take them where they need to go? *(Step-by-Step plan)*	**Instructional strategies/Social constructs: How will they work?** *(AND what will YOU do?)*	**Resources needed: What materials and resources will they need?** *(Page #s read, graphic organizers, books, posters, realia, etc…)*
6-G5.1.1 Describe the environmental effects of human action on the atmosphere (air), biosphere (people, animals, and plants), lithosphere (soil), and hydrosphere (water) (e.g., changes in the tropical forest environments in Brazil, Peru, and Costa Rica). **Pre-test/Anticipatory set:** Put figure "5X5" (attached) up on the overhead/ projector and ask students to do a 5X5. A 5X5 is when students list 1 through five on two columns of a lined sheet of paper. They are two write five observations (anything that they see) and five questions they have. Instructor can give them hints for the questions such as "are any of you thinking about why the earth is in the middle? and "what is apart of each of these sections on the picture?" Go over student answers and write on the board 5 things they see and 5 questions they have. When 10 things have been written on the board, tell them that each of the four corners represents a part of the Earth's environment and that is why Earth is in the middle.	**Instructional strategies/Social constructs**: How will they work? Students will participate in whole group discussion as the vocabulary words and concepts are introduced by the instructor with a campfire analogy. They will work together and discuss poems in order to understand the differences between each of the four categories and examples that fit with each.. Students will independently read two environment poems and fill in blanks for analogies using both terms and examples that correlate with each term. They will discuss their results to other classmates and write their answers on paper. Students will use Think, Pair, Share to answer the question, "What parts of the environment are referenced in the two poems you were given? Give specific examples."	**Resources needed:** What materials and resources will they need ? • Vocabulary Script (**Attachment A**) • Word Wall • Writing utensils and lined paper • Attachment E: 5X5 picture

Lessons: How will you take them where they need to go? **Direct Instruction:** 1. Teacher will start the lesson off by introducing the five vocabulary words according to the script (Attachment A). Marzano's Six Steps to Building Academic Vocabulary will serve as the model.	Students will create a layered look book and fill it with examples and definitions for each of the terms.t This will help them create a broad understanding of the terms and become familiar with the situations and items that are included in each of the parts of the atmosphere.	• Atmosphere video: http://education-portal.com/academy/lesson/major-components-of-the-atmosphere-their-effect-on-ozone-depletion.html#lesson • You and the environment. (2003, April 24). Retrieved from http://www.cyh.com/HealthTopics/HealthTopicDetailsKids.aspx?p=335&np=288&id=2651 • Word wall cards
2. Teacher will use multiple examples to show the four different parts of the environment; these examples include a campfire analogy and two poems. **Note:** this is where the previous lesson comes in to play. Students have analyzed their water consumption and now have one more example for their foldables…they can see that they affect the hydrosphere!	Students will listen to others' answer for the 5X5 exercise and being to form their own definition of each of the four following terms: atmosphere, biosphere, hydrosphere, lithosphere. Then participate in whole group discussion where the teacher asks the questions (and others that arise): "What makes a campfire?" "Where does the smoke go?" "Was the wood living at one point?" "What is used to put out a fire?"	• white board • **Attachment E**

Guided Practice: 3A. Teacher will provide ample opportunity for students to talk with one another about the four parts of the environment. 3B. Teacher will show students how to make the layered look book foldable to insert each of their terms and examples for each term. 3C. Teacher will provide two poems for pairs of students to sort and categorize prior to the assessment.	A. Students will read the two poems and look for ways to sort the lines of the poems. If water or contaminated water is mentioned, they will think of it in terms of the "hydrosphere" and reflect on each of the line of the poems to put every line into one of the four parts of the environment. B. With the teacher modeling, students will create the layered look book foldable and write a term on each tab. They will fill in information, examples, pictures, and definitions as the lesson progresses. C. Students will work in pairs to talk about the lines of the poems and where they fit in with the environment. Think, Pair, Share will be used here.	• Poem #1 (**Attachment B**) • Poem #2 (**Attachment C**) • Three pieces of colored paper • Glue • Scissors
Independent Practice: 4. Teacher will provide analogies for students to consider and work through. Three of the four lines will be filled and students must fill in the missing piece of the analogy.	Students will independently read the analogies they are given and decide what term or example will fit in the blank spot. They will add their analogies onto the back of their foldables.	• Environment Analogies (**Attachment D**).
5. Teacher will review and revise further lessons as needed for students to understand the concepts of the Atmosphere, Biosphere, Hydrosphere, and Lithosphere.	Students will revise their understanding and participate in further instruction as needed.	• The teacher may need to provide additional examples or analogies to help students understand the different examples that belong to each category of the environment.

5. ***Sequence of Instruction:*** *What will you do? What will they do?*

Lesson 2: How will you take them where they need to go? *(Step-by-Step plan)*	**Instructional strategies/Social constructs: How will they work?** *(AND what will YOU do?)*	**Resources needed: What materials and resources will they need?** *(Page #s read, graphic organizers, books, posters, realia, etc…)*

6-G5.1.1 Describe the environmental effects of human action on the atmosphere (air), biosphere (people, animals, and plants), lithosphere (soil), and hydrosphere (water) (e.g., changes in the tropical forest environments in Brazil, Peru, and Costa Rica). **Pre-test/Anticipatory set:** Students will begin with discussing things that can affect the environment. How is it that water affects the environment? Does the amount of water you consume affect the environment? Do we use too much water/are we wasteful? Raise your hands to answer: "How many of you brushed your teeth today?" "Gone to the bathroom?" "Washed your hands (I HOPE!)?" "Things that you do **everyday**, on top of simply drinking water, have you consuming water…all day long"	**Instructional strategies/Social constructs**: The teacher will lead a discussion on the small things students do everyday that cause them to consume water and which part(s) of the environment their water consumption affects.	**Resources needed:** • None

<u>Lessons:</u> **Direct Instruction:** **Instructor:** Take the water amounts for each fact on **Attachment F's** home water usage facts for the United States and put them on the right side of the whiteboard. Now, take the "water users" (such as "Bath", "Shower" "Washer", etc. on the left side of the board.	The teacher will match two "water users" to two amounts on the board (not the largest or the smallest amount because students will be guessing that later on). The teacher will make two columns for the "water users" and water amounts on the board and students will cut up a paper version to manipulate on their desks.	• Whiteboard • **Attachment F** • Scissors
Guided Practice: Ask students to connect, one at a time, where they think "water users" will go with "water amount". Facilitate discussion before asking students to draw the lines on the board. Ask: which "water user" takes up the <u>least</u>, do you think? Which "water user" consumes the <u>most</u>, and why?	The teacher will tally students' guesses for the least and greatest "water users" to see what the most popular answer is.	• Whiteboard • **Attachment F**
Independent Practice: Students will track their water consumption for a week using a spreadsheet provided by the instructor. Students may choose to measure in any unit they choose; however, the end results needs to be in the same units to come to a week total.	The teacher will model how to create a week long water tracking calendar. Students will keep track of how much water they consume for the entire week to see how much they impact the environment with their water consumption. Students will generate estimates (based on their weekly consumption) of how much water they consume in a month, a year, and ten years.	• Paper • Pencil • Water Tracking Journal • Measurement convertor

4.Teacher will hold a class discussion on total water amounts (weekly, monthly, yearly, etc.) at the end of the week.	The teacher will ask students if they were aware of using that much water and if they think their consumption makes a difference. Could they cut down on their consumption? They will generate ideas to use less water in this discussion as well.	• None

5. ***Sequence of Instruction:*** *What will you do? What will they do?*

Lesson 3: How will you take them where they need to go? *(Step-by-Step plan)*	**Instructional strategies/Social constructs: How will they work?** *(AND what will YOU do?)*	**Resources needed: What materials and resources will they need?** *(Page #s read, graphic organizers, books, posters, realia, etc…)*
6-G5.1.1 Describe the environmental effects of human action on the atmosphere (air), biosphere (people, animals, and plants), lithosphere (soil), and hydrosphere (water) (e.g., changes in the tropical forest environments in Brazil, Peru, and Costa Rica). **Pre-test/Anticipatory set:** "Remember how we broke apart the campfire? We're going to do something similar with a volcano. So let's watch this video and keep the atmosphere, biosphere, lithosphere, and hydrosphere in mind. I'll ask for specific examples at the end of the video" **Play video**: https://www.youtube.com/watch?v=8YpRaL6USow; "This teacher who made the video is a little wacky but he has plenty of information that we can use today!"	**Instructional strategies/Social constructs**: The teacher will show a video on the effects of volcanos on the atmosphere to get them thinking that multiple parts of the environment can be affected at the same time.	**Resources needed:** • Whiteboard • **Play video**: Bergmann, J. (2011, February 6). The effect of volcanos on the atmosphere. In *Flipped learning*. Retrieved April 16, 2014, from https://www.youtube.com/watch?v=8YpRaL6USow

<u>Lessons:</u> **Direct Instruction:** Just like with the the campfire analogy, the instructor will model breaking apart a volcano. "We're going to take apart 5 effects of volcanos. Take note that for this volcano 'dissection' there may be connections with multiple parts of the environment" Write the following examples on the board to pick apart. A. Acid lakes occur when water collects in a place that volcanic gases are being emitted on a volcano B. Ash pollutes the water C. Ash on the ground makes it harder to grow crops D. If ash becomes too heavy, it becomes difficult to breathe E. Soil near volcanos are more fertile	Students will continue creating their foldables. This class period will help them add to their examples under each category of the environment.	• Pre-made student foldables • Writing utensils

Instructor: First example (not written on the board) - Eruptions release water vapor ,which is a gas, into the air so which of the four categories does this go into? **Desired student answer**: "atmosphere"; instructor can help students out if they are going in the wrong direction or support and ask for more if they are close to the correct answer. **Instructor:** let's add more. D. says "If ash becomes too heavy, it becomes difficult to breath. Who is berating in that air?" **Student**: humans **Instructo**r: and animals (or vice versa if they say animals first) So it affects the atmosphere which affects the biosphere.		• Whiteboard • Pre-made student foldables

Guided Practice: Then, continue with the rest of the letters. As for student volunteers to write on the board, too. Encourage students to write some of this information in their foldables because they will need at least 5 examples for each tab (atmosphere, biosphere, hydrosphere, and lithosphere) **A.** Acid lake - hydrosphere. Living things could drink that (biosphere). The acid lake could be absorbed into the land (lithosphere) **B.** Ash pollutes water (hydrosphere) which fish live in and they could die (biosphere). >> There are so many possibilities so brainstorm with your students and make at least one double connected for each letter.	The teacher will write ideas on the board that come from the students and, together, the teacher and students will decide which parts of the environment are affected. **Now that students can see that there are several parts of the environment being affected simultaneously, the instructor will change over to human effects on the environment. Humans do not simply affect one part of the environment when they pollute, overfish, or drive cars. They affect multiple parts of the environment (biosphere, hydrosphere, lithosphere, and atmosphere). The teacher will give students the example of spilling oil into a lake. Students will need to pick apart the scenario and figure out which affects match which part of the environment. For example, humans (biosphere) are changing the water quality (hydrosphere). When animals are dying in the oil spill water, the biosphere (animals) is affected by the biosphere (humans).	• Whiteboard • Pre-made student foldables
Independent Practice: 3.The students will research their assigned topic, find 5 examples of humans affecting the environment in their topic, and be ready to explain to other groups what they have found and which part(s) of the environment are being affected.	Students will be assigned to groups 1 through 5. This will be a jigsaw activity, with students researching in separate groups and then teaching students in the others about their topic.	• **Attachment I** • Pre-made foldables • Writing utensils • Computer

4.Teacher will review each student's foldable to see that there are ample examples for each category of the environment.	The teacher will ask students if they are lacking any examples under a certain part of their foldable. If so, students will help each other fill in additional examples.	• Pre-made foldables • Writing utensils

GLCE (coding and wording) and Verb underlined	6 – G5.1.2 Describe how variations in technology affect human modifications of the landscape (e.g., clearing forests for agricultural land in South America, fishing in the Grand Banks of the Atlantic, expansion of cities in South America, hydroelectric developments in Canada, Brazil and Chile, and mining the Kentucky and West Virginia). (Knowledge)			
Knowledge (K)	**Understand (U)**	**DO: Demonstration of Learning (DOL)**	**Vocabulary**	**I Can**
Students will know that the technologies humans have developed to use resources and create the lifestyle they choose to live come with consequences. Humans extract resources from the land and consume resources; the amount of consumption largely depends on the technology a country or region has. Large houses that need wood from many trees benefits the family who wants to live there, but damages the forest - especially when replacement trees are not planted. Expanding cities, clearing forests, and fishing are all examples of humans using technology. This technology, when overexploited, uses nonrenewable resources, diminishes animal populations, and eliminates forests.	Students will understand that advances in technology help humans while simultaneously harming the environment.	Students will create a presentation, using resources that have been given to them and other research, telling about at least three human technologies, including both past and present technologies, that have changed the earth's landscape, their effects, and what humans use each technology for.	Technology Agriculture Expansion Hydroelectric Overexploitation Variations Modifications Renewable resources Nonrenewable resources	I can describe different technologies that have changed the environment and have helped humans gain access to natural resources.

GLCE (coding and wording) and Verb underlined	6 – G5.1.3 Identify the ways in which human-induced changes in the physical environment in one place can cause changes in other places (e.g., cutting forests in one region may result in river basin flooding elsewhere; building a dam floods land upstream and may permit irrigation in another region). (Knowledge)			
Knowledge (K)	**Understand (U)**	**DO: Demonstration of Learning (DOL)**	**Vocabulary**	**I Can**
Students will know that the changes made to one place are an effect on their own and other effects may follow in other places (both positive and negative). Cutting forests - trees help prevent sediments from running off in rivers. When trees are cut, less roots are holding soil in place, and less roots are taking in any water which leads to floods. The Yangtze flood in Northern China (1998) is an example. Over fishing - can lead to and extinction of species, a lack of food to sell, or a change of eating habits for a population. Dams - the Aswan High dam on the Nile River allowed for irrigation systems to be put in place which extended the amount of surrounding land that could be farmed.	Students will understand that changes in one area of the land may lead to changes in one or more other areas.	Students will write a RAFT (Role, Audience, Format, Topic) on a given country: A journalist (R) writes a blog post (F) to friends and family (A), describing how human-induced changes in the physical environment have affected another location (T).	Irrigation Human-induced changes Irrigation Greenhouse Gases Sea level	I can identify causes and effects of human interactions with the environment on multiple areas.

*4..**Assessment ideas**: (6-G5.1.2) a. How will you know they've learned it?*

The students will create a presentation on the technologies that change/affect our environment. They will research either the Grand Banks Fishery Collapse, Dams, or Deforestation and share, via presentation, what they found.

b. I will base students' grades on the amount of examples they found that relate to what humans have done to the environment and their clear teaching to other groups. They will need to take the topic they are given and figure out how humans come in to play.

*4..**Assessment ideas**: (6-G5.1.3) a. How will you know they've learned it?*

The students will research a topic given to them and create a R.A.F.T based off of their research findings.

Paper-and-Pencil Test, Report, ***And***

b. I will evaluate students on their R.A.F.T.s. Each student needs to clearly communicate his or her opinion on their chosen topic for the R.A.F.T. and explain why. Both the technology that affects the environment, the affects on outside communities, and which part of the environment that is changed needs to be included.

5. ***Sequence of Instruction:*** *What will you do? What will they do?*

Lesson 4: How will you take them where they need to go? *(Step-by-Step plan)*	**Instructional strategies/Social constructs: How will they work?** *(AND what will YOU do?)*	**Resources needed: What materials and resources will they need?** *(Page #s read, graphic organizers, books, posters, realia, etc…)*
6 - G5.1.2 Describe how variations in technology affect human modifications of the landscape (e.g., clearing forests for agricultural land in South America, fishing in the Grand Banks of the Atlantic, expansion of cities in South America, hydroelectric developments in Canada, Brazil and Chile, and mining the Kentucky and West Virginia). **6-G5.1.3 Identify** Identify the ways in which human-induced changes in the physical environment in one place can cause changes in other places (e.g., cutting forests in one region may result in river basin flooding elsewhere; building a dam floods land upstream and may permit irrigation in another region).	**Instructional strategies/Social constructs**: The teacher will lead an initial discussion on electricity in students homes and where some of it comes from (dams) to get students thinking about where their electricity comes from.	**Resources needed:** Water/electricity facts from the following website: Hydroelectric power water use (n.d.). In *USGS water science school*. Retrieved April 6, 2014, from https://water.usgs.gov/edu/wuhy.html

<u>Pre-test/Anticipatory set:</u> "By a show of hands…Who in here has electricity in their house?" "Who has electricity in their school?" "Okay, do any of you know where we get our electricity?" Possible student answer: "the power company, etc" "Did anyone know that 19% of the world's total electricity supply (that's almost one-fifth!) is generated by large dams?!" "We're going to be learning today about large dams, what they do for locals and elsewhere, and their pros and cons"		

<u>Lessons:</u> **Direct Instruction:** How do we get hydroelectric power from dams? Point to turbines, reservoir, dam, intake, and outflow as you explain the anatomy of the dam (use picture attached) 1. There are electric turbines inside a dam. When water from the dam passes through, the turbines spin. This creates electricity. 2. Hydroelectric power is produced as water passes through a dam, and into a river below. The more water that passes through a dam, the more energy is produced. Once a dam is built, an artificial man-made lake is created behind the dam. 3. Electricity is produced by a device called a turbine. Turbines contain metal coils surrounded by magnets. When the magnets spin over the metal coils, electricity is produced. Turbines are located inside dams. The falling water spins the magnets. 4. Dams provide clean, pollution free energy, but they can also harm the environment.	The teacher will show the picture of the anatomy of a dam and a turbine (**Attachment G)** and instruct students on the different parts and uses for a dam. The teacher will also point out a few points (both the positive and negative) for the effects of dams on humans and on the environment.	• **Attachment G**

Species that use rivers to spawn are often hurt by dams. In the Northwest, sockeye salmon and trout populations have dropped from 16 million to 2.5 million since hydroelectric plants were built on the Columbia River. Dams all over the world have hurt some species. "So far, we know that dams can have positive and negative effects, so lets sort out some of those effects…"		
Guided Practice: 2. The teacher will give out materials. Individually, and then altogether, students will work on sorting out positive and negative effects from dams.	The teacher will give students cut up facts from Attachment F. In groups, students will sort out the facts into either the positive category or negative category for the environment or for humans. When students are finished, the positive and negatives from building dams will be written in a T-chart on the board.	• **Attachment F** • Whiteboard

Independent Practice: 3. Students will be numbered off as a 1, 2, or 3. Those who are 1's will be researching deforestation. Those who are 2's will be researching the Grand Banks Fishery Collapse. Lastly, those who are 3's will be researching the Aswan High Dam and its specific pros and cons (Example - Pro: The Aswan High Dam provides irrigation and power in the Nile River region). There are resources for students to start off with and they may look up other sites if/when they need more information for their project.	Students will be making posters in groups of 3. Each group will have a 1, a 2, and a 3 student. The posters will have each of the three situations on them and each group can organize it in any way they please. They will present to the class when finished. The pro and con theme may be used or compare and contrast. Technology will need to be mentioned in their presentation as well as their poster and its affect on humans as well as the landscape/environment. The group who gets "Dams" will be researching the Aswan High Dam specifically so they will need to find research on this dam's pros and cons instead of general dam facts.	• Writing Utensils • Posterboard • Internet Access • Deforestation o Deforestation (n.d.). In *World wildlife foundation*. Retrieved April 13, 2014, from http://wwf.panda.org/about_our_earth/about_forests/deforestation/ o Hilderman, R. (2010, December 27). The Effect of Deforestation on the Climate and Environment. *Mother Earth News*. Retrieved April 15, 2014, from http://www.motherearthnews.com/nature-and-environment/the-effect-of-deforestation-on-the-climate-and-environment.aspx#axzz2zWPbVG5o • Grand Banks Fishery Collapse o Cod. (n.d.). World wildlife foundation. Retrieved April 15, 2014, from http://wwf.panda.org/what_we_do/endangered_species/cod/ • Dams o Megadams: Pros, cons, and consequences (n.d.). In UIUC. Retrieved April 18, 2014, from http://classes.geology.uiuc.edu/05SprgClass/geo497/Class%2013%20/Big%20Dams.htm

4.Teacher will review each of the groups' posters and presentations as well as each student's exit paragraph. The teacher will reflect on how the unit went, and if there is anything else that needs to be covered or reviewed for students.	Students will write an short R.A.F.T. about their opinion on one of the following topic: Role: Journalist Audience: Friends and Family Format: Blog Post Topic: (choose 1, 2, or 3) 1. If it were proposed that a dam should be built in Michigan (in their city), would you vote yes or no? 2. More cities are wanted in your region of Michigan and law makers want to convert forest area and farm land into housing developments - do you agree with this decision? 3. The Great Lakes have been named the greatest fishing areas to visit - would you want to create a law to limit the number of fish taken out each year? Why or why not? Specifically, the use technology needs to be mentioned and the effects on the environment that could come as a result of whichever technology topic is chosen. In addition, the changes to other environments (outside of Michigan or the city they live in, depending on which topic is chosen) or communities will need to be included.	• Paper • Writing utensil

6. Resource Attachments, labeled A, B, C, D, …

Attachment A -
A Script for Vocabulary Development

Vocabulary Terms:
1. Environment
2. Atmosphere
3. Biosphere
4. Lithosphere
5. Hydrosphere

Step 1
Provide a description, explanation, or example of the new terms.

Environment -
Give the definition for environment: the area in which something exists or lives; everything in the world around us which can affect our lives. Ask students for any of their own definitions of what their environment is. Hold up the environment card when you have read the dictionary definition and listened to student discussion on the environment of the world.

Biosphere -
Instructor:"Now we're going to look at at the environment with a different model"
"Someone give me a step for making a campfire"
Possible student answer: "wood"
Instructor: draws the part that students say as the conversations goes. The white board or chalk board will end up with a campfire drawn and labeled with kid friendly terms and new vocal, too.
Instructor: "okay, and wood is from trees and trees are living right?" "so we'll draw the wood and label it living thing, but we're going to start calling the living part of the atmosphere the biosphere".

[Hold up biosphere word wall card and put it on the word wall]

Lithosphere -
"What else can you think of? Where are campfires? on lakes, on boats, on the ground?"

Possible student answer: "land" or "dirt".
Instructor: "things that are part of the actual earth such as the ground, dirt, and rocks, we will title lithosphere:
[Hold up lithosphere word wall card and put it on the word wall]

Atmosphere -
Instructor: "what else makes up a campfire..when you think of a campfire, what do you picture?"
Possible student answer: "smoke"
Instructor: "and smoke is in the air, correct? So we'll draw some smoke coming off of our wood and flames and label it as: 'in the air'. Now, everything we have in the air will be in the atmosphere category." [Hold Atmosphere Card up/place it on word wall]
Show this video: Atmosphere video: http://education-portal.com/academy/lesson/major-components-of-the-atmosphere-their-effect-on-ozone-depletion.html#lesson

Step 2
Ask students to restate the description, explanation, or example in their own words.
Students have discussed that smoke comes from a campfire and is in the air (atmosphere) and now they have watched a video on the atmosphere and everything that it is made up of. In their foldables, students will be instructed to make their own definition, one that they will understand the next day or next week if they need to come back to it.

Instructor: "Now that we know more about the atmosphere and its make up, let's create our own definitions. How could you explain it to a younger sibling, maybe?"

Step 3
Ask students to construct a picture, symbol, or graphic representing the term.
Instructor: "since we have made our own definitions, how about a picture to remind us what the term means in a more visual way." Ask for student examples or draw a chimney with smoke as an example if there is confusion with what to do.

Hydrosphere -

Step 3
Ask students to construct a picture, symbol, or graphic representing the term.

Instructor: "Now, for the last of the four categories, what do we put the campfires out with?"
S**tudent answer**: "water"

Instructor: "The water, including lakes, rivers, and rain are part of the hydrosphere."
[Hold up hydrosphere word wall card and put it on the word wall]

Instructor: "On your foldable, in the hydrosphere tab, go ahead and draw a picture that will help you remember what the hydrosphere includes"

Step 4
Engage students periodically in activities that help them add to their knowledge of the terms in their notebooks/foldables.
Solving analogy problems: Attachment D.

Instructor: "To keep all of these categories straight, we are going to keep adding examples to our layered look book foldables. The analogies that you are currently solving should be written on the back of your foldable." Students are to discuss with their neighbors about which terms they chose to fill in the blanks and how others can have different examples and still be correct. Students will be asked to create on of their own analogies and switch with a partner to solve each other's.

Step 5
Periodically ask students to discuss the terms with one another.

Two poems (Attachment B and Attachment C) will be given out to pairs of students. They are to carry out a Think, Pair, Share. First, they will read one of the poems and then with with their partner. Individually, students will think about which lines of the poem would fall under which of the four categories of the environment. Then, they will share their thoughts with their partners. Lastly, as a class, a discussion will take place on what students were thinking all together about how the poem could be categorized into the different parts of the environment.

Step 6
Involve students periodically in games that allow them to play with terms.
Vocabulary Charades:
This is a great way to get students up out of their chairs and moving around. Students will be asked to get into groups of 5 or 6 and each student will get a turn at least once. One at a time, students are to act out (without speaking or lip moving) one of the terms or examples that go with one of the terms and the other students in the group will guess what they are pretending to be or gesturing at in order to move onto another person.

Attachment B -

Give a Man a Bulldozer

Give a man a bulldozer, [bio]
He'll fill the lake with muck, [litho, hydro]
A thousand years it was running clear,
But now it's running out of luck.

Give a man a bulldozer,
He'll shove the soil away,
A thousand years of careful loam
He pushes it down into the bay.

Give a man a bulldozer,
He sees a little glen,
It's nice with falls and fern and buds
And bugs and gentle violets, and then--

Give a man a bulldozer,
Made of fire and steel,
He'll make the whole world reel and rock,
He'll end up buried in the muck,
With the bulldozer on top.

-Malvina Reynolds

Attachment C -

Awareness

Broken bottles and charred pieces of glass
Wadded up newspapers tossed on the grass
Pouring of concrete and tearing out trees
This is the environment that surrounds me?

Poisons and insecticides sprayed on our food
Oceans filling with thick oil crude
All sea life destined to a slow awful doom
These are the things we are to consume?

Mills pumping out iron expelling yellow fumes
Airlines emitting caustic gases from fuels
Weapons of destruction tested at desolate sites
And this is the air that's to sustain life?

There has to be something that someone can do
Like raise the awareness to those around you
That if we don't heed the problem at hand
It's your life that's at stake, the destruction of man.

-Sylvia Stults

Attachment D -

1. Air is to atmosphere as water is to _____.

2. _____ is to lithosphere as plants are to biosphere.

3. Smoke is to river as _____ is to hydrosphere.

4. Humans are to biosphere as plants are to _____.

5. Living things are to _____ as mountains are to lithosphere.

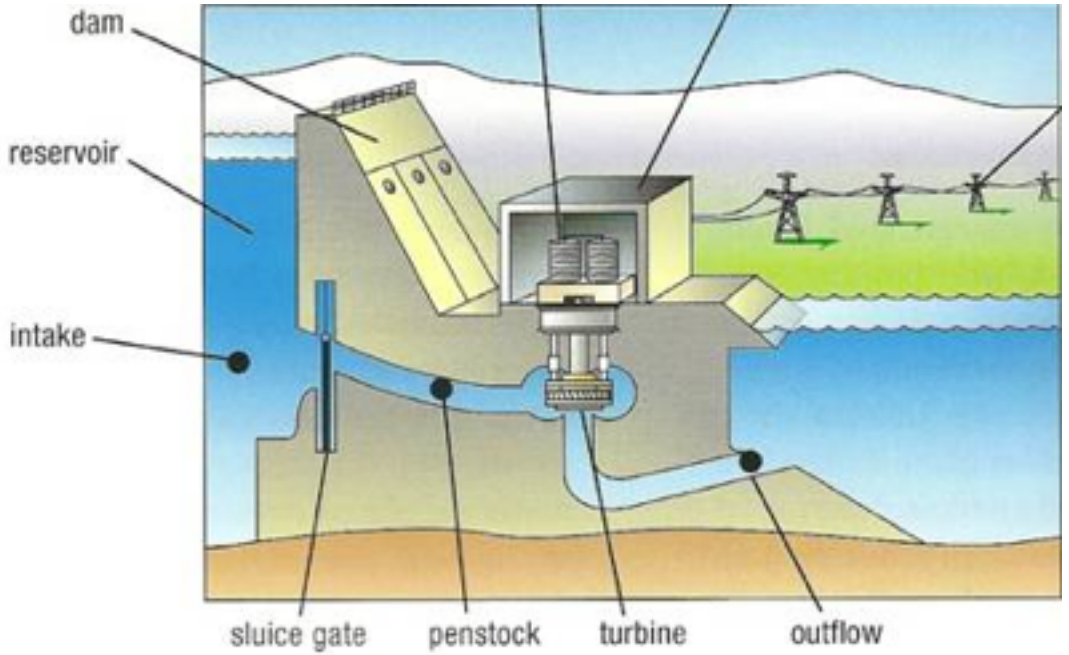
Attachment E -
5X5 image:

Attachment F -

Typical water use at home

Bath	A full tub is about 36 gallons.
Shower	2 gallons per minute. Old shower heads use as much as 5 gallons per minute.
Teeth brushing	<1 gallon, especially if water is turned off while brushing. Newer bath faucets use about 1 gallon per minute, whereas older models use over 2 gallons.
Hands/face washing	1 gallon
Face/leg shaving	1 gallon
Dishwasher	4 to 10 gallons/load, depending of efficiency of dishwasher
Dishwashing by hand:	20 gallons. Newer kitchen faucets use about 2.2 gallons per minutes, whereas older faucets use more.
Clothes washer	25 gallons/load for newer washers. Older models use about 40 gallons per load.
Toilet flush	3 gallons. Most all new toilets use 1.6 gallons per flush, but many older toilets used about 4 gallons.
Glasses of water drunk	8 oz. per glass (did you remember to drink your 8 glasses of water today?)
Outdoor watering	5 to 10 gallons per minute

Attachment G -



Attachment H -

Benefits of dams	
Water storage	
Flood control	Floods affected the lives of 65 million people between 1972 and 1996.
Irrigation	Dams contribute to 12-16% of world food production.
Electrical Power Generation	19% of the worlds total electricy supply, in 150 countries. 24 countries depend on dams for 90% of their power supply.
Industrialization	
Increased croplands	
Improved navigation	Stabilized annual flows
Improved domestic water availability	In 1990, over a billion people had access to less than the minimum required of 50 litres per person per day.
Recreation	Fishing cab be improved esp. in lakes but also in rivers with introduced species, leisure (e.g., boating on lakes, extended rafting season on the Colorado River)
Ecological	Increased riparian vegetation if dam discharges are steady

CONS OF DAMS

Ecological disruption	Fragmentation of 60% of the worlds rivers; Disruption of movement of species (e.g., destruction of up to 75% of riparian bird species on the Colorado) Destruction of riparian vegetation if discharges are irregular, e.g., peak-power of flood control types of operations; loss of beaches and marshes
Seepage and evaporation	15% for Nile system
Groundwater table effects	
Sedimentation behind dams	
Erosion downstream by sediment-starved waters	
Flucuation vs. steady releases	Flucuations strand fish, reduce habitat for larval native fishes; deny access to tributaries;
Clogging of rivers by side-canyon floods	Peak floods required to clear channel may be eliminated

Attachment I

The Human Population (including land development:

Possible reading:

Sand Dollars

Examining the Benefits and Drawbacks of Land Development in the Bahamas

http://www.nytimes.com/learning/teachers/lessons/20000301wednesday.html)

A. When the human population was smaller, people lived in small communities, so the effects of their activities were small and localized. A rapid increase in the human population and an increase in the standard of living have lead to widespread damage of the environment.
B. Raw materials, including non-renewable energy resources, are rapidly being used up.
C. More waste is being produced and unless this is properly handled it will cause more pollution.
D. Humans are destroying habitats and reducing the amount of land available for other organisms by building, quarrying, farming and dumping waste.
E. Human activities are polluting water, air and land.

Farming

A. Modern day farming affects the environment in many ways.
B. Hedgerows are often removed to allow the use of large machinery which makes crop growing more economic.
C. However, this destroys habitats and upsets the feeding relationships in food webs.
D. Farmers use pesticides to kill pests such as weeds, insects and rodents. They increase food production but can kill other wildlife. They also contaminate food for human consumption.
E. Pesticides may be washed into water supplies and contaminate drinking water.
F. Fertilizers are used to add nutrients to the soil to improve plant growth.
G. These can also be washed out of the soil into lakes and rivers and can pollute drinking water supplies.

The Greenhouse Effect

A. The greenhouse effect is caused by pollutant gases building up in the atmosphere and preventing heat from escaping to outer space at night. As a result the earth is gradually getting warmer, this is called global warming.
B. The main greenhouse gases are carbon dioxide and methane .
C. The levels of these gases in the atmosphere are slowly rising.
D. Carbon dioxide is produced when fossil fuels are burnt.
E. Methane is released by cattle and from rice fields.

F. An increase of only a few degrees Celsius may cause big changes in the Earth's climate, upsetting weather patterns and affecting the types of crops that can be grown in different parts of the world.
G. Polar ice caps may melt, causing the sea level to rise.

Acid Rain

A. Burning fossil fuels may also produce sulfur dioxide and nitrogen oxide gases.
B. These gases rise up in the atmosphere from factories, power stations and vehicles and dissolve in the water in clouds forming acid. This falls as acid rain.
C. Acid rain can damage trees directly.
D. If the water in rivers and lakes becomes too acidic plants and animals cannot survive.
E. Acid rain also damages buildings.

Other Pollutants

A. Sewage pollutes the sea and fresh water, unless it is treated properly.
B. This is a health hazard, but it also upsets the balance of organisms living in the water.
C. Toxic chemicals are released from industrial plants and by farmers. These can pollute the land and water.
D. Some toxins can accumulate along food chains until the top predator has very high, often lethal, amounts in its body.

7. Citation Page

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