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Radical Rainforest

Abstract:

This lesson will serve as an introduction to a mini unit on forests. This particular lesson will focus on rainforests and the four different layers that make up a rainforest. During this lesson students will be going to a variety of different centers such as computers and an art center. By the end of this lesson students will have a greater knowledge and understanding about what makes up a rainforest.

Grade Level: 3rd

Utah State Core Curriculum Standards:

Benchmark

- For any particular environment, some types of plants and animals survive well, some survive less well and some cannot survive at all. Organisms in an environment interact with their environment. Models can be used to investigate these interactions.

Standard

- Students will understand that organisms depend on living and nonliving things within their environment.

Objective

- Classify living and nonliving things in an environment.

Instructional Time: 1 Hour

Materials:

- Tent
- Decorations of plants, animals, and etc.
- Rainforest CD
- Humidifier
- Rainforest Literature
- Computers
- Layers of Rainforest Recording Sheet
- Art Materials such as: posterboard, glitter, markers, feathers, paint, etc.
- Science Lab Notebook

Terminology:

- Emergent Layer – The emergent layer towers about 200 feet above the forest floor with trunks that measure to be up to 16 feet around. Most of these trees are broad-leaved,

hardwood evergreens. Sunlight is plentiful up here. Animals found are eagles, monkeys, bats and butterflies.

- Canopy – This is the primary level of the forest and forms a roof over the two remaining layers. Most canopy trees have smooth, oval leaves that come to a point. It's a maze of leaves and branches. Many animals live in this area since food is abundant. Those animals include: snakes, toucans, and treefrogs.
- Understory – Little sunshine reaches this area so the plants have to grow larger leaves to reach the sunlight. The plants in this area seldom grow to 12 feet. Many animals live here including jaguars, red-eyed tree frogs and leopards. There is a large concentration of insects here.
- Forest Floor – It is very dark down here. Almost no plants grow in this area, as a result. Since hardly any sun reaches the forest floor things begin to decay quickly. A leaf that might take one year to decompose in a regular climate will disappear in 6 weeks. Giant anteaters live in this layer.

Intended Learning Outcomes:

- Demonstrate a sense of curiosity about nature.
- Voluntarily read or look at books and other materials about science.
- Report observation with pictures, models, and sentences.
- Use available reference sources to obtain information.

Background Information:

The emergent layer is where the tallest trees are found. These trees get a lot of light, but wind can be a big problem sometimes. The tall trees make great perches for eagles and other predatory birds.

The canopy is where there is a thick growth of tall trees that take most of the light that makes it past the emergent layer. The branches at this level seem to touch filling in any space where light could fall to the other two layers. Many of the animals in the rainforest live in the canopy eating fruit, flowers, and leaves. Meat eaters will be found in this section as well as to prey on the animals in this section.

In the understory there are small trees, shrubs, and bushes. These plants have learned to adapt to their surroundings by growing large, tender leaves in order to capture as much light energy as they can. At this level there are lots of fragile amphibians that enjoy the humid atmosphere.

The forest floor only receives two percent of the light that falls from the canopy. There are not many plants down here. The floor consists of dead leaves, twigs, animals, and fallen fruit. There are a few animals that live on the forest floor such as wild pigs. At this level the world is a dim and easy place to live in.

http://curriculum.calstatela.edu/courses/builders/lessons/less/biomes/rainforest/tropi_rain/rain.html

Invitation to Learn:

1. The day before, prep the students by telling them that the class will be taking a trip to an exotic location. Tell them where we are going, but describe the climate, animals, plants that live where we are going.

2. Before the students enter the room, decorate the room to model the rainforest. Hang cut-outs of animals and trees all over the room and ceiling. Have a tent set up in the corner of the classroom. The tent will be called "The Radical Rainforest". A humidifier will be placed in the

tent to create a "wet" feeling of how a rainforest really feels like. Have various rainforest books around the class in order for the students to read more information on the rainforest.

3. When the students enter the classroom, have a CD playing different noises of a rainforest--bird calls, waterfalls, animal cries, and rain showers.

Prior Knowledge Assessment:

Allow the students to walk around the room and observe at the pictures, decorations, and books that are around the room. Answer none of the questions that are asked by the students. Ask the students to predict what they think our lesson is going to be about today. Instruct the class to climb in the canoe (a taped off area shaped like a canoe) and pretend that they are traveling to an exotic land. Let the students ask questions at this time to try to figure out where they are traveling to. Also ask the students questions to see what they already know and what they would like to know about rainforests. Ask the students to predict what the word strata means. Ask the students to predict how our topic today ties in with living and nonliving organisms.

Procedures:

1. Ask the students to enter "The Radical Rainforest" where instruction will begin. The students will sit in the tent and begin the lesson.

2. At this time, present the class with the layers of the rainforest. Instruct the students that the word strata means layers. A discussion will follow about the different layers of the rainforest using visuals such as a picture. Included in the discussion is the topic of living and nonliving organisms. Make sure the students can differentiate between the layers as well as living and nonliving organisms.

3. Also while in the tent bring up the different centers that the students will be going to, the centers are mentioned in the following sections.

4. The first center is the “Canopy of Computers.” Here the students will use the Internet and visit websites that deal with the rainforest to further their understanding of the layers of the rainforest. Students will go to the website that follows and follow the directions listed. http://www.uen.org/utahlink/activities/view_activity.cgi?activity_id=16687

5. The second center is the “Magical Books of Forests.” Here the students will look at different books about the animals in the rainforest. Students will find one animal they are interested in and write interesting facts about the animal and why he or she likes that particular animal. If students finish early they may work on a word search.

6. The third center is the “Creation Station.” Students will create an advertisement poster advertising a trip to the rainforest. Students should put information concerning why people should visit as well as interesting information about the rainforest. Students should also talk about the living and nonliving organisms that may be found in the rainforest.

7. Students will be assigned which center they will start at and then rotate from there. After all the students have been to each center students will travel back to the “Radical Rainforest” were

students may share their posters as well as a favorite animal they found or anything they found interesting.

Adaptations and Modifications for Special Learning Needs:

- Animal Books on Rainforests will be available in different languages.
- Students with a lower reading ability will be partnered with a strong reader.
- Students with special needs may only complete one center that they want to do.

Assessment:

- Students will have completed an "Activities" assignment while at the "Canopy of Computers" that will be recorded in their science notebook
- Students will have completed a paper on a favorite animal to be handed in at the "Magical Books of Forests."
- Students will have created a poster selling a trip to the rainforest at the "Creation Station."
- Students will write down at least four different items that they found to be living and four that are nonliving in their science notebook.
- Students will journal about their experience in the rainforest

Extensions:

- The next day give the students a little quiz on the different layers of the rainforest as well as living and nonliving organisms.

Resources:

http://curriculum.calstatela.edu/courses/builders/lessons/less/biomes/rainforest/tropi_rain/rain.html
http://www.srl.caltech.edu/personnel/krubal/rainforest/Edit560s6/www/whlayers.html
http://www.teachers.net/lessons/posts/1705.html

Rainforests

Welcome students! Today we are going to go on an adventure through the rainforest and learn about the different layers within. Another important word that will describe the different layers in a rainforest is the word strate so keep a sharp eye out for that word.

Discover the rainforest at night!

At this website you will discover that the rainforest is teaming with life during the night.

1. Once you are at the site read the introduction and than click explore.
2. A second window should have opened up. In the bottom right-hand corner you will see the words "To Canopy" and "To Forest Floor" click on forest floor until you find the bearded pig and click on him.
3. Another window should have popped up. Read about the bearded pig and answer this question in your science notebook, "Describe what bearded pigs eat."
4. Close the bearded pig window and click on to canopy until you find the flying fox bat. Answer this question, "Describe the importance of the flying fox bat's tongue."
5. Close the flying fox bat window and find either another animal or shrubbery that is interesting, read about it and write down one new thing you learned.

Strata of the Tropial Rainforests

At this website you will learn more in-depth about the four different layers that make up the rainforest.

1. Search through this webpage and answer the following questions in numerical order.
2. What is another word for strata?
3. What is the name of the lowest of the strata of the rainforest?
4. What is the name of the next layer, the dark cool zone above the ground but under the leaves?
5. What is the name of the rainforest stratum that includes leafy tree environments and the tree tops?
6. Name two rainforest strata that receive the most sunlight.
7. Name two rainforest strata that receive the least sunlight.
8. In which rainforest layer do most of the large animals live?
9. In which rainforest layer do many bird, like the toucan, live?
10. Which is the tallest rainforest zone?

Elements of the Rainforest

At this website you will learn more about the different strata or layers of the rainforest.

1. Once you are at the website please click on the link to forest floor. Read about the saddleback caterpillar and tell me why you think this insect got its name saddleback.
2. Read about one other insect and tell me one interesting fact about the insect.

3. Now click on section beginning at the bottom of the web page. Now click on visit the canopy. Answer this question, "What are the different ways trees support their height in the rainforest."
4. Click on section beginning at the bottom of the web page. Now click on visit the understory. Now answer this question, "What are three different categories of life found at this level?"

Rainforest Terms

E F S F X B F T L H N Z P X J
U U L W Y O N A I D B R N U V
J W J O R R C O X D E C Y H Q
Y P Y E O I O D R C K R T Z E
M Z S M P D I T I O O L I K T
P T Z O V U E P S P O Z H A L
C K R Y H V I D Y R B L I T L
A T C W E T Q J S C E U F M A
N T A T A R T S X R Z D D O F
O R L T E M E R G E N T N K N
P O I T S E R O F N I A R U I
Y O E O J E B Y W V U R F X A
N S S B O R J I O C Z Z G H R
O U O P F T K E L V G W C A P
M N D I G Q V Q H R N H I A L

CANOPY
EMERGENT
FLOODED
FLOOR
FOREST
PRECIPITATION
RAINFALL
RAINFOREST
STRATA
TREE
TROPICAL
UNDERSTORY

12 of 12 words were placed into the puzzle.

Radical Rainforest

Teacher Name: **Mrs. Sarah**

Student Name: _____

CATEGORY	4	3	2	1
Quality of Information	Information clearly relates to the main topic. It includes several supporting details and/or examples.	Information clearly relates to the main topic. It provides 1-2 supporting details and/or examples.	Information clearly relates to the main topic. No details and/or examples are given.	Information has little or nothing to do with the main topic.
Internet Use	Successfully uses suggested internet links to find information and navigates within these sites easily without assistance.	Usually able to use suggested internet links to find information and navigates within these sites easily without assistance.	Occasionally able to use suggested internet links to find information and navigates within these sites easily without assistance.	Needs assistance or supervision to use suggested internet links and/or to navigate within these sites.
Time and Effort	Class time was used wisely. Much time and effort went into the planning and design of the poster. It is clear the student understands the topic of Rainforest.	Class time was used wisely. Student could have put in more time and effort designing.	Class time was not always used wisely, but student did do some work.	Class time was not used wisely and the student put in no additional effort.

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Fall, 2005

"Competing Agendas"

Abstract: In this lesson, students will synthesis and discuss various issues pertaining to the forest biomes (concentrating primarily on the North American forest ecosystem). Students will examine current events using newspapers, magazines and on-line resources to learn about and determine various factors, governments, and people who compete for the natural resources these forests provide. Students will formulate questions and opinions in the course of their research that will be used to role-play and debate in a "town-hall" format before council members.

Grade Level: 3rd Grade

Time allotment: Two 45 minute class periods

Science Benchmark: For any particular environment, some types of plants and animals survive well, some survive less well and some cannot survive at all. Organisms in an environment interact with their environment. Models can be used to investigate these interactions.

Utah State Core Objectives:

Science: Standard II: Students will understand that organisms depend on living and nonliving things within their environment.

Objective 2: Describe the interactions between living and nonliving things in a small environment.

- Predict the effects of changes in the environment on a living organism
- Pose a question about the interaction between living and nonliving things in the environment that could be investigated by observation.

Other Core Standards and Objectives:

Social Studies Standard 1: Students show how environments and communities change over time through the influence of people

Objective 1: Predict how human activity will influence environments

- Describe various environments (forests)
- Identify the influence of people on the environments and environments on people
- Describe changes in environments caused by inventions

Fine Arts/Theater: Standard 2: Students will cooperate, imagine, and assume roles, explore personal preferences and meaning

Objective 3: Develop emotional recall

Objective 4: Develop ability to listen to and observe others

Personal Objectives/Rational:

- Students will research various aspects of the forest ecosystem and determine the characteristics that define a healthy environment.
- Students will select and develop a role in a problem-solving context
- Students will understand how human populations have affected the forest ecosystem and observe the changes that have taken place in these regions due to human impact.
- Students will analyze, problem-solve, predict, think critically, and communicate their findings regarding forest ecosystems and the various factors that contribute to the health, preservation or use of these natural resources.

Intended Learning Outcomes:

1.Use Science Process and Thinking Skills
- Use simple predictions and inferences based upon observation
- Compare things and events
- Use observations to construct a reasonable explanation

2. Manifest Scientific Attitudes and Interests
- Pose questions about objects, events, and processes

4. Communicate Effectively Using Science Language and Reasoning
- Use available reference sources to obtain information

Materials:

- text book/computers/newspapers for research
- pens/pencils
- paper
- maps
- journals
- tables and chairs
- gavel or bell for attention-getting
- picture-book: *Sierra*, by Diane Siebert.

Terminology:

Biome: A major ecological community type (i.e.; grasslands, forests, etc.)
Conflict: Mental struggle resulting from incompatible or opposing needs, desires, or demands
Debate: To discuss an issue or a question by considering opposing arguements
Ecosystem: The complex of a community and the functioning of it as a unit
Endangered species: A species of plants or animal life threatened with extinction.
Primary danger: Principle threats to an ecosystem
Role-play: To assume a part or character and act out or dramatize feelings and events
Town meeting: A meeting of town inhabitants or taxpayers constituting the legislative authority of a town.

Background Information: Throughout the United States-- forests, wooded areas and scattered trees and groves have provided food, fuel, medicines, filtered water, shelter and building materials throughout history. Just as in other parts of the world, however, these regions become more threatened as human populations and their increasing needs expand.

What is a forest? Forests are defined as land areas "dominated by trees where the tree canopy covers at least 10% of the ground area." Forests cover appx. 25 % of the Earth's land surface, excluding Antarctica and Greenland. (Earthtrends, 2001) Some people estimate that before people began clearing forests for agriculture, forests covered 20 to 50 % more land than they do now. In the U.S., much of the remaining forest is being designated as wilderness, and outside Alaska, only 8% of this land qualifies.

All over the world, forest ecosystems are disappearing and with them we lose valuable plant and animal life, healthy top soil for growing, and water sheds are increasingly threatened. In the northern hemisphere, environmental issues like acid rain and other pollutants are taking their toll. Humans lose their aesthetic and recreational opportunities. However, in areas where forests have been managed to some degree, (parts of the U.S. and Western Europe) some forests are increasing as deforested areas are replanted or allowed to regenerate.

What is the primary danger? The principle threat to the forest ecosystem comes from logging, mining, fragmentation by roads and other forms of infrastructure, and clearance for agriculture. In addition, with roads and human settlement, hunting and poaching increases, and endangered species are put at risk.

**Students will be role-playing in this activity and they should have some sort of idea about the "town meeting" format used in local government. To do this, I will ask students what they know about how laws are made in a community and what branches of government make these laws. We will talk briefly about the role of a judge or a community council that decides important issues that affect citizens. We will recreate a "town meeting" in the classroom, lining up desks and chairs to resemble what a town meeting might look like.

Invitation to Learn:

I will read the students a storybook, *Sierra*, by Diane Siebert. This is a wonderful poem about the Sierra Nevada Mountains, and describes the wildlife, plants and natural resources found there. The author warns the reader about the dangers to the ecosystem due to the demands of mankind. This book will be used to facilitate a class discussion about this "warning". I will ask the students what they think is the meaning of the authors message. Is the threat just to the Sierra Nevada's or could this apply to all the forests on earth? I will take a class survey, by the show of hands, asking how many students have had an opportunity to spend time in a forest and to describe for others what they did there. After a brief discussion of these experiences, I will then read a newspaper article that pertains to the destruction of forest land and the effects of this on the surrounding community. This will be a great way to create an emotional response and invite students to learn more about the "competing agendas" for natural resources.

**Alternatively, if your school borders a forest ecosystem, you could take a walking field trip to investigate the ecosystem. Provide students with an observation sheet to record their impressions, or they could use a "nature journal" complete with sketches as they tour the area.

Prior Knowledge Assessment:

K-W-L Chart: I will post a large sheet of butcher paper on the board and divide it into three columns. I will label the first column with a K (what we know), the second column with W (what we wonder or want to learn more about), and the last column with a L (What was learned).*This chart will help me know where my students are in their understanding of forest biomes*. The previous lessons on the rain forest will help us segue to the forests found in America, because the issues about resources are the same. Students will need to consider the differences of plant and animal species, climate, precipitation, geology and landscape.

Procedures:

1.Students will be divided into groups of 3 or 4 and be assigned topics to research (ex:, logging interests, mining claims, water shed management, developers, environmentalists and recreation enthusiasts). They will come up with arguments for staking claim on the forest land.

2. After students have researched this topic using the text-book, newspapers, and computer resources, they will come up with at least one important reason for why their group should take precedence over the others for the control of this land.

3. Three students will be chosen to represent the community council members who will be deciding the issues. They will sit behind the desks as groups of "citizens" come before them to argue their point. Each group will have 5 minutes at the stand. In the end, the council members will weigh the arguments and make a decision about the use of the land.

4. Closure: After students have role-played and reached a group decision, they will go back to their desks and write a reflection on their experience. Questions to consider include the following ideas:

- What will future generations think of our actions today?
- What kinds of responsibilities do we have towards people in the future as we manage the forests today?
- What would you like to see happen?

Adaptations/Modifications:
Rather than role-play, students can present their findings in another format, such as making posters or creating a power-point presentation. Students with special needs can contribute by taking on non-speaking roles. They may draw a picture for the group to use in their role-play, examples of plant life or endangered species. Other ideas include: writing a story or poem about the forest and all that might be found there, compiling a weather chart, etc.

Assessment: I will assess the accurate information found in their research and how much they contributed to the activity. Were their arguments meaningful and concise? Did they change their opinions or viewpoints, etc. Did the students make a connection of how nonliving things, like housing developments or forest fires, interact with living things in the forest environment? How will mining interests (*nonliving*) be managed to ensure the least damage to trees and wildlife (*living)* as possible. I will write questions like these on the board that students will need to address in their overall reflection (**See questions above for more ideas).Students will also complete a self-reflection.

References:

www.uen.org

Siebert, D. Sierra. USA: Wendall-Meyer, 1991

http://www.pbs.org/earthonedge/ecosystems/forests1.html

http://sftrc.cas.psu.edu/lessonPlans/Forestry/WalkWoods.html

www.umnh.utah.edu/museum/Education/Downloads/Biology/Biology

http://www.usoe.k12.ut.us/curr/science/core/4th/4thSciber/enviro/html/biomepro.htm

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Terrarium ecosystems

Abstract: Students will learn how to make an ecosystem that represents a forest in a terrarium. In an introductory lesson the students learned about the ecosystem in different types of forests and we will recreate the forest in a terrarium using the same elements. Creating terrariums help students understand how creatures depend on living and nonliving things.

Grade Level: Third

Utah State Core Curriculum:

Science Benchmark: For any particular environment, some types of plants and animals survive well, some survive less well and some cannot survive at all. Organisms in an environment interact with their environment. Models can be used to investigate these interactions.

Standard II: Students will understand that organisms depend on living and nonliving things within their environment.

Objective 2:

a. Describe the interactions between living and nonliving things in a small environment. Identify living and nonliving things in a small environment (e.g., terrarium, aquarium, flowerbed) composed of living and nonliving things.
b. Predict the effects of changes in the environment (e.g., temperature, light, moisture) on a living organism.
c. Observe and record the effect of changes (e.g., temperature, amount of water, light) upon the living organisms and nonliving things in a small–scale environment.
d. Compare a small–scale environment to a larger environment (e.g., aquarium to a pond, terrarium to a forest).
e. Pose a question about the interaction between living and nonliving things in the environment that could be investigated by observation.

Instructional Time: About an hour to make the terrarium and another hour lesson after the terrarium is made. (Might want to break this down to two thirty minute lessons on two days)

Materials:

- containers for terrariums
- soil
- plants
- seeds

- stones and sticks
- leaf letter
- spray bottles
- small creatures
- hand lens

Terminology: These words will be introduced as vocabulary for their spelling test.

- **Environment:** The totality of circumstances surrounding an organism or group of organisms, especially: The combination of external physical conditions that affect and influence the growth, development, and survival of organisms.
- **Interaction:** Any of four fundamental ways in which elementary particles and bodies can influence each other, classified as strong, weak, electromagnetic, and gravitational.
- **Living:** Having life; living. Dwelling or inhabiting; often used in combination; "tree-living animals".
- **Nonliving:** Not having or characterized by life.
- **Organism:** An individual form of life, such as a plant, animal, bacterium, protist, or fungus; a body made up of organs, organelles, or other parts that work together to carry on the various processes of life.
- **Survive:** To remain alive or in existence. To live, persist, or remain usable through: i.e. plants that can survive frosts.
- **Observe:** To be or become aware of, especially through careful and directed attention; notice. To watch attentively. To make a systematic or scientific observation of.
- **Terrarium:** A small enclosure or closed container in which selected living plants and sometimes small land animals, such as turtles and lizards, are kept and observed.
- **Temperature:** The degree of hotness or coldness of an environment.
- **Moisture:** Diffuse wetness that can be felt as vapor in the atmosphere or condensed liquid on the surfaces of objects; dampness. Wetness caused by water.
- **Small–scale:** limited in size or scope, "a small-scale model".

Intended Learning Outcomes:

1. Use Science Process and Thinking Skills.

a. Observe simple objects and patterns and report their observations.
b. Make simple predictions and inferences based upon observations.
c. Conduct a simple investigation when given directions.
d. Develop and use simple classification systems.
e. Use observations to construct a reasonable explanation.

2. Manifest Scientific Attitudes and Interests.

a. Demonstrate a sense of curiosity about nature.
b. Pose questions about objects, events, and processes.

4. Communicate Effectively Using Science Language and Reasoning.

a. Record data accurately when given the appropriate form and format (e.g., table, graph, chart).
b. Report observation with pictures, sentences, and models.
c. Use scientific language appropriate to grade level in oral and written communication.
d. Use available reference sources to obtain information.

Background Information: Forests are an important resource. Many children are unaware of how important they are and why. It is important to talk to the students about why we need forests. Who else besides us, needs forests to survive? (bugs, birds, animals, plants, and trees)

What is an ecosystem? An ecosystem is a community of organisms (such as plants, animals and bacteria) interacting with their environment. A forest is an example of an ecosystem. It includes trees, soil, rocks, water, air, all plant and animal life, and climate. Also talk about the different types of forests and where they are located. Do you find different ecosystems in these different types of environments?

Forests can be described in three layers. A.) The canopy which is the coverage the large trees provide. B.) The field layer which is all the shorter plants that grow up from the forest floor i.e. shrubs, and fallen pine cones. C.) The ground layer which are plants that stay on the ground i.e. moss and ivy.

It might be a good idea to talk a forest walk, or if there aren't any forests in your area find a picture or websites to look at for more details about forests. This is a good time to introduce good observational skills, and how to record their data.

For detailed information about what creatures to use and how to make a terrarium visit these websites:

http://www.uen.org/lessonplan/upload/9683-3-12707-Creature_Info.pdf

http://www.uen.org/lessonplan/upload/9683-3-12708-Terrarium_Aquarium_Info.pdf

Invitation to learn: Choose a small creature like a cricket, potato bug, snails, or worms, for your students to observe. Encourage students to write down what they think they know about their creature and what they would like to learn. Ask students to think about what nonliving things and living things their creature will need in its environment to survive? List their ideas on the board and discuss ways of providing those needs for their creatures. I will use the website activities to get the students emerged in the information about forest ecosystems. Each student will need to go to this website http://www.uen.org/utahlink/activities/view_activity.cgi?activity_id=16691 and complete all the questions for each web activity listed. This will help each student to gain knowledge about forests and the ecosystems within them.

Prior Knowledge Assessment: The website activity listed above will utilize the students' prior knowledge and there is enough information on the sites that should get everyone on the same page. Also, including some of the background information listed above to make sure all the students know all the information they will need. Doing it as a whole group and writing the students answers on the board will let those who already know about the terminology share that with others, and help introduce it.

Procedures: The class will be constructing an environment for the creatures that we discussed earlier. Each pair of students will get one creature and create one terrarium per group. The whole class will observe the same kind of creature using different ecosystem elements. Each group of students will state a hypothesis about what they think will happen to their creature based on the elements in their terrarium. Each group will decide what to use based on their knowledge of forest ecosystems. Each group will be assigned a different condition. Some groups will have lots of sun; while others will have lots of shade etc…They will observe and compare their results to the class.

Taking the class outside to look for places they think their creature might live. Students may also collect a few items such as sticks, rocks, plants, leaf litter, or soil to put in their environments.

Demonstrate what methods the students will use to construct their environments. In fact it might be a good idea to have the students work outside. This will make clean up much easier if dirt happens to get spilled. If outside is out of the question, then spreading newspapers to protect student's work surfaces will work just fine.

Step 1: Select a container. Containers can be made from any type of enclosure that has a removable lid. The lid needs to have small holes poked in it for air or a screen. The containers need to be clear so the students can observe what is in it. Examples of materials to use are plastic peanut butter jars, 2-liter pop bottle, or large terrariums can be made out of glass aquariums.

Step 2: Putting in soil. Any potting soil or soil the student collects can be used. It might be a good idea to mix both about 50-50. A small layer of gravel from the playground should be placed under the soil to help drain water.

Step 3: Planting the plants. What type of plants the students place in their terrarium depends on what condition they have been assigned too. If the area they are testing is shady, then good shade plants need to be used. If the area gets lots of water, then water resistant plants should be used. If the student wants to study the ground layer of the forest they might want to use moss, and decaying leaves and/or compost material. Depending on the amount of time, the plants can be planted as seeds, or transplanted as established plants.

Step 4: Adding water. The terrarium should stay moist for the best growing/maintaining conditions. If too much water is added, leave the lid off for a few days to help dry it out. The best way to water the terrarium is by spraying it with a spray bottle. The water will help the plants grow and provide water for the creatures in the terrarium.

Step 5: Extra elements. Each set of students will need to add other elements to their terrarium based on their conditions, such as sticks, rocks, leafs etc…

The students can use a hand lens to make close observations of their creatures. Students could also use a ruler to make measurements and carefully record their observations using notes and drawings on a Creature Observation paper available on this website http://www.uen.org/lessonplan/upload/9683-6-12716-Creature_Observations.pdf. On the back of this worksheet have the students talk about what is happening in the environment. Are things dying? Is there more liter decomposing as the creatures eat it? Is the lack of sun or too much sun having an effect on the environment? The student may also wish to draw a picture to help explain the ecosystem.

Place the completed terrariums in the designated areas to coordinate with the particular condition of the forest that each group is assigned to; however, not in direct sunlight as they may overheat and harm the plants.

In a few days, after the terrariums have stabilized, add the creatures. Before adding the creatures, make sure all openings that may be used as escape routes are closed. Environments will need to be monitored and watered and provided with food. Additional creatures may be added to establish food chains such as grasshoppers and praying mantises. **At the end of the activity, please return any items that were collected to their natural environment and clean out the containers. **

To conclude the lesson, the students will have several sheets of paper that they did their creature observations on. Combine them together to create a book about their terrarium. Each group will need to present their findings with the class and a class tally graph will help us compare each terrarium. This will help students see what conditions work best to have non-living elements help living creatures and plants survive.

Adaptations and Modifications for Special Learning Needs: Place a student with a learning disability with a certain group that can help accommodate them. Already have a terrarium set up as much as possible, but yet still allow the student a way to participate. Have the option to set up an aquarium as a pond ecosystem instead (not quite so many steps). For ESL: Have instructions in Spanish, and be sure to do a very accurate job of modeling each step as they go.

Assessment: Each week that students will observe in some detail what is happening in their ecosystem. They will be recording it on the observation page to create a lab notebook. At the end of the project each group will present to the class a detailed description including all the information about their ecosystem. We will do a group chart to compare and contrast each group to one another to find out what conditions were ideal for the best ecosystem and figure out why. See this website for the grading rubric to use for this assignment.

Science mini unit of Forests: Forest ecosystem terrarium

Teacher Name: **Mrs. Martin**

Student Name: _____

CATEGORY	**10-8**	**8-6**	**6-4**	**4-2**
Used correct elements for the assigned ecosystem	Independently identified which elements for their terrarium could be investigated.	Identified, with adult help, the elements for their terrarium which could be investigated.	Identified, with adult help, some elements for their terrarium which could be investigated.	Identified some elements that could not be tested/investigated or one that did not merit investigation.
Hypothesis Development	Independently developed a hypothesis and did independent research to find out what was needed for their terrarium without any assistance.	Independently developed a hypothesis with not enough research for their terrarium.	Independently came up with an idea but needed some adult assistance to develop into a hypothesis with only adult help to find research for their terrarium.	Needed adult assistance to develop a hypothesis and did little or no research for their terrarium.
Display	Each element in the display had a function and clearly served to illustrate some aspect of the experiment. All items and graphs etc. were neatly and correctly labeled.	Each element had a function and clearly served to illustrate some aspect of the experiment. Most items and graphs etc. were neatly and correctly labeled.	Each element had a function and clearly served to illustrate some aspect of the experiment. Most items and graphs etc. were correctly labeled.	The display seemed incomplete or chaotic with no clear plan. Many labels were missing or incorrect.
Lab book created with creature and ecosystem observations	Provided an accurate, easy-to-follow observations with labels to illustrate the procedure or the process being studied.	Provided an accurate observation with labels to illustrate the procedure or the process being studied.	Provided an easy-to-follow observation with labels to illustrate the procedure or process, but one key step was left out.	Did not provide a observation OR the observation was quite incomplete.

Presenting results	Student was able to clearly explain what elements they used, how they were used, and what happened in their terrarium.	Student was able to do a good job explaining what elements they used, how they were used, and what happened in their terrarium.	Student was able to explain what elements were used, how they were used, and what happened in their terrarium, but left our some information.	Student either did not present the elements well, or had many missing pieces. Seemed incomplete.
How well the students worked as a team.	Worked well together, no conflict, and shared all responsibilities.	Worked together, no conflict, and split up the responsibilities.	Worked ok together, minimal conflict, and one person over the other took on most of the responsibilities.	Did not work well together, lots of conflict and only one person did most of the responsibilities.

Resources:

www.uen.org

http://www.uen.org/lessonplan/upload/9683-6-12716-Creature_Observations.pdf

http://www.uen.org/utahlink/activities/view_activity.cgi?activity_id=16691

http://www.uen.org/lessonplan/upload/9683-3-12707-Creature_Info.pdf

http://www.uen.org/lessonplan/upload/9683-3-12708-Terrarium_Aquarium_Info.pdf

http://www.americanforests.org/

http://www.nationalgeographic.com/geographyaction/habitats/forests.html

www.usask.ca/education/ideas/tplan/sslp/forestry.htm

http://www.saburchill.com/lab/field/field05.html

http://www.nationalgeographic.com/geographyaction/habitats/forests.html

http://www.historictrees.org/ht_m/treenv_co.htm

http://rubistar.4teachers.org/index.php?screen=Home&module=User&