

**BARRO COLORADO ISLAND: A VIRTUAL TOUR TO THE TROPICAL RAINFOREST**

**1. Wet Season/September: The Mystery of Plantae**

**2. Wet Season/September: Biomes and Ecosystems**

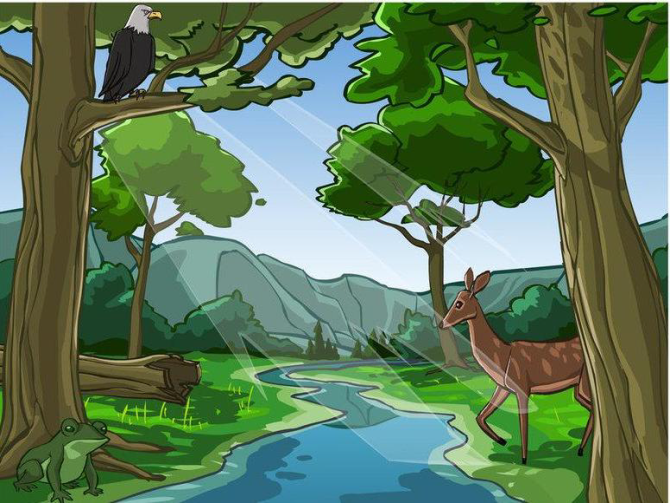
**3. Wet Season/October: Plant Adaptations**

**4. Dry Season/January: Animal Adaptations and Cycles of Matter**

**5. Dry Season/March: Sustainability of the Rainforest**

**6. Wet Season/May: Biodiversity**

**7. Wet Season/June: Analyzing Forest Plots for Biodiversity: Line Transects**

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**WISCONSIN FORESTS: ACTIVITY FIELD TRIP**

**1. Summer/September: Meet a Tree**

**2. Summer/September: Biomes and Ecosystems**

**3. Fall/October: Trees and Leaves**

**4. Winter/January: Animal Tracking**

**5. Spring/March: Maple Trees**

**6. Spring/May: Three Ecosystems- Wetlands, Forest, Grasslands**

**7. Summer/June: Forestry Measurements**

**Resources**

**Templates and Rubrics for Student Work**



**BARRO COLORADO ISLAND: A VIRTUAL TOUR TO THE TROPICAL RAINFOREST**

**Wet Season/September: The Mystery of Plantae**

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| **Your Name: Veronica Ocampo** | |
| Grade Level: 6th grade | Subject Area: Science |
| Lesson Title: Adapting to Life in the Tropical Rainforest | Lesson Length: 120 min |

**The Teaching Process**

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| **Lesson Overview**  Students will analyze plants and trees of the tropical rainforest, and will observe and note the adaptations they developed for life in that particular ecosystem. They will draw conclusions on the challenges, morphology and functions of the trees and plants of the tropical rainforest. The access to light for photosynthesis should be a central theme.  Students will also take note of the differences in temperature and length of time and day, by analyzing the tilt of the Earth and the inclination of the sun’s rays at **9.1500° N, 79.8500° W.** |
| **Unit Objectives:**  This lesson is designed to raise students’ awareness of the tropical rainforest biome, locating the regions of the world where it exists. They will also draw inferences on the plants in this ecosystem based on readings, and the viewing of videos and pictures. |
| **Standards addressed** MS-LS4-4 Construct an explanation based on evidence that describes how genetic variations of traits in a population increase some individuals’ probability of surviving and reproducing in a specific environment. |
| **List of Materials**  brown paper bags with assorted picture cards taken in Barro Colorado Island, worksheet, videos and video guides on the tropical rainforest, science binder  Smithsonian Tropical Research Institute website: <http://www.stri.si.edu/index.php>  McDougal Littell’s Note-Taking Wizard: <http://www.classzone.com/cz/ot/secured/resources/applications/vpg_organizer/index.jsp> |

**Instructional Sequence**

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| **Phase One: Engage the Learner** |
| Mystery Bag: Groups of Five: Students will draw cards from their bag, and will write their inferences on an observation matrix. They can use the internet to gather and confirm information.  Watch video of Barro Colorado Island  <http://www.youtube.com/watch?v=qQBFFtc3J7U>  Students record the sunrise/sunset times in Panama City, Panama in a log. They should also write the length of day, the difference, and the time, altitude, and distance of the solar noon. They should also record the maximum and minimum temperatures.  Students must file this log in their Forest Binders.  <http://www.timeanddate.com/worldclock/astronomy.html?n=192> |

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| **Phase Two: Explore the Concept** |
| Gallery Walk: Students walk around a six stations displaying notorious species of tropical rainforest trees. They take notes of the characteristics they observe, and write them on the same three-column matrix that students used in the “Meet a Tree” activity. Students should watch out for all adaptations of the tree trunks in the tropical rainforest.  Students should start a Venn Diagram to clearly differentiate the characteristics of the temperate forest and the tropical rainforest. Students can also use the internet and information sheets to complete this task. |

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| **Phase Three: Explain the concept and define terms** |
| Video Plants  <http://www.youtube.com/watch?v=X4L3r_XJW0I>  Academic vocabulary: sporophyte, gametophyte, nonvascular plant, vascular plant, gymnosperm, angiosperm  tropism, phototropism, gravitrotropism, evergreen, deciduous  Students make illustrated definitions of academic vocabulary. |

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| **Phase Four: Elaborate the Concept** |
| Required Reading:  “What Makes a Plant a Plant?”, *Microorganisms, Fungi, and Plants,* Holt, Rinehart and Winston, pp. 74-77.  “Plant Responses to the Environment”, Microorganisms, Fungi, and Plants”*,* Holt, Rinehart and Winston, pp. 113-117.  Students take notes on two column chart. They also pick a plant of their choice and make an annotated diagram of all the plant structures they observe.  A closing activity will be a whole-class fifteen-minute blog. Students will write four blogs and will need to respond to four of their peers’. The conversation must be academic, and repetitions should be avoided. Repeated observations do not count as a valid blog. |

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| **Phase Five: Evaluate students’ Understanding of Concept** |
| **Evaluation criteria (Forest Binder)**  Participation in field trips and class experiment  Field guide observation sheets and class experiment reports  Oral presentations (power points and photographs)  Academic discussions with team members and whole group  Blogs (Student Learning Community: SLC)  Two-column charts, video guides and class notes (illustrated when required)  All student work and participation will be evaluated following rubrics.  Students will hold brief individual conferences to ensure quality work, and improvement for next phase of the program. |



**BARRO COLORADO ISLAND: VIRTUAL TOUR TO THE TROPICAL RAINFOREST**

**Wet Season/September: Biomes and Ecosystems**

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| **Your Name: Veronica Ocampo** | |
| Grade Level: 6th grade | Subject Area: Science |
| Lesson Title: Biomes and Ecosystems: The Tropical Rainforest | Lesson Length: 120 minutes |

**The Teaching Process**

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| **Lesson Overview**  Students will watch video and complete class readings to arrive to a definition and understanding of a biome and an ecosystem. |
| **Unit Objectives:**  Students will recognize and differentiate the different biomes and ecosystems in the world. They will be able to identify their main features, and to recognize the biotic and abiotic components. Students will be able to locate the different biomes in a world map. |
| **Standards addressed**  MS-LS2-1 Analyze and interpret data to provide evidence for the effects of resource availability on organisms and populations of organisms in an ecosystem. |
| **List of Materials**  Smithsonian Tropical Research Institute website: <http://www.stri.si.edu/index.php>  McDougal Littell’s Note-Taking Wizard: <http://www.classzone.com/cz/ot/secured/resources/applications/vpg_organizer/index.jsp> |

**Instructional Sequence**

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| **Phase One: Engage the Learner** |
| Groups of Four: After having a brief discussion, students place chips with pictures of trees, plants, flowers and fruits (and some animals) from different biomes. In a two-column matrix, students must write down the common name of their plant or animal specimen if they know it. Using a full-color world map, students place different plant chips from all around the world in their corresponding biome.  Careers in Science: Meet our Scientists: Smithsonian  <http://www.youtube.com/watch?v=b-6PkZn7EPw> |

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| **Phase Two: Explore the Concept** |
| Wild Classroom Video: The Tropical Rainforest  [www.thewildclassroom.com/biomes/rainforest.htm](http://www.thewildclassroom.com/biomes/rainforest.htm)  Discovery Ed video “Tropical Rainforest” Students take notes on a two-column chart.  <http://app.discoveryeducation.com/player/view?assetGuid=8e94ff08-684e-4b43-9c99-cc384ce9fc3b> |

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| **Phase Three: Explain the concept and define terms** |
| Required readings:  “Everything is Connected”,  *Environmental Science*, Holt Rinehart and Winston, pp. 4-7  Academic Vocabulary: ecology, biotic, abiotic, population, community, ecosystem, biosphere.  Students make illustrated definitions of academic vocabulary. |

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| **Phase Four: Elaborate the Concept** |
| Students make an annotated world biome map. Students use a blank world map to delineate the different land biomes, and draw and annotate facts regarding plant and animal life, and physical data of the different biomes. Special emphasis should be placed on different types of forests, and their location in the world.  Activity: Living and Nonliving Parts of an Environment: Pond, Forest and Meadow  Warren, Patricia A. and Janet R. Galle, “ Examining the Living and Nonliving Parts of an Environment”, *Exploring Ecology”,* pp. 53-57  A closing activity will be a whole-class fifteen-minute blog. Students will write four blogs and will need to respond to four of their peers’. The conversation must be academic, and repetitions should be avoided. Repeated observations do not count as a valid blog. |

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| **Phase Five: Evaluate students’ Understanding of Concept** |
| **Evaluation criteria (Forest Binder)**  Participation in field trips and class experiment  Field guide observation sheets and class experiment reports  Oral presentations (power points and photographs)  Academic discussions with team members and whole group  Blogs (Student Learning Community: SLC)  Two-column charts, video guides and class notes (illustrated when required)  All student work and participation will be evaluated following rubrics.  Students will hold brief individual conferences to ensure quality work, and improvement for next phase of the program. |



**BARRO COLORADO ISLAND: VIRTUAL TOUR TO THE TROPICAL RAINFOREST**

**Wet Season/October: Plant Adaptations**

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| **Your Name: Veronica Ocampo** | |
| Grade Level: 6th grade | Subject Area: Science/Math |
| Lesson Title: “Keyed on Leaves”` | Lesson Length: 240 minutes |

**The Teaching Process**

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| **Lesson Overview** Students will use a dichotomous key to identify samples of leaves in the rainforest. They will also analyze the adaptations of leaves in the tropical rainforest. They will also analyze samples of leaf damage by pests (insects or fungi). |
| **Unit Objectives:** Students will link the leaves to the process of food production through photosynthesis. They will analyze the challenges of capturing light by the leaves in the tropical rainforest, and will make inferences of how this limited amount of light conditions configured the characteristics of plants and leaves in the different layers of the rainforest. Students will study leaf damage and how it affects photosynthesis capacity. |
| **Standards addressed**  MS-LS1-5 Construct a scientific explanation based on evidence for how environmental and genetic factors influence the growth of organisms.  MS-LS1-6 Construct a scientific explanation based on evidence for the role of photosynthesis in the cycling of matter and flow of energy into and out of organisms.  CCSS-Math.Content. 6-G-A-1 Find the area of right triangles, other triangles, special quadrilaterals, and polygons by composing into rectangles or decomposing into triangles and other shapes; apply these techniques in the context of solving real-world and mathematical problems. |
| **List of Materials** pictures, leaf samples of healthy leaves and damaged leaves, and healthy leaves of different colors, mortar and pestle , coffee filter paper, science experiment design worksheet, graph paper, colored pencils, information sheet on characteristics of leaves of tropical rainforest trees  Smithsonian Tropical Research Institute website: <http://www.stri.si.edu/index.php>  McDougal Littell’s Note-Taking Wizard: <http://www.classzone.com/cz/ot/secured/resources/applications/vpg_organizer/index.jsp> |

**Instructional Sequence**

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| **Phase One: Engage the Learner** |
| Show Life in a Leaf Video, and have students comment on what they see, and what it possibly means.  <http://www.noahwhiteman.org/2/post/2012/07/life-in-a-leaf.html>  Present pictures and samples of healthy and damaged leaves.  Making your own food: Video  <http://app.discoveryeducation.com/search?Ntt=food+chains> |
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| **Phase Two: Explore the Concept** |
| Why are leaves green?  <http://www.youtube.com/watch?v=sclK6duS9zQ>  Basic photosynthesis  <http://www.youtube.com/watch?v=aAQYpra4aUs>  <http://www.youtube.com/watch?v=545rqaOJQD8>  Information Sheet: Why are Plants Green? Or Not?  Academic vocabulary: cuticle, waxy layer, spongy layer, upper epidermis, lower epidermis, stomata, vein, xylem, phloem, photosynthesis, chlorophyll, cellular repiration, stomata, transpiration, energy, ATP  Students make an annotated diagram of a leaf, following the model: <http://bs079.k12.sd.us/School%20Web%20Page/BIOLOGY/Photo%20Imports/Leaf%20Diagram.jpg> |

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| **Phase Three: Explain the concept and define terms** |
| Required reading:  Ozsuscik, Sarah, “Liana Activity Book”, Panama, Project TREEES, 2012.s  Wong, Marina and Jorge Ventocilla, *A Day on Barro Colorado Island,* “Barro Colorado Island. Physical Factors”, pp.26-30.  “The Ins and Outs of Making Food”, *Microorganisms, Fungi, and Plants*, Holt Rinehart and Winston, pp. 110-112  “Seasonal Changes in Leaves”,  *Microorganisms, Fungi, and Plants*, Holt Rinehart and Winston, pp. 116-117  Leaf structure and functions. Use the following pictures: stomata - images  **Classroom Lab**: Materials: clips of healthy leaves (green and other colors), acetone and coffee filter paper, plate and mortar and pestil, watch and tw-column chart for observations  Procedure: Different groups of students grind the leaves with a mortar and pestle. Once they have been well smashed, students place coffee filter paper under the bed of leaves, and teacher adds acetone to the smashed leaf clippings. After 20 minutes, there should be a green stain on the filter paper. Leaves with different color patterns will produce a different stain, related to their pigments.  <http://classroom.hiddenvilla.org/curriculum/curriculum-for-your-school-garden/fifth-grade/why-are-plants-green>  Students will keep the leaves from which they extracted the chlorophyll, and will observe them against the sun with a magnifying glass. They will also observe fresh samples of those same leaves, and make drawings of the structures they observe.  Students will write down question, hypothesis, materials and procedure. As they progress in the lab, they should time their observations and take notes on their observations table. They will write their conclusions after they compare their experiment with experiments from other groups.  “What Plants Talk About”  <http://video.pbs.org/video/2338524490/> |

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| **Phase Four: Elaborate the Concept** |
| World-map photosynthesis map. Watch and discuss video (for a 6th grade level, watch first minute.)  Watch video to understand the chemistry in photosynthesis (for a 6th grade level, watch the first 3 ½ minutes are fine. Higher grades should watch more footage.)  <http://www.youtube.com/watch?v=g78utcLQrJ4>  **Class experiment: Photosynthesis production**  Materials: 100 ml water, 1 g baking soda, baby spinach leaf punch holes, lamp with a strong bulb, recipient with water to capture heat.  Watch video to follow procedures.  <http://www.youtube.com/watch?v=ZnY9_wMZZWI>  Groups of Four. Students will perform experiment, as instructed in the video. Students should write a class lab report.  Math Connection. Measuring Leaf Area and Photosynthesis Production: Using centimeter and milimetric paper, students will calculate the approximate leaf area of different types of leaves. They will understand that a plant’s photosynthetic capacity is directly proportional to their leaf area. Students will need to make conjectures about different leaf sizes and shapes, and whether they are deciduous or evergreens, and its possible implication for different types of forest biomes.  Show video of leaf measurement in BCI laboratory or commercial video for instrument  Show samples of damaged leaves and discuss the implication for photosynthesis production and plant survival. This discussion should initiate a conversation on how biodiversity assists survival of plants of the same species in the presence of herbivores, fungi and pests.  Place Mat Activity: Groups of Four. Use the following categories: leaf morphology and functions, chlorophyll, photosynthesis, color of leaves  A closing activity will be a whole-class fifteen-minute blog. Students will write four blogs and will need to respond to four of their peers’. The conversation must be academic, and repetitions should be avoided. Repeated observations do not count as a valid blog. |

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| **Phase Five: Evaluate students’ Understanding of Concept** |
| **Evaluation criteria (Forest Binder)**  Participation in field trips and class experiment  Field guide observation sheets and class experiment reports  Oral presentations (power points and photographs)  Academic discussions with team members and whole group  Blogs (Student Learning Community: SLC)  Two-column charts, video guides and class notes (illustrated when required)  All student work and participation will be evaluated following rubrics.  Students will hold brief individual conferences to ensure quality work, and improvement for next phase of the program. |



**BARRO COLORADO ISLAND: VIRTUAL TOUR TO THE TROPICAL RAINFOREST**

**Dry Season/January: Animal Adaptations and Cycles of Matter**

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| **Your Name: Veronica Ocampo** | |
| Grade Level: 6th grade | Subject Area: Science |
| Lesson Title: Producers, Consumers and Decomposers | Lesson Length: 120 minutes |

**The Teaching Process**

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| **Lesson Overview:** This lesson is a complement of the winter forest walk (Animal Tracking). Students will analyze the close relationships between plants and animals by constructing food webs. |
| **Unit Objectives:**  Students will describe the functions of producers, consumers, scavengers and decomposers in an ecosystem.  Students will describe types of interactions among living things in different ecosystems and biomes. |
| **Standards addressed**  MS-LS1-4 Use argument based on empirical evidence and scientific reasoning to support an explanation for how characteristic animal behaviors and specialized plant structures affect the probability of successful reproduction of animals and plants respectively.  MS-LS1-5 Construct a scientific explanation based on evidence for how environmental and genetic factors influence the growth of organisms. |
| **List of Materials**  Panama TREEES animal species cards  Smithsonian Tropical Research Institute website: <http://www.stri.si.edu/index.php>  McDougal Littell’s Note-Taking Wizard: <http://www.classzone.com/cz/ot/secured/resources/applications/vpg_organizer/index.jsp> |

**Instructional Sequence**

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| **Phase One: Engage the Learner** |
| Pairs: Students use Panama TREEES species cards to play Web War, Gain a Chain or Consumer Concentration.  Students play online Food Chain game. |

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| **Phase Two: Explore the Concept** |
| Students complete classroom lab.  “Nitrogen Needs”,  *Environmental Science,* Holt, Rinehart and Winston, pp.130-131.  Students complete a five-day observation chart. Special care should be placed on Analysis questions, #8-12. |

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| **Phase Three: Explain the concept and define terms** |
| Required reading, “Living Things Need Energy”, *Holt, Rinehart and Winston,* pp. 8-11.  Required reading, “Types of Interactions”, *Holt, Rinehart and Winston,* pp. 14-17.  Individual work. Students play online food chain, which introduces specific vocabulary.  <http://www.gould.edu.au/foodwebs/kids_web.htm>  Academic vocabulary: producers, consumers, scavengers, decomposers, decomposition, competition, predators, prey, mutualism, commensalism, parasitism, nitrogen  Students create illustrated definitions of academic vocabulary |

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| **Phase Four: Elaborate the Concept** |
| Required reading, “The Cycles of Matter”, *Environmental Science,* Holt, Rinehart and Winston, pp. 30-33  Activity: Water, Carbon, Oxygen and Nitrogen Cycles  Warren, Patricia A. and Janet R. Galle, “Mother Nature’s Recycling Project”, *Exploring Ecology”,* pp. 173-182  Discovery Ed: Producers, Consumers and Decomposers  <http://app.discoveryeducation.com/search?Ntt=food+chains>  YouTube Barro Colorado Island (A decomposer: coprophagus dung beetle on task)  <http://www.youtube.com/watch?v=odPYGSV1oJ0>  Pairs: Students use Panama TREEES species cards to play Chain Builders.  <http://www.vtaide.com/png/foodwebS.htm>  A closing activity will be a whole-class fifteen-minute blog. Students will write four blogs and will need to respond to four of their peers’. The conversation must be academic, and repetitions should be avoided. Repeated observations do not count as a valid blog. |

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| **Phase Five: Evaluate students’ Understanding of Concept** |
| **Evaluation criteria (Forest Binder)**  Participation in field trips and class experiment  Field guide observation sheets and class experiment reports  Oral presentations (power points and photographs)  Academic discussions with team members and whole group  Blogs (Student Learning Community: SLC)  Two-column charts, video guides and class notes (illustrated when required)  All student work and participation will be evaluated following rubrics.  Students will hold brief individual conferences to ensure quality work, and improvement for next phase of the program. |



**BARRO COLORADO ISLAND: VIRTUAL TOUR TO THE TROPICAL RAINFOREST**

**Dry Season/March: Sustainability of the Rainforest**

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| **Your Name: Veronica Ocampo** | |
| Grade Level: 6th grade | Subject Area: Science |
| Lesson Title: Sustainability of the Rainforest | Lesson Length: 120 min |

**The Teaching Process**

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| **Lesson Overview** Through the story of a notorious tree fall (Big Tree/Big Gap in Barro Colorado), students will understand the fragility of the forest ecosystem. |
| **Unit Objectives:** Students will complete a research project addressing the importance of sustaining the forests, and all the life contained in them. |
| **Standards addressed**  MS-LS2-4 Construct an argument supported by empirical evidence that changes to physical or biological components of an ecosystem affect populations.  MS-LS2-5 Evaluate competing design solutions for maintaining biodiversity and ecosystem services |
| **List of Materials**  Smithsonian Tropical Research Institute website: <http://www.stri.si.edu/index.php>  McDougal Littell’s Note-Taking Wizard: <http://www.classzone.com/cz/ot/secured/resources/applications/vpg_organizer/index.jsp> |

**Instructional Sequence**

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| **Phase One: Engage the Learner** |
| Pictures and news articles stories of Big Tree/Big Gap Barro Colorado Island  <http://drawingthemotmot.wordpress.com/2009/09/17/panamas-big-tree-comes-to-oklahoma/>  <http://www.stri.si.edu/english/about_stri/headline_news/news/article.php?id=1681>  <http://www.thepanamadigest.com/2013/06/big-tree-falls-on-barro-colorado-leaves-clearing/>  Pictures of Big Gap shared by the teacher. Comments of the fight for light in the tropical rainforest.  Meet our Scientists: Smithsonian  <http://www.youtube.com/watch?v=5zKvE1XjMk4> |

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| **Phase Two: Explore the Concept** |
| Trees in Costa Rica tropical rainforest  <http://www.youtube.com/watch?v=s6SM8Xi3FaA>  The jewels of the rainforest  <http://www.youtube.com/watch?v=w7uzixtg4vI>  Watch video on different tree falls in forests  <http://www.youtube.com/watch?v=sEnewrCLAM0> |

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| **Phase Three: Explain the concept and define terms** |
| Watch video (select segments dealing with biodiversity)  <http://app.discoveryeducation.com/search?Ntt=food+chains>  Required reading, “Types of Interactions”, *Environmental Science,* Holt, Rinehart and Winston, pp. 14-19. |

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| **Phase Four: Elaborate the Concept** |
| Biodiversity: We’re all in this together  <http://www.youtube.com/watch?v=drd-Bs4jtf8>  As an introduction to next BCI virtual trip, students should start a mini-research project on forest sustainability, biodiversity and its benefits.  A closing activity will be a whole-class fifteen-minute blog. Students will write four blogs and will need to respond to four of their peers’. The conversation must be academic, and repetitions should be avoided. Repeated observations do not count as a valid blog. |

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| **Phase Five: Evaluate students’ Understanding of Concept** |
| **Evaluation criteria (Forest Binder)**  Participation in field trips and class experiment  Field guide observation sheets and class experiment reports  Oral presentations (power points and photographs)  Academic discussions with team members and whole group  Blogs (Student Learning Community: SLC)  Two-column charts, video guides and class notes (illustrated when required)  All student work and participation will be evaluated following rubrics.  Students will hold brief individual conferences to ensure quality work, and improvement for next phase of the program. |



**BARRO COLORADO ISLAND: VIRTUAL TOUR TO THE TROPICAL RAINFOREST**

**Wet Season/May: Biodiversity**

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| **Your Name: Veronica Ocampo** | |
| Grade Level: 6th grade | Subject Area: Science |
| Lesson Title: Biodiversity | Lesson Length: 180 min |

**The Teaching Process**

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| **Lesson Overview** Through carefully selected videos, students will understand what biodiversity is, and how important it is to sustain life on all ecosystems and biomes on Earth. |
| **Unit Objectives:** Students will be able to define biodiversity, and to make strong arguments in favor of preserving all kinds of life on Earth. |
| **Standards addressed**  MS-LS2-4 Construct an argument supported by empirical evidence that changes to physical or biological components of an ecosystem affect populations.  MS-LS2-5 Evaluate competing design solutions for maintaining biodiversity and ecosystem services. |
| **List of Materials**  Smithsonian Tropical Research Institute website: <http://www.stri.si.edu/index.php>  McDougal Littell’s Note-Taking Wizard: <http://www.classzone.com/cz/ot/secured/resources/applications/vpg_organizer/index.jsp> |

**Instructional Sequence**

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| **Phase One: Engage the Learner** |
| Bill Nye Biodiversity  <http://www.youtube.com/watch?v=qZJJWYGIb44>  Video: The Wild Classroom, Biodiversity  <http://www.youtube.com/watch?v=N5boLwt6oZY>  Meet our Scientists: Smithsonian  <http://www.youtube.com/watch?v=S7Y75g5z7gw> |

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| **Phase Two: Explore the Concept** |
| “Barro Colorado, Island of Magic Diversity in the Middle of the Panama Canal”. National Geographic *Newswatch*  [*http://newswatch.nationalgeographic.com/2013/08/13/barro-colorado-island-of-magic-diversity-in-the-middle-of-panama-canal/*](http://newswatch.nationalgeographic.com/2013/08/13/barro-colorado-island-of-magic-diversity-in-the-middle-of-panama-canal/)  Class tour of liana ecology project: Dr. Stefan Schnitzer  <http://www.lianaecologyproject.com/photos?nggpage=3>  Watch DiscoveryEd video (plant and animal biodiversity segments)  <http://app.discoveryeducation.com/search?Ntt=food+chains>  Smithsonian Gardens: *Aristolochia grandiflora*  <http://www.youtube.com/watch?v=HS8ewmHr2To> |

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| **Phase Three: Explain the concept and define terms** |
| Required readings:  Wong, Marina and Jorge Ventocilla, “Plants”, *A Day on Barro Colorado Island,* pp. 31-38.  Wong, Marina and Jorge Ventocilla, “Animals”, *A Day on Barro Colorado Island,* pp. 39-44.  Slideshow of Barro Colorado pictures (teacher) |

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| **Phase Four: Elaborate the Concept** |
| Whole class reading of Stuart Davies interview on tropical rainforest and diversity.  <http://www.learner.org/courses/envsci/scientist/transcripts/davies.html>  Pairs Activity: students will search the internet, or use teacher pictures or scan pictures to illustrate eight passages of the interview. Constraint: No group can repeat photographs. All photographs need to have due credit.  A closing activity will be a whole-class fifteen-minute blog. Students will write four blogs and will need to respond to four of their peers’. The conversation must be academic, and repetitions should be avoided. Repeated observations do not count as a valid blog. |

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| **Phase Five: Evaluate students’ Understanding of Concept** |
| **Evaluation criteria (Forest Binder)**  Participation in field trips and class experiment  Field guide observation sheets and class experiment reports  Oral presentations (power points and photographs)  Academic discussions with team members and whole group  Blogs (Student Learning Community: SLC)  Two-column charts, video guides and class notes (illustrated when required)  All student work and participation will be evaluated following rubrics.  Students will hold brief individual conferences to ensure quality work, and improvement for next phase of the program. |



**BARRO COLORADO ISLAND: VIRTUAL TOUR TO THE TROPICAL RAINFOREST**

**Wet Season/June: Analyzing Forest Plots for Biodiversity: Line Transects**

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| **Your Name: Veronica Ocampo** | |
| Grade Level: 6th grade | Subject Area: Science/Math |
| Lesson Title: Counting Species in a Forest Plot | Lesson Length: 200 min |

**The Teaching Process**

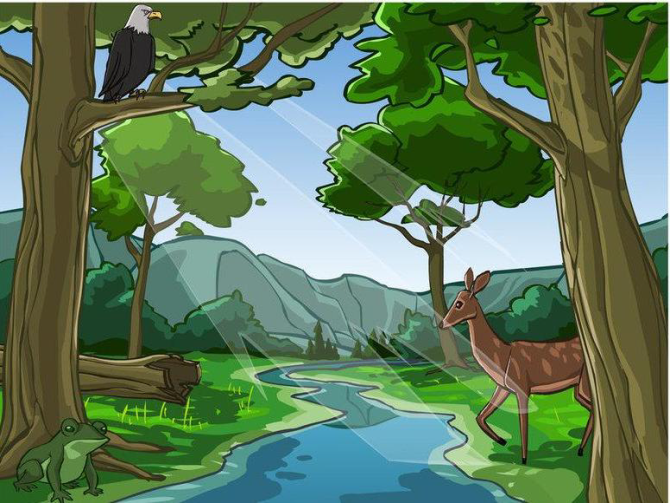
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| **Lesson Overview** Students will make a line-transect analysis of a plot in a day visit to a city park. They will identify plant and animal species in the line transect assigned to their group. |
| **Unit Objectives:**  Students will participate in a wildlife study induction experience by analyzing and recording the plant and animal populations they observe along a line transect. |
| **Standards addressed**  MS-LS2-1 Analyze and interpret data to provide evidence for the effects of resource availability on organisms and populations of organisms in an ecosystem.  MS-LS2-2 Construct an explanation that predicst patterns of interactions among organisms across multiple ecosystems.  MS-LS2-5 Evaluate competing design solutions for maintaining biodiversity and ecosystem services  CCSS-Math.Content. 6-G-A-1 Find the area of right triangles, other triangles, special quadrilaterals, and polygons by composing into rectangles or decomposing into triangles and other shapes; apply these techniques in the context of solving real-world and mathematical problems. |
| **List of Materials** field observation guide sheet, line transects, measuring tapes, meter sticks, stakes and string for land plotting, magnifying glasses, binoculars, camera, paper, pencil, colors  Smithsonian Tropical Research Institute website: <http://www.stri.si.edu/index.php>  McDougal Littell’s Note-Taking Wizard: <http://www.classzone.com/cz/ot/secured/resources/applications/vpg_organizer/index.jsp> |

**Instructional Sequence**

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| **Phase One: Engage the Learner** |
| Barro Colorado Official Video  <http://www.youtube.com/watch?v=tRGG-XmNMhk>  Monitoring Tigers and Their Prey: Video  <http://www.youtube.com/watch?v=bAdAGNRr-_Q>  Previous permission from school neighbors, students visit neighborhood gardens and record all the different plant and animal species they observe.  Students will create a simple line transect with their neighborhood species record.  <http://www.youtube.com/watch?v=B7R6CCojfAI> |

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| **Phase Two: Explore the Concept** |
| Monitoring Tigers and Their Prey (Introduction to Methodology)  <http://www.youtube.com/watch?v=aa4V9NbiphU>  Watch video on line transects and focus on the methodology (Line Transects for Plants)  <http://www.youtube.com/watch?v=xTR5upqtHGw>  Location: Wehr Nature Center  06/11/14, 9:00-10:30  Park plotting with Milwaukee County Parks naturalists. |
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| **Phase Three: Explain the concept and define terms** |
| Required readings:  “Maintaining Biodiversity”, *Environmental Science,* Holt, Rinehart and Winston, pp. 87.  Wong, Marina and Jorge Ventocilla, “Plant-animal interactions”, *A Day on Barro Colorado Island,* pp. 51-59  Wong, Marina and Jorge Ventocilla, “The value of a tropical forest”, *A Day on Barro Colorado Island,* pp. 60-63.  Briefly comment on scientific article on world study of forest plots (including Barro Colorado)  <http://ctfs.arnarb.harvard.edu/Public/pdfs/Condit_1998_CensusPlotsmethodsBook.pdf> |
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| **Phase Four: Elaborate the Concept** |
| Students will write a journal entry of their line transect activity, including relevant theoretical information from their readings. Students must pretend they are one of the field workers mentioned in the research study.  <http://ctfs.arnarb.harvard.edu/Public/pdfs/Condit_1998_CensusPlotsmethodsBook.pdf>  Final video viewing: Vine Virtuoso with Dr. Stefan Schnitzer  <http://www.youtube.com/watch?v=bIJi0VuISWY>  Students will use all resources (textbooks, books, internet, tables) to write their final report. They will consult with teacher whenever they need assistance, they will also need to consult their peers for guidance.  This project constitutes the final project of the program. |

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| **Phase Five: Evaluate students’ Understanding of Concept** |
| **Evaluation criteria (Forest Binder)**  Participation in field trips and class experiment  Field guide observation sheets and class experiment reports  Oral presentations (power points and photographs)  Academic discussions with team members and whole group  Blogs (Student Learning Community: SLC)  Two-column charts, video guides and class notes (illustrated when required)  All student work and participation will be evaluated following rubrics.  Students will hold brief individual conferences to ensure quality work, and improvement for next phase of the program. |



**WISCONSIN FORESTS: ACTIVITY FIELD TRIP**

**Summer/September: Meet a Tree**

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| **Your Name: Veronica Ocampo** | |
| Grade Level: 6th grade | Subject Area: Science |
| Lesson Title: “Meet a Tree”, Field Trip to City Park | Lesson Length: 120 min |

**The Teaching Process**

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| **Lesson Overview:**  This lesson is designed to raise students’ awareness of the temperate forest biome prevalent in Wisconsin, and to develop their senses to perform informed scientific observations of nature. |
| **Unit Objectives:** Through a sequence of outdoor learning experiences, readings and research students will discover  characteristics of a temperate forest, and the morphology and functions of the trees and plants of this ecosystem. |
| **Standards addressed** MS-LS1-5 Construct a scientific explanation based for how environmental and genetic factors influence the growth of organisms.. |
| **List of Materials:**  brown paper bags with assorted park samples (leaves, twigs, bark, pine needles, pine cones, leaf litter, fruits, flowers, grass, etc.), observation worksheet, magnifying glasses, rulers, worksheet, colored pencils, crayons, white paper, measuring tape  McDougal Littell’s Note-Taking Wizard: <http://www.classzone.com/cz/ot/secured/resources/applications/vpg_organizer/index.jsp> |

**Instructional Sequence**

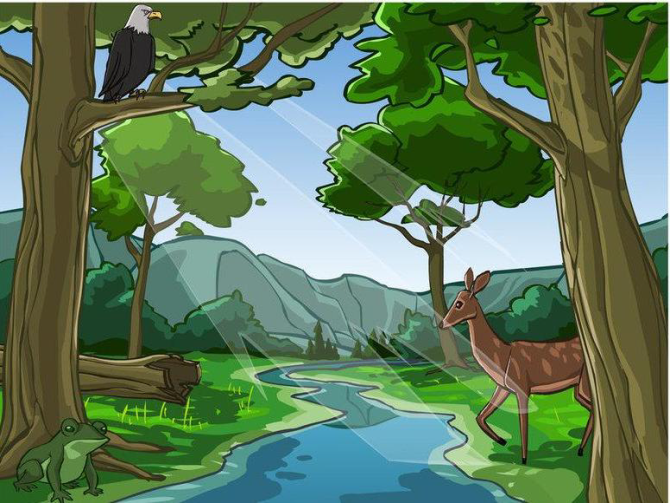
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| **Phase One: Engage the Learner** |
| Mystery Bag: Groups of Five: Students will draw objects from their bag, and will write their inferences on an observation matrix. They can use the internet and information sheets to gather and confirm information.  Students record the sunrise/sunset times in Milwaukee in a log. They should also write the length of day, the difference, and the time, altitude, and distance of the solar n-noon. They should also record the maximum and minimum temperatures.  Students must file this log in their Forest Binders.  <http://www.timeanddate.com/worldclock/astronomy.html?n=158> |

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| **Phase Two: Explore the Concept** |
| “Meet a Tree”: Location: Jackson Park, 09/13/13, 8:30-9:30 am.  Pairs. Student 1 is blindfolded. Student 2 guides him/her to a specific tree. Student 1 uses touch and smell to create an image of the tree he/she was presented to. He makes mental notes of diameter, trunk, texture, twigs, bark, terrain, etc. Student 2 walks Student 2 to start location. Student 1 needs to identify his tree by sight. Roles are reversed on the next round.  Students are asked to make bark rubbings of their tree. On the back of their rubbing they need to provide a detailed description of their tree, including tree diameter (inches and centimeters) and disposition of branches and leaves. |

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| **Phase Three: Explain the concept and define terms** |
| Required reading:  “Introduction to Plants”, *Microorganisms, Fungi, and Plants*, Holt Rinehart and Winston, pp. 74-91.  Students watch videos on plant structures.  Students take notes on their readings/videos on a two-column chart.  Students participate in small group and whole class discussions regarding their observations of plant samples. |

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| **Phase Four: Elaborate the Concept** |
| Students write a detailed report of their tree on a two-column matrix.  Students should start a Venn diagram to clearly differentiate the characteristics of the temperate forest and the tropical rainforest. They are expected to illustrate their work.  All groups make a graphic oral presentation (photographs, drawings, samples) of their findings on characteristics of plant samples.  A closing activity will be a whole-class fifteen-minute blog. Students will write four blogs and will need to respond to four of their peers’. The conversation must be academic, and repetitions should be avoided. Repeated observations do not count as a valid blog. |

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| **Phase Five: Evaluate students’ Understanding of Concept** |
| **Evaluation criteria (Forest Binder)**  Participation in field trips and class experiment  Field guide observation sheets and class experiment reports  Oral presentations (power points and photographs)  Academic discussions with team members and whole group  Blogs (Student Learning Community: SLC)  Two-column charts, video guides and class notes (illustrated when required)  All student work and participation will be evaluated following rubrics.  Teacher will hold brief individual conferences to ensure quality work, and improvement for next phase of the program. |

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**WISCONSIN FORESTS: ACTIVITY FIELD TRIP**

**Summer/September: Biomes and Ecosystems**

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| **Your Name: Veronica Ocampo** | |
| Grade Level: 6th grade | Subject Area: Science |
| Lesson Title: “Biodiversity Basics”, with Wehr Nature Center naturalist. Field Trip | Lesson Length: 150 minutes |

**The Teaching Process**

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| **Lesson Overview** Through the visit and observation of three different ecosystems, students will understand the differences among them |
| **Unit Objectives:**  Students will visit two or three ecosystems (wetland, forest and grassland) and will observe the main characteristics of each. They will record physical and biological data to describe the features of each ecosystem. Students will observe and record the different plants and animals they observe, and how they are spread out in a natural environment. They will construct their own definition of ecosystem. |
| **Standards addressed** MS-LS2-1 Analyze and interpret data to provide evidence for the effects of resource availability on organisms and populations of organisms in an ecosystem. |
| **List of Materials** textbook, field observation guide sheet, camera, two-column chart worksheet  McDougal Littell’s Note-Taking Wizard: <http://www.classzone.com/cz/ot/secured/resources/applications/vpg_organizer/index.jsp> |

**Instructional Sequence**

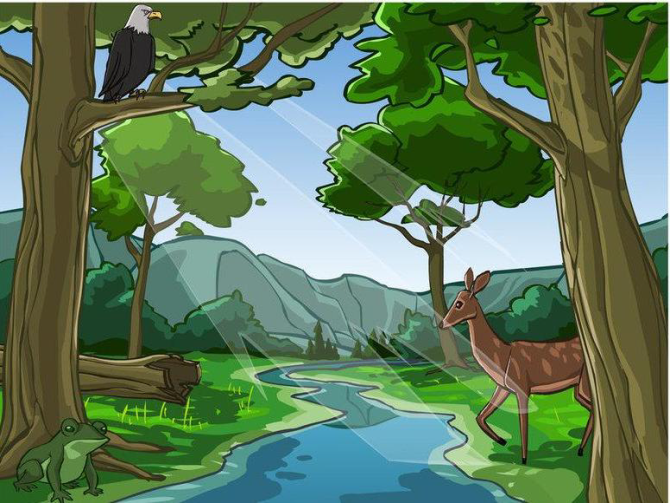
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| **Phase One: Engage the Learner** |
| Wild Classroom Video: Biodiversity  [www.thewildclassroom.com/video/index.html](http://www.thewildclassroom.com/video/index.html)  Wild Classroom Video: The Tropical Rainforest  [www.thewildclassroom.com/biomes/rainforest.htm](http://www.thewildclassroom.com/biomes/rainforest.htm)  Students take notes of videos on a two-column chart. They also create an illustrated online dictionary of vocabulary terms.  Academic vocabulary: biome, ecosystem, biotic, abiotic, organism, environment, adaptation, biodiversity, conservation, population, overpopulation, endangered, extinct |

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| **Phase Two: Explore the Concept** |
| Location: Wehr Nature Center  Date: 09/27/13, 9:00-11:30  “Biodiversity Basics”. Field trip with Wehr Nature Center specialist. Students will observe and record the different plant and animal species they observe, and how they are spread out in a natural environment.  Students record observations on their field observation guide sheets and take pictures of the different plants, animals and relevant abiotic elements on their visit to Wehr Nature Center. |

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| **Phase Three: Explain the concept and define terms** |
| Read information.  <http://www.ucmp.berkeley.edu/glossary/gloss5/biome/forests.html>  <http://www.worldbiomes.com/biomes_forest-images.htm>  With the readings, field observations and their own pictures students make an oral presentation of their findings of the forest ecosystem, with mention of the wetlands and grasslands. |

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| **Phase Four: Elaborate the Concept** |
| Required readings:  “Land Ecosystems”,  *Environmental Science*, Holt Rinehart and Winston, pp. 48-54  Students create illustrated definitions of key vocabulary: biome, temperate deciduous forest, coniferous forest, tropical rainforest.  A closing activity will be a whole-class fifteen-minute blog. Students will write four blogs and will need to respond to four of their peers’. The conversation must be academic, and repetitions should be avoided. Repeated observations do not count as a valid blog. |

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| **Phase Five: Evaluate students’ Understanding of Concept** |
| **Evaluation criteria (Forest Binder)**  Participation in field trips and class experiment  Field guide observation sheets and class experiment reports  Oral presentations (power points and photographs)  Academic discussions with team members and whole group  Blogs (Student Learning Community: SLC)  Two-column charts, video guides and class notes (illustrated when required)  All student work and participation will be evaluated following rubrics.  Teacher will hold brief individual conferences to ensure quality work, and improvement for next phase of the program. |



**WISCONSIN FORESTS: ACTIVITY FIELD TRIP**

**Fall/October: Trees and Leaves**

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| **Your Name: Veronica Ocampo** | |
| Grade Level: 6th grade | Subject Area: Science |
| Lesson Title: “Keyed on Trees”, with Wehr Nature Center naturalist. Field Trip | Lesson Length: 150 min |

**The Teaching Process**

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| **Lesson Overview** Using a tree key, students will identify Wisconsin trees. They will also be introduced to a dichotomous key for leaf identification. |
| **Unit Objectives:** Students will observe and record the differences in leaves in the temperate/boreal forest, and compare them to those of the tropical rainforest. They will draw conclusions regarding the adaptations of the leaves to the abiotic factors of their respective environments. |
| **Standards addressed** MS-LS1-5 Construct a scientific explanation based on evidence for how environmental and genetic factors influence the growth of organisms.  MS-LS1-6 Construct a scientific explanation based on evidence for the role of photosynthesis in the cycling of matter and flow of energy into and out of organisms. |
| **List of Materials:** school site map, compass (one per pair), Jackson Park map, leaves dichotomous keys (one per pair), magnifying glasses, ID worksheets for trees and leaves, slides of different leaf shapes  McDougal Littell’s Note-Taking Wizard: <http://www.classzone.com/cz/ot/secured/resources/applications/vpg_organizer/index.jsp> |

**Instructional Sequence**

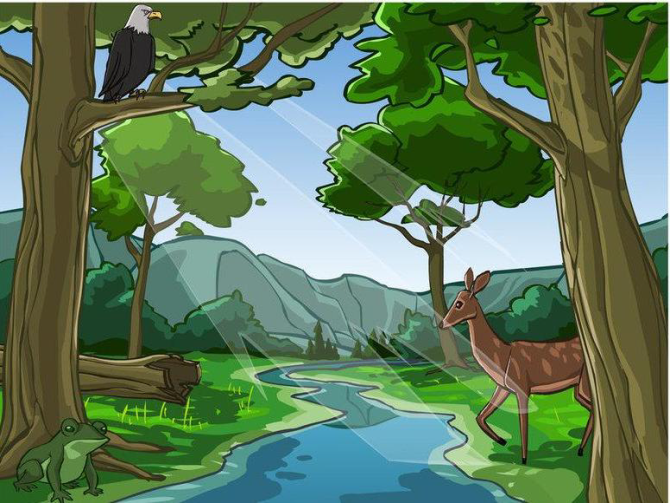
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| **Phase One: Engage the Learner** |
| Whole class: Dichotomous key games  <http://oregonstate.edu/trees/dichotomous_key.html>  <http://fergusonfoundation.org/btw-students/plant-identification/>  Location: Playground. “How to Use a Compass” (Pairs) |

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| **Phase Two: Explore the Concept** |
| Location: Jackson Park  Date: 10/11/13, 9:00-11:30  “Keyed on Trees”. Field trip with Wehr Nature Center naturalist. Students will identify at least five trees and five types of leaves. They will compare the shapes of temperate forests with those of the tropical rainforest, discuss, and draw conclusions for the different leaf shapes in each biome.  Students will participate actively in the tree and leaf identification activities. They will identify at least five trees and five leaves, recording their findings in a worksheet. |

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| **Phase Three: Explain the concept and define terms** |
| Students will be introduced to the importance of the leaf area and the production of food through photosynthesis.  Students will use graph paper to calculate leaf area, and make conjectures regarding absorption of light and production of food.  Students will be able to use books, information sheets and the internet to determine the role of leaves in the plant’s food production.  Students will observe leaves, take measurements, and draw scientific conclusions based on their observations.  Students will demonstrate understanding of the relationship between leaf area and photosynthetic capacity.  Academic vocabulary: sporophyte, gametophyte, nonvascular plant, vascular plant, gymnosperm, angiosperm, xylem, phloem |

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| **Phase Four: Elaborate the Concept** |
| Required reading,  “A Plant’s Food Factories,  *Microorganisms, Fungi, and Plants*, Holt Rinehart and Winston, pp. 92-93 and 96-97.  Students will pick five specimens to complete an observation and measurement activity.  Students will converse, draw, and compare leaf samples to dichotomous keys to organize multiple leaf samples, and classify them using a scientific methodology.  Students will determine the unique value of leaves in the photosynthesis process.  A closing activity will be a whole-class fifteen-minute blog. Students will write four blogs and will need to respond to four of their peers’. The conversation must be academic, and repetitions should be avoided. Repeated observations do not count as a valid blog. |

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| **Phase Five: Evaluate students’ Understanding of Concept** |
| **Evaluation criteria (Forest Binder)**  Participation in field trips and class experiment  Field guide observation sheets and class experiment reports  Oral presentations (power points and photographs)  Academic discussions with team members and whole group  Blogs (Student Learning Community: SLC)  Two-column charts, video guides and class notes (illustrated when required)  All student work and participation will be evaluated following rubrics.  Teacher will hold brief individual conferences to ensure quality work, and improvement for next phase of the program. |



**WISCONSIN FORESTS: ACTIVITY FIELD TRIP**

**Winter/January: Animal Tracking**

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| **Your Name: Veronica Ocampo** | |
| Grade Level: 6th grade | Subject Area: Science |
| Lesson Title: Animal Tracking | Lesson Length: 80 min |

**The Teaching Process**

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| **Lesson Overview** Students will conduct a hike in the forest looking for animal signs and tracks. They will describe the adaptations animals and plants need to survive in the winter. |
| **Unit Objectives:** Students will understand the different adaptations of animals under extreme temperature conditions.  Students will analyze food webs and food chains, and how those are modified during the winter months. |
| **Standards addressed**  MS-LS1-4 Use argument based on empirical evidence and scientific reasoning to support an explanation for how characteristic animal behaviors and specialized plant structures affect the probability of successful reproduction of animals and plants respectively.  MS-LS1-5 Construct a scientific explanation based on evidence for how environmental and genetic factors influence the growth of organisms. |
| **List of Materials** animal cards, animal track ID cards, field observation guide sheets  McDougal Littell’s Note-Taking Wizard: <http://www.classzone.com/cz/ot/secured/resources/applications/vpg_organizer/index.jsp> |

**Instructional Sequence**

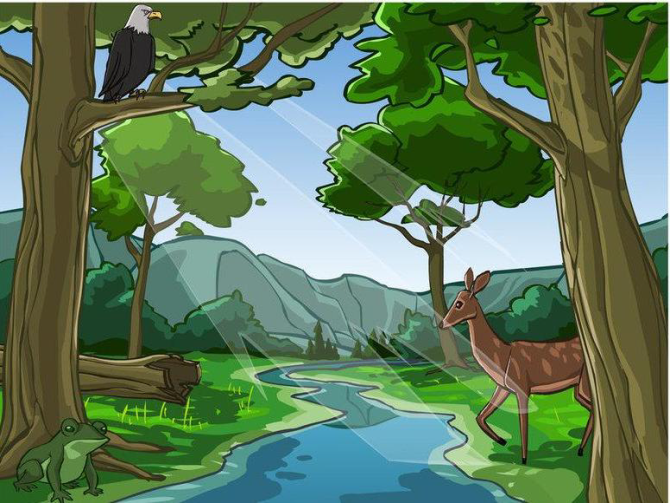
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| **Phase One: Engage the Learner** |
| Print out cards of different animals in the temperate forest/boreal forest biomes. Place four stations in four corners of the room with these categories: hibernation, migration, dormancy and remaining active. Teams of Four: Students place the animal cards on each of the corners according to their winter adaptations. Use “New England Mammals in Winter” (Parrella, Deborah and Cat Bowman Smith, *Project Seasons,* Shelburne Farms, pp. 147-148).  Students will have academic conversations on their animal cards. They will need to debate over their right placement based on what they know of wintering habits. There should be consensus regarding the placements. |

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| **Phase Two: Explore the Concept** |
| Location: Wehr Nature Center  Date: 01/31/14, 9:00-10:30  “Animal Tracking”. Field trip with Wehr Nature Center specialist. Students will observe and record signs of animal activity during their winter, and will identify their tracks and habitats.  Students use a track pattern card to identify tracks, animal activity and habitats (Parrella, Deborah and Cat Bowman Smith, *Project Seasons,*  Shelburne Farms, pp. 161-162) to identify tracks of animals on their hike in Wehr Nature Center.  Students will record their findings in their field observation guide sheets. |

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| **Phase Three: Explain the concept and define terms** |
| Students create their online food web.  <http://www.vtaide.com/png/foodchains.htm>  Students will play web online game on the four biomes presented.  Academic Vocabulary: herbivore, carnivore, scavenger, food chain, food web, energy pyramid, habitat, niche, hibernate, migrate, dormancy, animal activity  Students create online illustrated definitions of the academic vocabulary. |

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| **Phase Four: Elaborate the Concept** |
| Required reading, “Wolves and the Energy Pyramid”, *Environmental Sciences,* Holt, Rinehart and Winston,pp. 12-13  <http://app.discoveryeducation.com/search?Ntt=food+chains>  Students will take notes on a two-column chart.  A closing activity will be a whole-class fifteen-minute blog. Students will write four blogs and will need to respond to four of their peers’. The conversation must be academic, and repetitions should be avoided. Repeated observations do not count as a valid blog. |

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| **Phase Five: Evaluate students’ Understanding of Concept** |
| **Evaluation criteria (Forest Binder)**  Participation in field trips and class experiment  Field guide observation sheets and class experiment reports  Oral presentations (power points and photographs)  Academic discussions with team members and whole group  Blogs (Student Learning Community: SLC)  Two-column charts, video guides and class notes (illustrated when required)  All student work and participation will be evaluated following rubrics.  Teacher will hold brief individual conferences to ensure quality work, and improvement for next phase of the program. |



**WISCONSIN FORESTS: ACTIVITY FIELD TRIP**

**Spring/March: Maple Trees**

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| **Your Name: Veronica Ocampo** | |
| Grade Level: 6th grade | Subject Area: Science |
| Lesson Title: Maple Trees: Rational and Sustainable Use of Natural Resources | Lesson Length: 120 min |

**The Teaching Process**

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| **Lesson Overview** Students will participate in a forest walk and identify maple trees after knowing their basic characteristics. They will describe the history of maple sugaring, and will realize that there are rational and sustainable methods in the use and exploitation of the forest biomes. |
| **Unit Objectives:**  Students should be able to analyze and evaluate different scenarios of forest exploitation, and be able to defend the options that represent a rational and sustainable use and exploitation of the forest biomes resources. |
| **Standards addressed**  MS-LS2-5 Evaluate competing design solutions for maintaining biodiversity and ecosystem services |
| **List of Materials**  McDougal Littell’s Note-Taking Wizard: <http://www.classzone.com/cz/ot/secured/resources/applications/vpg_organizer/index.jsp> |

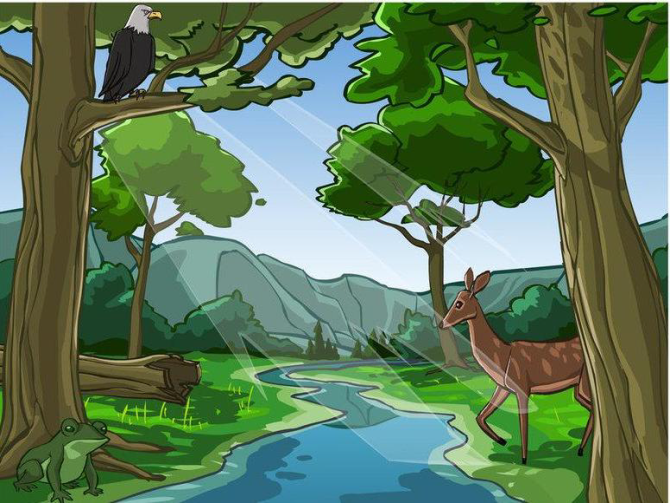
**Instructional Sequence**

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| **Phase One: Engage the Learner** |
| Pancake and syrup breakfast  Watchvideo on maple sugaring in Ohio  <http://www.youtube.com/watch?v=4rWwWm62LqA>  Teacher will organize volunteer mothers to prepare and serve breakfast for the students. |
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| **Phase Two: Explore the Concept** |
| Location: Wehr Nature Center  03/31/2014, 9:00-10:30  “Maple Magic” Field trip with Wehr Nature Center naturalist.  Students watch a video on maple syrup production in the 1920s  <http://www.youtube.com/watch?v=70hz54jIHTU>  Students create an annotated diagram of a cross-sectional slice of a tree, after reading “The Inside Story” (Parrella, Deborah and Cat Bowman Smith, *Project Seasons,*  Shelburne Farms, pp. 208)  Academic vocabulary: outer bark, inner bark, cambium, sapwood, heartwood, xylem, phloem |

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| **Phase Three: Explain the concept and define terms** |
| <http://www.youtube.com/watch?v=V49IovRSJDs>  “Ecological Succession”,  *Environmental Science,* Holt, Rinehart and Winston, pp. 34-37  Students take notes of their reading on a two-column chart. |

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| **Phase Four: Elaborate the Concept** |
| Using pictures from the internet or from their forest visits, students create an illustrated and annotated flow diagram of forest primary and secondary succession.  Academic vocabulary: succession, pioneer species, primary forest, secondary forest  A closing activity will be a whole-class fifteen-minute blog. Students will write four blogs and will need to respond to four of their peers’. The conversation must be academic, and repetitions should be avoided. Repeated observations do not count as a valid blog. |

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| **Phase Five: Evaluate students’ Understanding of Concept** |
| **Evaluation criteria (Forest Binder)**  Participation in field trips and class experiment  Field guide observation sheets and class experiment reports  Oral presentations (power points and photographs)  Academic discussions with team members and whole group  Blogs (Student Learning Community: SLC)  Two-column charts, video guides and class notes (illustrated when required)  All student work and participation will be evaluated following rubrics.  Teacher will hold brief individual conferences to ensure quality work, and improvement for next phase of the program. |



**WISCONSIN FORESTS: ACTIVITY FIELD TRIP**

**Spring/May: Three Ecosystems - Wetland, Forest, Grassland**

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| **Your Name: Veronica Ocampo** | |
| Grade Level: 6th grade | Subject Area: Science |
| Lesson Title: Three Ecosystems: Wetland, Forest, Grassland | Lesson Length:180 min |

**The Teaching Process**

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| **Lesson Overview** Students will go on to Wehr Nature Center, and observe the differences between a wetland, forest and grassland. They will observe the plants and animals, and use instruments to measure physical features of each ecosystem. |
| **Unit Objectives:** Students will be able to define a biome and locate their distribution in a world map. They will also distinguish different ecosystems, with special emphasis on the characteristics of Wisconsin ecosystems. |
| **Standards addressed**  MS-LS2-2 Construct an explanation that predicts patterns of interactions among organisms across multiple ecosystems.  MS-LS2-3 Develop a model to describe the cycling of matter and flow of energy among living and nonliving parts of an ecosystem. |
| **List of Materials**  McDougal Littell’s Note-Taking Wizard: <http://www.classzone.com/cz/ot/secured/resources/applications/vpg_organizer/index.jsp> |

**Instructional Sequence**

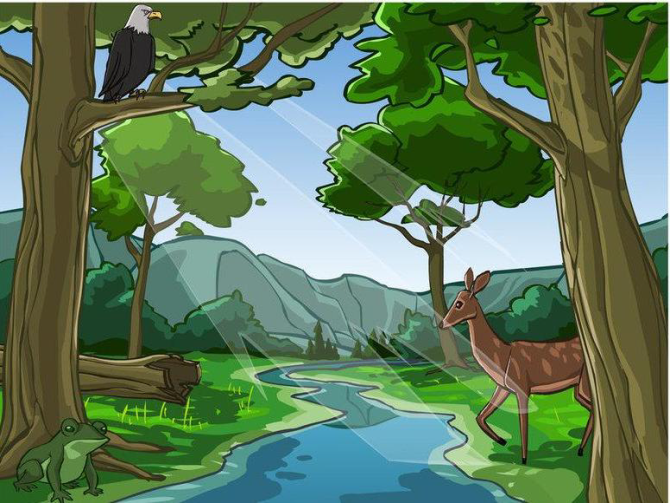
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| **Phase One: Engage the Learner** |
| Power Point Presentation. Teacher will project slides with pictures of different ecosystems across the world. Students will observe the picture carefully, and will use their textbook, notes, or internet to classify each ecosystem based on its characteristics. Students should write down the clues that determined their choice.  Students use a two-column chart to complete this task. |

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| **Phase Two: Explore the Concept** |
| Students will prepare the project guidelines to complete the Discovery Lab:  “Biodiversity –What a Disturbing Thought”,  *Environmental Science,* Holt, Rinehart and Winston, pp. 134-137  Students will need to complete the discovery lab as homework. They will choose a highly disturbed plot and a relatively undisturbed one, and will analyze the biodiversity in each of their mini-plots. They will need to sketch the variety of biotic and abiotic elements in their plot of land. They will present a report following the scientific method, as explained in the book. |

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| **Phase Three: Explain the concept and define terms** |
| Location: Wehr Nature Center  “Biodiversity”  05/29/2013, 9:00-11:30  Students will participate in the nature hike with a naturalist. They will make annotated color sketches of the ecosystems presented by the naturalist. Students will need to provide some hard data: temperature, plot measurements, species measurement, when possible, weather conditions, etc., as narrated by the naturalist, and investigated on their own. |

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| **Phase Four: Elaborate the Concept** |
| Required Reading:  “Defining Wetlands”, *Wow! The Wonders of Wetlands,* The Watercourse and Environmental Concern, Inc., pp. 10-19.  Students will take this class time to finish their field trip report.  A closing activity will be a whole-class fifteen-minute blog. Students will write four blogs and will need to respond to four of their peers’. The conversation must be academic, and repetitions should be avoided. Repeated observations do not count as a valid blog. |

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| **Phase Five: Evaluate students’ Understanding of Concept** |
| **Evaluation criteria (Forest Binder)**  Participation in field trips and class experiment  Field guide observation sheets and class experiment reports  Oral presentations (power points and photographs)  Academic discussions with team members and whole group  Blogs (Student Learning Community: SLC)  Two-column charts, video guides and class notes (illustrated when required)  All student work and participation will be evaluated following rubrics.  Teacher will hold brief individual conferences to ensure quality work, and improvement for next phase of the program. |



**WISCONSIN FORESTS: ACTIVITY FIELD TRIP**

**Summer/June: Forestry Measurements**

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| **Your Name: Veronica Ocampo** | |
| Grade Level: 6th grade | Subject Area: Science/Math |
| Lesson Title: Measurement Trees/Environmental Problems and Solutions | Lesson Length: 180 minutes |

**The Teaching Process**

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| **Lesson Overview**  Students will make a guided hike to Wehr Nature Center, where they will use the measurement instruments provided by the Center to perform direct and indirect measurements of the forest. |
| **Unit Objectives:**  Students will develop skills and concept knowledge to carry out a scientific visit to forests or other ecosystems. |
| **Standards addressed**  MS-LS2-2 Construct an explanation that predicts patterns of interactions among organisms across multiple ecosystems.  CCSS-Math.Content. 6-G-A-1 Find the area of right triangles, other triangles, special quadrilaterals, and polygons by composing into rectangles or decomposing into triangles and other shapes; apply these techniques in the context of solving real-world and mathematical problems. |
| **List of Materials**  Measurement instruments to be provided by Wehr Nature Center. Field Observation Guide Sheet, pencil, colors, clipboard, rulers  McDougal Littell’s Note-Taking Wizard: <http://www.classzone.com/cz/ot/secured/resources/applications/vpg_organizer/index.jsp> |

**Instructional Sequence**

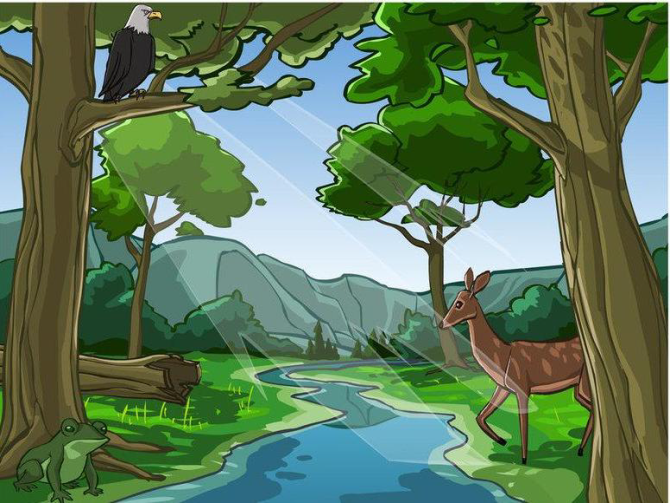
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| **Phase One: Engage the Learner** |
| Pairs. Students will play a challenge indirect measurement game, where they will need to determine the approximate height of trees using the Pythagorean theorem, or another mathematical approach.  Students will record wins and losses in the game to keep interest.  (Use Sketchpad and TI-84 resources) |

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| **Phase Two: Explore the Concept** |
| Location: Wehr Nature Center  06/05/2013, 10:00-12:00  Students will conduct a guided hike with a naturalist, and will use specialized instruments to make measurements of plants in the three ecosystems: wetlands, forest and grasslands.  Students will record data, take pictures, and make drawing or sketches as necessary to write a complete field trip report. |
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| **Phase Three: Explain the concept and define terms** |
| Required Reading, “First the Bad News”, *Environmental Science,* Holt, Rinehart and Winston, pp. 74-80.  “The Good News: Solutions”, *Environmental Science,* Holt, Rinehart and Winston, pp. 81-84.  Students will take notes of the reading on a two-column chart. |

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| **Phase Four: Elaborate the Concept** |
| Students will use all resources (textbooks, books, internet, tables) to write their final report. They will consult with teacher whenever they need assistance, they will also need to consult their peers for guidance. Checklist and rubric for this project will be handed beforehand so students can make questions to the naturalist in order to complete their project.  Final report:  Complete data analysis: date, time, temperature, humidity, sunrise/sunset times  Description of plot: ecosystem, location, measurement, abiotic elements, biotic elements (species, placement, interactions), measurement of species when possible  Annotated color sketches of plots  Photographs  This project constitutes the final project of the program.  A closing activity will be a whole-class fifteen-minute blog. Students will write four blogs and will need to respond to four of their peers’. The conversation must be academic, and repetitions should be avoided. Repeated observations do not count as a valid blog. |

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| **Phase Five: Evaluate students’ Understanding of Concept** |
| **Evaluation criteria (Forest Binder)**  Participation in field trips and class experiment  Field guide observation sheets and class experiment reports  Oral presentations (power points and photographs)  Academic discussions with team members and whole group  Blogs (Student Learning Community: SLC)  Two-column charts, video guides and class notes (illustrated when required)  All student work and participation will be evaluated following rubrics.  Teacher will hold brief individual conferences to ensure quality work, and improvement for next phase of the program. |

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**RESOURCES**

**Bernstein, Leonard, Martin Schachter, Alan Winkler and Stanley Wolfe, *Life Science. Concepts and Challenges,* New Jersey, Pearson Education, Inc., c. 2003.**

**Eckhardt Slattery, Britt and Kesselheim Alan S., *Wow! The Wonders of Wetlands. An Educator’s Guide,* Montana, Montana State University, c. 2003.**

**Forsyth, Adrian and Ken Miyata, *Tropical Nature,* New York, Simon and Schuster, c. 1984.**

**Holt Science and Technology, *Environmental Science,* Austin, Holt, Rinehart and Winston, c. 2002.**

**Holt Science and Technology, *Microorganisms, Fungi, and Plants,* Austin, Holt, Rinehart and Winston, c. 2002.**

**Parrella, Deborah and Cat Bowman Smith (ill.), *Project Seasons,* Shelburne, Shelburne Farms, c. 1995.**

**Warren, Patricia A. and Janet R. Galle, *Exploring Ecology: 49 Ready-To-Use Activities for Grades 4-8,* Arlington, NSTApress, c. 2005.**

**Wong, Marina, Jorge Ventocilla and José A. Polanco (ill.), *A Day on Barro Colorado Island,* Panama, Smithsonian Institution, 2002.**

**World Wildlife Fund, *Windows on the Wild. Biodiversity Basics*, California: World Wildlife Fund and Acorn Naturalists, c. 2003.**

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