First Grade
Maya Mountain Marine Corridor, Belize

National Standards for First Grade Lessons

Writing
Standard 3 Level 1: K-2
1. Generates questions about topics of personal interest.
2. Uses a variety of sources to gather information.

Reading
Standard 7 Level 1 Grade K-2
1. Uses reading skills and strategies to understand a variety of informational texts.
4. Relates new information to prior knowledge and experiences.

Listening and Speaking
Standard 8 Level 1 Grade k-2
8. Listens and responds to a variety of media.

Thinking and Reasoning
Standard 1 Level 1 Grade K-2
Understands and applies the basic principles of presenting an argument.
Standard 5 Level 1 Grade K-2
Identifies simple problems and possible solutions

Mathematics
Standard 1 Uses a variety of strategies in the problem-solving
Level 1 Grade K-2
A) Draws pictures to represent problems.
B) 4. Makes organized lists or tables of information necessary for solving a problem.

Standard 3 Level 1 Grade K-2
3. Understand basic estimation strategies

Standard 4 Level 1 Grade K-2
1. Understand the basic Measures of length, width, height, weight, and temperature.

Life Sciences
Standard 6 Level 1 Grade K-2
1. Knows that plants and animals need certain resources for energy and growth
2. Know that living things are found almost everywhere in the world and that distinct environmental support the life of different types of plants and animals.

Standard 13 Level 1 Grade K-2
Understands that in science it is helpful to work with a team and share the findings with others.
Standard 12 Level 1 Grade K-2

1. Knows that learning can come from careful observations and simple experiments.

Standard 5 Level 1 Grade K-2
1. Knows the basic needs of plants and animals (air, water, nutrients, light or food, shelter)
2. Knows that plants and animals have features that help them live in different environments.

Standard 4 Level 1 Grade K-2
3. Knows that differences exist among individuals of the same kind of plant or animal.

Standard 7 Level 1 Grade K-2
2. Knows that there are similarities and differences in the appearance and behavior of plants and animals.

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Lesson 3: How Do the Jaguar and Howler Monkeys in Belize Depend on Us?

Concept
Forests that line the rivers along a watershed play an important role in keeping waterways healthy, safe and comfortable for animals and people.

Essential Question
How does the weather (particularly the amount of rain) link the jaguar and howler monkey with the manatee and the loggerhead turtle?

Additional Resources

- **Resource Index -** Check out this page at http://www.rainforest-alliance.org/programs/education/teachers/curriculum/resources/index.html for additional supplemental materials that complement these dynamic units and to access many of the resources listed below.

- **Slideshow** – The Learning Site provides a slideshow and script about Belize that includes background information about the animals, people and landscape of this region. The slideshow can be downloaded for viewing in the classroom, printed out and read as a story, or viewed online with the students.

- **Unit-Specific Stories -** The Rainforest Alliance has developed two original stories for use with these units, available in English, Spanish and Portuguese. The stories are available to download and print or can be viewed on-screen.

  Manny Manatee and the Mystery of the Murky Water
  My Dad the Ranger

- **Species Profiles** – The species profiles, available to view on screen or download from the beginning of the unit or the Resource Index, include photos, habitat, foraging behavior, group relationships, threats and many more facts.

  – Ocellated Turkey
  – Jaguar
  – Howler Monkey
  – Manatee
  – Scarlet Macaw

- **Ranger Rick Article -** Download *"Rick and the Gang Visit Costa Rica and Go Bananas,"* a colorful article about bananas and coastal wildlife from the National Wildlife Federation's Ranger Rick magazine.

- **Rainforest Poster –** Download and print out this colorful two-page poster, which is available for you to use in explaining the layers of the rainforest, its products and the environmental threats facing many rainforests around the world.

  Inside the Canopy – Structure and species of the rainforest

  Status Report – What is happening to the rainforest

- **Rainforest Products** – Visit http://www.rainforest-alliance.org/resources/forest-facts/lives.html for a summary of products that we use in our everyday lives that originate in rainforests. Both teachers and students will find information on the products found in their homes and supermarkets that either originated in tropical forests or are currently produced there.

- **Profiles in Sustainability** – Click here http://www.rainforest-alliance.org/programs/profiles/index.html for case studies on companies who work closely with the Rainforest Alliance to ensure that their practices protect wildlife, workers and communities.

- **Toledo Institute for Development and the Environment (TIDE)** - Check out these online resources for more information about the Rainforest Alliance's partner group in Belize:
  www.rainforest-alliance.org/programs/aar/belize.html
  www.tidebelize.org

- **Certificate of Accomplishment** – Print out colorful rainforest certificates for your students to commemorate their completion of these units.

Informational Introduction for the Teacher

The Maya Forest is the watershed for the Coastal Ecosystem of Belize. If the waterways that carry rainfall are degraded, the soil from the rainforest floor erodes into the rivers and travels down to the coast. When roots of trees aren't present to hold back the soil, it floods the rivers making the rivers murky and muddy. When the habitat of the jaguar and howler monkey is deforested it negatively affects the manatee and loggerhead at the other end of the watershed. Due to deforestation to meet the needs of rising consumer markets, erosion occurs because the roots of trees are needed to hold soil in place. This is true in the North American forests as well.

Step 1 – CONNECT (The Concept to Prior Knowledge)

Challenge

Identify the ways that a landscape might change due to weather. By altering the landscape through the simulation of flood and resulting erosion, children will understand why rivers get muddy/murky at the coast. This will help them understand how Manny's home was affected by erosion.

Materials
- Book: **The Magic School Bus: At the Waterworks**, by Joanna Cole and Bruce Degen
- Map of local watershed
- Simulated watershed system: 3-inch high baking pan, dirt and clean water

Procedure
1. Discuss where the water comes from to get to the school faucets. Sources of water are often a distance away from the faucet. The water the manatee and loggerhead swim in originates far from their home but affects the safety and health of their water.

2. Read **The Magic School Bus: At the Waterworks**, by Joanna Cole and Bruce Degen.

3. Show the students a map of their watershed. Describe how the water flows from its origin to the school.

4. Discuss how water picks up loose materials on its way to the ocean or reservoir.

5. Show students how water picks up materials along the riverway by simulating a watershed in the classroom or in the play space. This can be done using a 3" high baking pan in which dirt is formed into a landscape that roughly simulates a downward incline to the ocean from hills. Have students take a sample of the clean water at the start and compare it to the murky water that lands in a pool at the end of the waterway.

6. Discuss how this kind of riverbank can affect changes in water quality with large amounts of moving water. (You could simulate another environment using pieces of sod to stabilize the riverbank. This shows the difference between rooted plants lining a river, holding in soil and a pure dirt-lined riverbed. Or, do the experiment outside using two different sites in the schoolyard and have students describe the differences.

Step 2 – LITERATURE/DISCUSS (Give Expert Information Book; Ask Questions)

Challenge
Students discover the habitat of the jaguar and the howling monkey. They begin to conceptualize how life for the jaguar and monkey is tied to the manatee and loggerhead and ways that it is similar to their watershed.

Materials
- Video: **"A Walk in the Rainforest"** available from Bullfrog Films
- Book: **At Home in the Rain Forest,** by Diane Willow and Laura Jacques
- Book: **Here is the Tropical Rain Forest,** by Madeleine Dunphy
- Species profiles: jaguar, howler monkey – Available on the Learning Site

Procedure
1. Show students **"A Walk in the Rainforest"** available from Bullfrog Films. In this video, an 8 year-old boy takes his friends on a tour of a rainforest in Belize. The video portrays a variety of plants and animals that live there.

2. Read **At Home in the Rain Forest,** by Diane Willow and Laura Jacques. This story describes the sights and sounds of the rainforest, introducing the reader to the plants and animals that inhabit this precious ecosystem.

3. Read the **Here is the Tropical Rain Forest,** by Madeleine Dunphy. This story has a cumulative text, taking the reader on a journey through the rainforest from the mossy forest floor up to the emergent layer at the top.

4. Show students the species profiles of the jaguar and the howler monkey. Describe where they live in the rainforest (i.e. the canopy, understory, forest floor) and discuss their relationship with the river or watershed.

5. Make comparisons to how these four species use and live within the Maya Mountain Marine Corridor. Remind students of how their watershed is similar. What effect would erosion have on the jaguar and monkey in the Maya Mountain Marine Corridor compared to the manatee and the loggerhead at the mouth of the River?

6. Look at the Rainforest Alliance Web page, http://www.rainforest-alliance.org/programs/aar/belize.html, which discusses threats to the environmentally important Maya Mountain Marine Corridor and efforts to protect it.

7. Additional References:
   Nature's Green Umbrella by Gail Gibbons

Step 3A – PRACTICE (Math and Learning Centers)

Challenge
Students carry out a number of comparisons to judge how muddy the water at the end of their simulated watershed is when lined with sod or just dirt.

Materials
- Simulated watershed system from Step 1
- Sod
- Dirt

Procedure
1. Using the simulated watershed system, one with sod and the other bare dirt, create a chart that gives indicators of muddiness. Have students name the various gradations and align them with the health of the water for living species, including the manatee and turtle.

2. Collect water samples from each 'watershed' after a bucket of water has been poured down. Match the samples with the chart of muddiness.

3. Annotate the samples with gradations of "healthy for land animals" or "healthy for water animals."

Step 3B – CREATE (Performance tasks related to Standard Indicators)

Challenge
Students are challenged to research the four different species highlighted in this unit and write a story from the perspective of each one regarding the watershed and how important it is to their livelihood.

Materials
- Paper
- Art supplies

Procedure
1. Students draw pictures of themselves using water and write one or two sentences about how important water is to their lives.

2. Students draw pictures of the different species using the water source and write one or two sentences on how important the water is to their lives.

Step 4 – PRESENT

Challenge
Students will each begin to compile a book called *The Rainforest and Me*. In this will go their maps of local place and Belize as well as the new information on water sources.

LESSON 3 ASSESSMENT RUBRIC:
Teacher observations of tasks with rubrics as listed below, as well as collected work samples.

Assessment Guidelines	3 = P (Proficient)	2 = S (Satisfactory)	1 = NW (Needs Work)
1. Students identifies how weather impacts a landscape, particularly rain/erosion through the watershed simulation task.			
2. Student begins to understand the concept of a watershed through the mapping activity. Student will understand how different animals living in a watershed depend on its health and services.			
3. Student collects data from the watershed simulation and shows how erosion impacts the health of a watershed.			
4. Student represents through pictures, the relationship different animals have to watersheds and the importance of maintaining the health and function of watersheds for their welfare.			