The Big Gift 2011

Teacher's Guide: One Sq. Yard of Rainforest

What's in your One Sq. Yard of Rainforest Kit

25 Earth Banks
1 Poster: 1 Square Yard of Rainforest
2 Reproducible Handouts
- Handout One - Area of Rectangles
- Handout Two - One Square Yard of Rainforest

1 Fact Sheet
- The Importance of Rainforests

1 Green String, 1 yard length

Introduction

The Big Gift to the Earth 2011 is designed to teach students about the importance of the rainforest biome and that their actions can make a difference in protecting this valuable habitat. Students are given Earth Banks and challenged to collect at least one dollar in pennies to purchase rainforest habitat in Peru. One penny can purchase 1 square yard of rainforest! Multiple activities model the positive impact that one classroom can have in rainforest conservation. **This unit provides opportunities for students to practice math skills: measurement, area of rectangles, and ratio and proportion. These activities align with state math standards for grades 4-6.**

The Big Gift is fundamentally a service project: collecting coins to purchase and protect vulnerable rainforest habitat, one square yard at a time.

Background

Why do rainforests get so much attention among environmental conservationists? Why do they spend so much energy working to understand and protect this biome when there are clearly other important environmental issues closer to home? Wouldn't conservation efforts have a greater impact on our lives if we focused on our local environment? These conservationists know that even though rainforests, both temperate and tropical, account for only 2% of the earth's surface, they are vitally important for the health of the whole planet; rainforest conservation is important to us all, no matter where on the planet we call home.

Rainforests are characterized by high rainfall, over 70 inches per year. Rain forest plants quickly absorb rain water, which then evaporates from their leaves, replenishing water vapor in the atmosphere. This process has a cooling effect. Increased vapor in the air keeps temperatures more stable, less susceptible to the extreme highs and lows that are typical of deserts. This water recycling also increases cloud cover and precipitation. Rainforests can be seen as the thermostats and humidifiers of the world.

Not only do rainforests play a significant role in the water cycle, but they are also important actors in the carbon cycle. It is estimated that the soil and plants in each hectare (2.471 acres) of rainforests remove from the atmosphere one ton of carbon dioxide per year. That comes out to about 8 lbs per square yard. On the other hand, the destructive slashing and burning of rainforests accounts for 25% of the carbon dioxide emitted by human activities today. Protecting rainforests can make a significant impact on global carbon dioxide levels, reducing greenhouse gasses in the atmosphere and

combating the global warming trend.

Even though rainforests account for such a slim fraction of the earth's area, this biome is home to 50 percent of its plants and animals. (Here's an unusual fact: there area more fish species in the Amazon River than in the entire Atlantic Ocean!) Unfortunately, as the forests are being cleared to create marginally productive farms and pastureland, this human activity has increased the natural extinction rate by 10,000%. Our planet is currently experiencing the largest mass-extinction since the dinosaurs died-out 65 million years ago. But it may be mankind who pays the final price for the rainforests destruction. Check out the following statistics:

- At least 1,650 rainforest plants can be utilized as alternatives to our present fruit and vegetable staples
- 37% of all medicines prescribed in the US have active ingredients derived from rainforest plants
- 70% of the plant species identified by the US National Cancer Institute as holding anti-cancer properties come from rainforests
- 90% of the rainforest plants used by Amazonian Indians as medicines have not been examined by modern science
- of the few rainforest plant species that have been studied by modern medicine, treatments have been found for childhood leukemia, breast cancer, high blood pressure, asthma, and scores of other illnesses

Rainforest conservation is a global issue, for the long-term health of humankind is linked to the survival of the world's rainforests. All funds donated through the Big Gift to the Earth will be dedicated to preserving rainforest in the Molino Pampa Community Reserve. $50 purchases and protects an acre of rainforest forever, but any amount will help – small actions add up to a Big Gift to the Earth.

Classroom Activity 1: How Much Will You Protect?

A Simple Ratio: One cent protects one square yard of rainforest!
Green Math: If each student in your class collected $1.00, how much area can your class protect all together?
Teacher Prep: Look over *Handout 1*. You may want to create an answer key before class begins, since the answers are based on the number of students specific to your class.
Purpose: Students determine the area of rainforest they will protect. They will use the formula for the area of rectangles to determine the best length and width for modeling this amount in the schoolyard.
Time: One class period
Materials:

Teacher: *Fact Sheet 1*
1 Square Yard of Rainforest Poster
Earth Banks
For each student: *Handout 1* and a calculator

Instructions:

- Read *Fact Sheet 1* aloud to the class
- Tell the students "We have the opportunity to collect money to purchase rainforest habitat so that it will be protected forever. It will cost only one penny to

purchase 1 square yard of rainforest in Peru." This is a good time to show the *1 Square Yard of Rainforest Poster.* "We will do an activity to figure out how much rainforest we could protect if each student were to collect 100 pennies." This is a good time to show students the *Earth Banks*. "Before we are able to figure out how much rainforest we will protect, it is important to review some properties of rectangles."

- Using your white/black board, review the formula for area of a rectangle, *a=l(w)*, where a=area, l=length, and w=width. Show some examples of determining an area with given lengths and widths using multiplication.
- Pose the question: "If an area is known, 24 square yards for example, how can I determine the *l* and *w*?" Discuss the strategy "Guess and Check" and how students can divide 24 by one factor (*l*) to determine the second factor (*w*). Follow up question: "Is there more than one whole number solution?"
- Write the factor pairs (1,24), (2,12), (3,8), and (4,6) on the board. "These are the factor pairs for the number 24. How can I use them to draw the different rectangles that have whole number lengths and widths and have an area of 24?"
- Draw the following rectangles: a. *l=1, w=24,* b. *l=2, w=12,* c. *l=3, w=8, d. l=4, w=6* so that students can visualize the 4 rectangles that have a whole number length and width and have an area of 24 square yards.
- Students begin *Handout 1*: Review and discuss the answer to question #1 before students continue.
- If time is short, work together as a class and ask students to volunteer answers. Write answers on your white/black board and proceed immediately to discussion.
- Review answers and, as a class, decide the best rectangle to build out on the school yard and where to do it.

Classroom Activity 2: Building the Rectangle

A Simple Ratio: One cent protects one square yard of rainforest!
Teacher Prep: After your students have completed Activity 1, do a quick check of the space where the class chose to build the rectangle. If it does not work for this activity, suggest another space.
Purpose: Students build the rectangle that represents the area of rainforest that they will protect. Students challenged to come up with a unique way to quantify that space.
Time: One class period
Materials:

1 yd. of green string, which can be separated into strands to make several copies, or you may want to provide a 1 yd. length of string for each student
Rope or cones or other objects to mark the rectangle's perimeter

Instructions:

- After deciding on an appropriate outdoor space for this activity, students measure out the perimeter of the rectangle using the 1 yd. pieces of string. Mark the perimeter of the rectangle with chalk, cones, rope, etc.
- Have students walk the perimeter, counting their paces. Which student has a total closest to the actual measurement in yards?
- Have students take a while to occupy the space and observe its size and what it contains.
- Ask students to come back to class with a unique measurement or estimate

about the rectangle. Students may use the green string or may use non-standard units, like body lengths.
    - Examples: Measure the length of the diagonals, how many students they think could fit inside (perhaps they see how many students fit in one square yard and multiply), how many trees or insects it contains, how many hand lengths around the perimeter, etc.
- Let each student share the way that he/she quantified the space. Possible follow up question: How this area of school yard like the exact same area of rainforest? How is it different?

Classroom Activity 3: Rainforest Ratios

A Simple Ratio: One cent protects one square yard of rainforest!
Teacher Prep: Look over *Handout 2*. You may want to create an answer key before class begins, since the answers are based on the number of students specific to your class.
Purpose: Students use ratio and proportion to determine some of the living species that their donation will protect.
Materials:

Handout 2
Calculators for each student, if you choose
Earth Banks

Instructions:

- Students begin *Handout 2*: Review and discuss the answer to question #1 before students continue.
- If time is short, work together as a class and ask students to volunteer answers. Write answers on your white/black board and proceed immediately to discussion.
- Review answers. There is no answer key because the answers are specific to the # of students in your classroom, however the following guide can help you come up with the correct solutions (the variable "s" represents the # of students in your class):
  Answers
  1. **S x 100**
  2. **S x 100 x 700**
  3. **S x 100 x 167**
  4. **(S x 100) ÷ 700**
  5. **A bit more complicated. First, a peccary requires 30 x 4,840 = 145,200 sq. yds. Assuming that your class will not protect that amount with 100 sq. yds. per student, you will subtract 145,200 – (S x 100) to get the area of additional land that you would need to purchase. To find the cost, divide the area by 100 to find a dollar amount.**
- Hand out the *Earth Banks* to begin the fundraiser!

Kicking off The Big Gift to the Earth Fundraiser:

Challenge your students to raise as much money as possible. How much money would they have to raise to protect an area the same size as your school site? How about the same size as your town? What if every student in every school participated – would it be possible?

Other ideas:

- Persuasive writing – students write about the importance of rainforests and the need to act quickly to protect them. They can read their speeches in other classrooms to motivate the entire school.
- Posters – students design posters to bring attention to the Big Gift to the Earth and rainforest conservation. Display the posters around the school.
- Letter writing – students write letters to friends and relatives who live out of town, explaining the fundraiser to them and asking for donations.
- Designing penny jars - students design donation jars and distribute them to local businesses that wish to participate.

Fact Sheet 1: The Importance of Rainforests

- **Fact:** Covering less than 2 percent of the Earth's total surface area, the world's rainforests are home to 50 percent of the Earth's plants and animals.
- **Fact:** Rainforests can be found all over the world from as far north as Alaska and Canada to Latin America, Asia and Africa.
- **Fact:** Rainforests are found on every continent across the Earth, except Antarctica.
- **Fact:** There are two major types of rainforest: *temperate rainforests* and *tropical rainforests.*
- **Fact:** The largest temperate rainforests are found on North America's Pacific Coast and stretch from Northern California up into Canada.
- **Fact:** Temperate rainforests used to exist on almost every continent in the world, but today only 50 percent – 75 million acres – of these forests remain worldwide.

Facts about the Rainforest as Part of our Global Environment and Well-being:

- **Fact:** Rainforests act as the world's thermostat by regulating temperatures and weather patterns.
- **Fact:** One-fifth of the world's fresh water is found in the Amazon Basin.
- **Fact:** Rainforests are critical in maintaining the Earth's limited supply of drinking and fresh water.

Facts about the Abundant Life and Important Resources that Rainforests Share with Us:

- **Fact:** A typical four square mile patch of rainforest contains as many as 1,500 flowering plants, 750 species of trees, 400 species of birds and 150 species of butterflies.
- **Fact:** Rainforests provide many important products for people: timber, coffee, cocoa and many medicinal products, including those used in the treatment of cancer.
- **Fact:** Seventy percent of the plants identified by the U.S. National Cancer Institute as useful in the treatment of cancer are found only in rainforests.
- **Fact:** More than 2,000 tropical forest plants have been identified by scientists as having anti-cancer properties.
- **Fact:** Less than one percent of the tropical rainforest species have been analyzed for their medicinal value.

Facts about the Threats to Rainforests, Indigenous People and Species:

- **Fact:** Rainforests are threatened by unsustainable agricultural, ranching, mining and logging practices.
- **Fact:** Before 1500 A.D., there were approximately 6 million indigenous people living in the Brazilian Amazon. But as the forests disappeared, so too did the people. In the early 1900s, there were less than 250,000 indigenous people living in the Amazon.
- **Fact:** Originally, 6 million square miles of tropical rainforest existed worldwide. But as a result of deforestation, only 2.6 million square miles remain.
- **Fact:** At the current rate of tropical forest loss, 5-10 percent of tropical rainforest species will be lost per decade.
- **Fact:** Nearly 90 percent of the 1.2 billion people living in extreme poverty worldwide depend on forests for their livelihoods.
- **Fact:** Fifty-seven percent of the world's forests, including most tropical forests, are located in developing countries.
- **Fact:** Every second, a slice of rainforest the size of a football field is mowed down. That's 86,400 football fields of rainforest per day, or over 31 million football fields of rainforest each year.
- **Fact:** More than 56,000 square miles of natural forest are lost each year.

Handout 1: Area of Rectangles student name_____

1. Calculate the area of rainforest that your class will protect if each student collects 100 pennies. (1 penny = 1 sq. yd.).

_____

2. Several rectangles can be made that have the area that you calculated above and that also have sides with whole number measurements. You can use the formula for the area of rectangles (area = length x width) to help you, but using algebra we can change it to be more helpful: width = area ÷ length. You can use guess and check and division to find length and widths of whole numbers. Guess a whole number length, divide the area by it, and see if you get a whole number width. How many rectangles can you find?

Length	Width	Area

3. In the space below, draw each of the rectangles that you listed in the above table.

5. Which of these rectangles most closely resembles a square? Explain.

4. Remember, a yard is exactly three feet - that's about the length of one big walking step. If you were to mark the boundaries of one of these rectangles somewhere in the school yard, where would you do it? Which of the rectangles would you choose? Be prepared to discuss your choice with the class.

Handout 2: Rainforest Ratios student name_____

1. How many square yards of rainforest will your class protect if each students collects just one dollar?

2. In the Amazon Rainforest, ants have been surveyed at 3.5 million per acre – that's about 700 ants per square yard! How many ants will your classroom donation protect?

3. One square yard of Amazon Rainforest contains, on average, 167 lbs of living plants. That includes all of the trees, moss, ferns, flowers, shrubs – there are over 40,000 different kinds of plants in the Amazon! How many pounds of living plants will your classroom donation protect?

4. In another Amazon Rain Forest study, researchers determined that there were about 7 birds per acre of forest. That means that there is about one bird for each 700 square yards of rainforest. How many birds will your classroom donation protect?

5. Peccaries are some of the most common mammals in the Amazon Rainforest. They are primarily fruit and seed eaters and resemble pigs. As seed dispersers and seed destroyers, engineers of freshwater habitats and forest gaps, peccaries play a great role in maintaining rainforest health. Peccaries need a lot more habitat than birds and ants. A rough estimate of peccary population density is one peccary for every 30 acres (there are 4840 sq. yds. In an acre). Will your classroom collect enough to save a peccary?

   If not, how many more square yards would you need to purchase? How much more would that cost?

January 2011

Dear Teacher,

Earth's Birthday Project proudly announces our 2011 Big Gift Rainforest Site – the Molino Pampa Community Reserve in northern Peru. This tropical rainforest reserve in the Andes is home to the rare and endangered Yellow-Tailed Woolly Monkey, Mountain Tapir, and Spectacled Bear—species threatened by habitat loss from deforestation.

Enclosed you will find a poster featuring images from the Reserve – a piece of green string! Use this string in an activity to help your students envision the impact that one student and one classroom can make.
The One Square Yard Activity Guide can be found on our website at http://earthsbirthday.org/gifts.

These tools offer a window into another world for your students, but one that is not altogether disconnected from their everyday lives. This swath of rainforest helps to clean the air we breathe. In fact, just one of Molino Pampa's 25,000 acres captures 660 people's daily carbon output. Through the lens of nature, your students will have a fresh frame to connect them to a larger community that is vitally important to the health of our own. Additional online activities found on our website provide a deeper look at the Reserve's rich biodiversity and help kids make the carbon connection—what nature must bank to offset our carbon spending.

Our free Earth Banks also make it easy for kids to realize how little contributions (lingering underneath couch cushions or at the bottom of the hamper) can add up to a Big Gift to the Earth. To request Earth Banks, return the enclosed card or visit http://earthsbirthday.org/gifts/earth-banks.

I hope you and your students will find inspiration in being part of our 2011 Big Gift. Your participation translates into essential conservation of the Molino Pampa, and gives children the experience of knowing that by taking a small action, together, we can make a BIG difference!

In partnership for the Rainforest,

Cliff Ross