



RAIN FOREST TEACHING CURRICULUM



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Welcome to Rain Bird's Rain Forest Teaching Curriculum!

The Rain Bird Rain Forest Teaching Curriculum features “I can relate to that” science learning tools for teachers, students, and parents. The following is a list of answers to some frequently asked questions about the Rain Bird Rain Forest Teaching Curriculum:

What is it?

Rain Bird's Rain Forest Teaching Curriculum is an online educational tool for teachers to use and find specific lesson plans and related course work for kindergarteners through high school seniors. This content is also available online at www.rainbird.com.



What is its purpose?

To teach natural history, ecology, biology, physics, and chemistry through demonstrations, experiments, and classroom activities. Rain Bird and California State Polytechnic University, Pomona (Cal Poly Pomona) designed the program content, which focuses on endangered tropical rain forests in Latin America, South America, Africa, and Southeast Asia as the basis for teaching science through fun, hands-on things children already do and like—art projects, outdoor activities, and classroom demonstrations. The curriculum motivates kids to think about the part each of them plays—or the actions they can take—in preserving and protecting the environment.

Who should use it?

Teachers and parents. Teachers who are seeking a new, fun and engaging resource to teach children about science. Parents who are looking for friendly, but educational how-to's on “bringing science home.” But most of all, it offers something for just about anyone and it's just plain fun for kids, no matter what their age.

Is the information easy to use?

Yes! The information is well organized and self-explanatory. The curriculum is arranged with grade-appropriate material (K-1, 1-2, 2-3, 3-4, 4-5, 6, 7, 8, and 9-12). As appropriate, each grade level contains projects that integrate science with art; data gathering, observation, and inference; analysis of physical matter; in-class demonstrations to be performed by teachers for students; and at-home projects that illustrate scientific principles in a manner both understandable and meaningful to school-age children.

Why the focus on rain forests?

Rain Bird has always supported and educated its consumers on the importance of the “Intelligent Use of Water.” The curriculum ties into this philosophy because rain forests provide oxygen and consume carbon dioxide, playing a pivotal role in the climate control of our planet. This affects wind, rainfall, humidity, and temperature worldwide. Rain Bird is deeply concerned about the environment and has always promoted stewardship of Earth’s resources, of which water is among the most precious. Some 30 million species of plants and animals—a majority of all things living on Earth—exist interdependently in tropical rain forests. In addition, rain forests are rich with plants vital in creating modern medicines.

What has the response to the curriculum been?

Thousands of online visitors each month learn about the important role tropical rain forests play in the world. And, because the information is being so well received, Rain Bird has expanded its commitment to university-level education through its partnership with California State Polytechnic University, Pomona. Jointly, they will unveil in 2002 three Rain Bird Learning Centers at Cal Poly Pomona’s BioTrek Project, located on the Cal Poly campus.

About Rain Bird

Rain Bird Corporation, based in Glendora, California, USA, is the world’s largest manufacturer of sprinkler and drip irrigation equipment. Founded in 1933, Rain Bird offers the industry’s broadest range of irrigation products to golf courses, sports arenas, amusement parks, farms, and commercial and residential developers in more than 130 countries. For more information, visit Rain Bird’s web site at www.rainbird.com.

This workbook is brought to you through a partnership between:



Rain Bird, Azusa, California

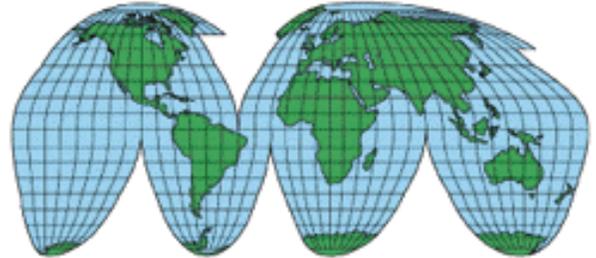


Science IMPACT, College of Science,
California State Polytechnic University, Pomona

The Rain Forest: An Introduction

What is a tropical rain forest?

A tropical rain forest is a forest that receives 4 to 8 meters of rain each year.



Where are tropical rain forests located?

Rain forests are located within a narrow region near the equator in Africa, South and Central America, and Asia.

Why are tropical rain forests important to our earth?

Rain forests play an important role in the climate control of our planet by having an affect on the wind, rainfall, humidity, and temperature. Within the rain forest, water, oxygen, and carbon are recycled. This natural recycling helps to reduce flooding, soil erosion, and air pollution.

The rain forests support over one half of the plant and animal life on Earth, even though they cover only 2% of the Earth's surface.



Approximately one fourth of the pharmaceuticals (medicines) we use come from plants of the tropical rain forests. According to the National Cancer Institute, 70% of the plants from which we make medicines and that are effective in the treatment of cancer can only be found in the rain forests.

What is happening to our rain forests?

27 million acres of the Earth's rain forests are destroyed each year due to man. The activities which threaten the rain forests are: agriculture, clearing and developing of land, beef cattle ranching, logging, and the building of dams and hydroelectric plants. This results in a loss of 100 acres of rain forest per minute and 80% of the rain forests in the world are now gone. The destruction of the world's rain forests at this rate causes 10,000 plant and animal species to become extinct each year.

Grades K-5 Activities Overview

Curriculum materials are divided into grade level segments. Within the segments for grades K-5, there are four components of curriculum materials:

- ❑ **Science Through Art** – These activities integrate science and artistic skills, such as coloring, drawing, painting, and printmaking.
- ❑ **Interactive Science Activity** – These activities are experimental in nature, requiring students to take data, make observations of the data and, at higher grade levels, to make inferences from the data.
- ❑ **Outdoor Activity** – These activities allow students to gather materials from the field and perform scientific analyses, appropriate to their grade level, on the materials that they bring in from their excursion to the outdoors.
- ❑ **In-Class Demonstration** – These activities are demonstrations to be performed for the students by the teacher, using commonly available materials, and primarily related to physical science aspects of rain forest phenomena.



Grades K-1 Activities At a Glance



- ❑ **Science Through Art: Rain Forest Mobile**
- ❑ **Interactive Science Activity: Seed Germination**
- ❑ **Outdoor Activity: Leaf Hunt**
- ❑ **In-Class Demonstration: Rainbow**

Grades K-1 Science Through Art Activity: Rain Forest Mobile

In this activity students can learn the names of some of the animals that live in the rain forest. They will do this by cutting out and coloring the pictures of various animals, which are provided.

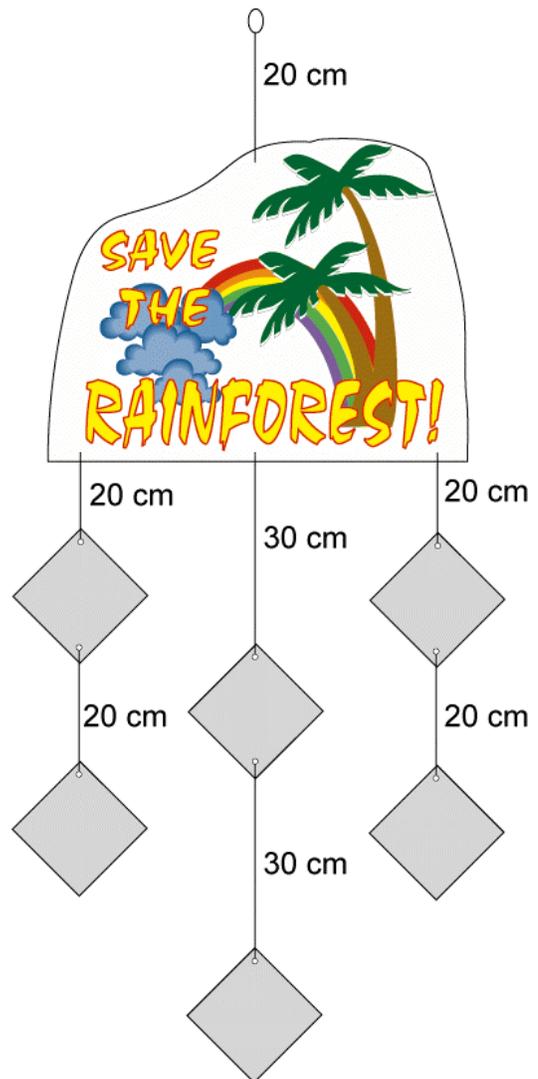
Materials:

Printouts of rain forest animals, crayons or markers, scissors, glue, yarn or heavy string, colorful construction paper, hole punch.

Procedure:

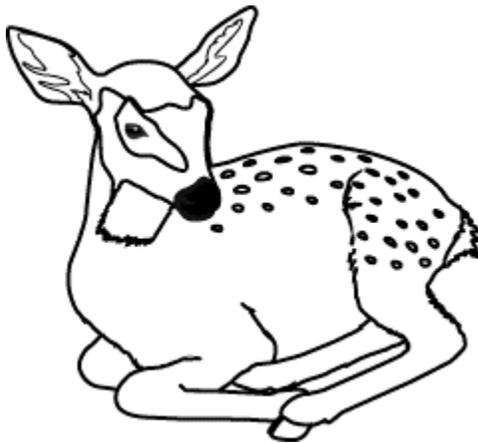
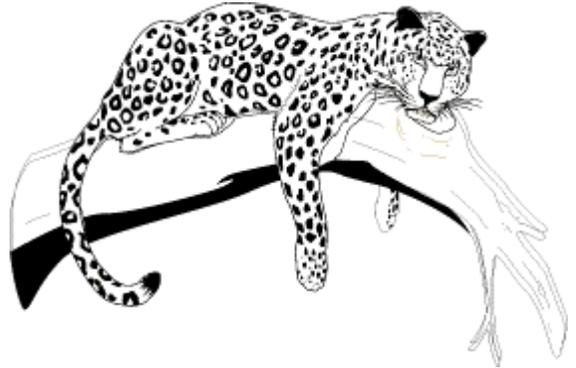
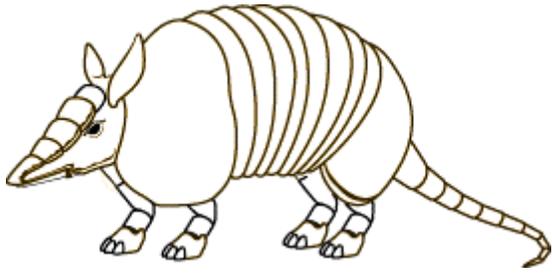
There are numerous ways to construct a mobile. This is a very simple version which takes the guesswork out of balancing the mobile.

1. Precut twelve construction paper squares of diameter 11 cm on a side for each student (using the paper cutter at your school will save time).
2. Print the pictures of the animals from this web site for the students to color and cut out. Allow the students to select ten construction paper squares in the colors of their choice.
3. Each student will need to paste two paper squares together, back-to-back, so that they have six doublethick squares, perhaps green on one side and yellow on the other, all the same color, or a variety.
4. Three of the double-sided paper squares will need a hole punched at the top and the bottom (with the squares in an orientation which makes them diamond-shaped, as in the diagram) and three of them will require a hole punched at the top only.



5. The students can now paste the animals they have colored and cut out on both sides of the paper squares. They can use different animals on each side, or the same animals on each side, but they should have a variety.
6. Print two "Save the Rain Forest" designs for each student. This design will form the top of the mobile. Have students paste the copies of the design on both sides of card stock or two thicknesses of construction paper. Punch three holes across the bottom and one at the top, as in the diagram.
7. Precut the yarn or heavy string for each student in the following lengths: two pieces of approximately 30 cm and five pieces of approximately 20 cm. Lengths may vary from these values, as long as they are the same on both sides of the mobile.
8. One of the 20 cm pieces will require a loop tied at one end so that the mobile can be suspended from the ceiling. Tie the other end through the hole at the top of the "Save the Rain Forest" design.
9. Tie the strings to the bottom of the "Save the Rain Forest" design as shown in the diagram. Construct the mobile by tying the paper squares to the strings as shown.







Grades K-1 Interactive Science Activity: Seed Germination

In this activity the students will learn about seed germination and discover that a plant embryo (or baby plant) exists in every seed. They will also experiment with the effect light has on seed germination, and predict if seeds germinate best in the light or the dark. There should be some discussion of the importance of plants in the rain forest and in other parts of the world - plants supply food, oxygen, shelter for animals and building materials for man, as well as maintain the climate of earth (through carbon dioxide absorption, helping to prevent global warming; some of this information is too sophisticated for K-1 students and should be used with teacher discretion).

Materials:

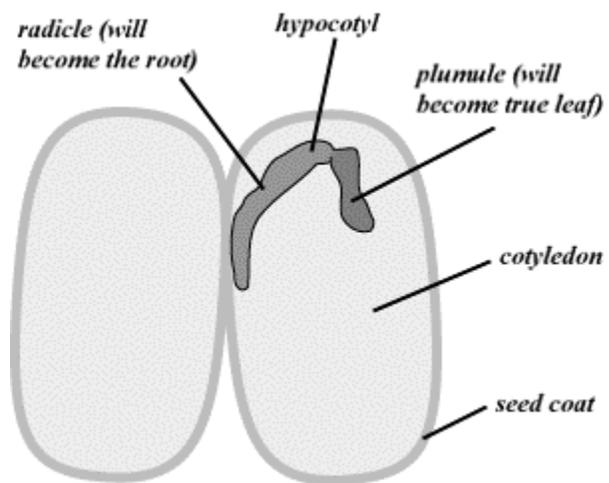
Dry lima beans (purchased from the market), water, magnifying glasses, plastic beverage cups, paper toweling, aluminum foil.

Procedure:

There are two components to this activity: (1) students explore the structure of the seed, and (2) they experiment with the effect of light on seed germination.

Component #1:

1. Soak enough lima beans to distribute one per student (have extras on hand for those who drop, lose, smash, etc. their specimen); soak for 30 minutes to loosen the seed coat.
2. Each student should examine the seed and peel off the seed coat, which serves as protection for the seed. This should be discussed; ask the students why the seed coat is there and why the seed needed to be soaked prior to peeling off the seed coat. Ask them also if they think this is what needs to happen in nature. They should arrive at the conclusion that there needs to be rain, or if we plant seeds, we need to water them. Also discuss that the seed itself is

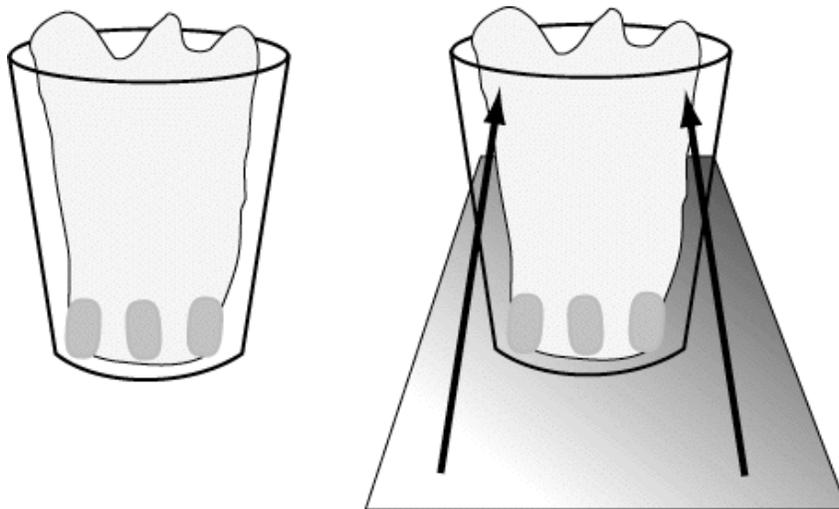


food for the baby plant until it germinates (or sprouts) and can make its own food by growing in sunlight and being watered by rain or irrigation.

3. Once the seed coat is off, have the students split the seed apart to expose the plant embryo and examine it with a magnifying glass. A diagram of the seed follows:

Component #2:

1. Soak (for about 30 minutes) enough dry lima beans so that each pair of students has six seeds.
2. Give each pair of students two plastic beverage cups, two paper towels, a shallow pan of water, six soaked lima beans, and enough aluminum foil to wrap one of the cups.
3. Working in pairs the students should soak two paper towels, wring them out, fold each to fit neatly in each of the two plastic cups, and drop three soaked lima beans in each cup, placing the beans between the wet toweling and the inner surface of the cup.
4. Have students completely wrap one of the cups in aluminum foil to block light from reaching the seeds.
5. Use a marker pen, such as a Sharpie, to identify which cups belong to whom and then place them in a location where they can be observed on a daily basis.
6. Have students make observations of their seeds each day and ultimately draw conclusions regarding the growth of plants from the seeds.



Fold aluminum foil up
to cover plastic cup

Questions for Students:

1. What was inside the seed when you opened it?
2. What effect did the difference in light have on the growth of the plants?
3. Why was it important for the towels to be wet?

Grades K-1 Outdoor Activity: Leaf Hunt

Students often overlook plants and their importance. This activity stimulates students to closely observe leaves and identify their characteristics. This simple activity also builds on students' counting and sorting skills.

Materials:

Paper or plastic sacks to collect leaves, magnifying glasses, chart paper and marker pens.

Procedure:

1. Take the students out to the campus to collect leaves (or ask them to bring leaves from their own yards).
2. Once inside, the students can sort the leaves by various characteristics, such as:
 - rough or smooth edges
 - veins in one direction, or branched
 - light or dark green pigment
 - leaves of colors other than green
 - thick or thin
 - lobed or not lobed
3. Using chart paper and marker pens, chart and graph the leaf hunt results.



Grades K-1 In-Class Demonstration: Rainbow

One of the most beautiful displays of physical science in the rain forest is the rainbow, which appears when there are droplets of water in the air. This demonstration allows you to create a rainbow on the ceiling of your classroom, so that all students can see it.

Materials:

Clear plastic cup, water, overhead projector.

Procedure:

1. Fill the cup with water and place it on the glass of the overhead projector. Turn on the projector.
2. As the water settles down after being placed on the overhead projector, you will see a large circular rainbow on the ceiling of the classroom.

Questions for Students:

1. Which color is on the outside of the rainbow? Which is on the inside?
2. In a real rainbow, which color is on the top?
3. What shape would the classroom rainbow have if a square plastic container were used? (Try it!)

