



# Amazing rainforests

**Exploring the rainforests** of the world provides an opportunity to discover an amazing feature of our number system, place value. A revolutionary development in number systems, place value allows us to express and compute very large and very small numbers efficiently. The problems presented this month offer an opportunity for students to think about base-ten units, flexible bundling and unbundling, and the positional notation that forms the foundation of our base-ten decimal number system.

## Grades 5–6

### WEEK 1

**Trees in the rainforest** have the ability to grow to tremendous heights—60–150 feet—and live for hundreds, even thousands, of years. These giants form the basic structure of the rainforest. Unfortunately, many of these trees are lost to logging. Express all your answers as a power of ten: If a logging company cuts down 1000 100-foot trees, how many feet of cut trees will they have? If these trees are cut into logs that are each 10 feet long, how many logs will they have from the 1000 trees? If the logs are stored on carts that can each hold 100 logs, how many carts are needed to hold the logs from the 1000 trees?

### WEEK 2

**At 2.5 million square miles** (sq. mi.), the Amazon rainforest represents 54 percent of the total rainforests left on Earth. What is the total size in square miles of all the rainforests left on Earth? Round this number to the nearest 100,000. Suppose a science foundation wants to partition the rainforests into sections of 10 sq. mi. each and hire 1 scientist to study each section: How many scientists must they hire? If the sections are each 100 sq. mi. and they hire 2 scientists to study each section, how many must they hire? If they hire teams of 20 scientists to study 1000 sq. mi. sections, how many scientists must they hire?

### WEEK 3

**About 50,000,000 tribal people** live in the world's rainforests today. Use the results of the week 2 problem to approximate the average number of people per square mile in the rainforests. Large urban areas typically have population densities of over 10,000 people per square mile. How many times greater is the population density of a large urban area than the population density in the rainforest?



### WEEK 4

**Rainforests are home** to an enormous range of bacteria that live in the soil of the forest floor and help dead material decompose to provide nutrients for the trees. Bacteria are measured in units called *micrometers*, or *microns*. One millimeter is equal to 1000 microns. If a scientist in the rainforest collects a sample of a bacterium that measures one-half micron, about how many of these bacteria would it take to make up 1 inch? (Assume that 1 inch = 2.5 centimeters.) How many would it take to make up 1 meter? How many would it take to make up 1 kilometer? Express your answers as a number multiplied by a power of 10.

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**WEEK 1**

**Rainfall in tropical rainforests** averages 200–1000 centimeters (cm) per year. Suppose the rainfall one year was 660 cm. In the number 660, how much greater is the value of the first 6 than the value of the second 6? If the rainfall the following year decreased by 90 cm, how much rain fell during that year? The third year, the rainfall decreased another 287 cm. What was the rainfall in the third year? By how much would the rainfall in the fourth year need to go up to reach a level of 500 cm? Use a number line to help you answer the questions.

**WEEK 2**

**Giant bamboo** can grow as much as 9 inches per day. Bamboo feeds and houses people and can be made into musical instruments, cooking and eating utensils, furniture, and hunting weapons as well as carrying and storage baskets, lampshades, ropes and strings, roof tiles, hats, and hundreds of other items. Suppose a family cuts the bamboo into 10-foot sections for food and utensils. How many days would it take for a bamboo plant to grow to 10 feet (ft.)? How many feet of bamboo would they have if they collected 7 sections? If a family collected 9 sections and another family collected 7 sections, how many feet of bamboo would they have altogether? Would it be enough to build a hut that requires 180 ft. of bamboo? If not, how many more 10 ft. sections of bamboo would they need?

**WEEK 3**

**A typical 4 sq. mi. area** of rainforest contains as many as 1500 flowering plants, 750 tree species, 400 bird species, and 150 butterfly species. How many different species is that altogether? How many times greater is the total number of species than the number of bird species? Create a table to show the total number of species in 4 different ways. An example is done for you, using the number of flowering plants.

Thousands	Hundreds	Tens	Ones
1	5	0	0
	15	0	0
		150	0
			1500

**WEEK 4**

**Rainforest trees** are always “sweating” water. A single tree might release over 755 liters of water every year. How much water would a group of 10 trees release in a year? If a typical swimming pool holds 40,000–50,000 liters of water, about how many sweating trees would it take to fill the swimming pool in 1 year?

**WEEK 1**

**Five turtles and seven frogs** live near the Amazon River. Are there more turtles or frogs? How many more? How many are there altogether? If 5 more frogs hop over, how many turtles and frogs are there now? The animals try to hop or climb onto a rock, but the rock has room for only 10 of them. How many turtles and frogs are left? If 4 more turtles crawl over, is there enough room for all the turtles and frogs on 2 rocks that could each hold 10 animals? Draw a picture to help you answer the questions.

**WEEK 2**

**Anacondas are large**, nonvenomous snakes found in South America. They can reach more than 16 feet (ft.) in length. The African rock python can be found in the rainforests of Africa and grows to 20 ft. or more. If you stretch the snakes out and lay them end-to-end, which would be longer, 4 anacondas or 3 rock pythons? What would be the total length of 2 rock pythons and 2 anacondas? Draw a picture to help you get an answer.

**WEEK 3**

**A number of tribes** in such areas as central Africa and Brazil live in rainforests and have no contact with the outside world. Suppose a tribe in Brazil includes 76 children who are put into groups of 10 to go out and collect berries. How many children are left after the first group exits? How many are left after 3 groups leave? How many groups of 10 can be made from 76 children? How many children are left after all the groups depart? Draw a picture to help you answer the questions.

**WEEK 4**

**Suppose a tribe** in the rainforest designs a large container that can hold 100 lemons and a small bag that can hold 10 lemons. Last week, tribe members collected 749 lemons. This week, they collected enough lemons to fill 5 large containers and 27 small bags. In which week did they collect more lemons? How many more? Next week, they would like to collect 930 lemons. Make a chart and show several different ways they could collect this number of lemons using large containers and small bags.