Name: _____ Date: _____

How Many Animals? Worksheet (page 1)

Students at the Center for Rainforest Studies in northeastern Australia are often given the task of making a census of the population of plants or animals in an area to determine the health or range of the population. Since it is usually not possible to count every single member of each species in a large area, students often must rely on estimates based on sample counts done for a relatively small area.

In this activity, you will conduct your own animal population survey. You will be surveying four different inhabitants of the rainforest. **Cassowaries** are Australia's largest birds, standing about five feet tall and weighing on average about 60 kg. They eat mainly fruit and are an endangered species. **Tree kangaroos** are tree-dwelling cousins of common kangaroos. They are **marsupials** and eat mostly leaves and fruit. There are two species of **python,** the carpet python, a snake which is fairly common and has a length of up to 2 meters, and the much rarer amethystine python, whose length ranges up to 8.5 meters (28 feet). Both eat small animals which they kill by constriction. **Geckos** are small, nocturnal reptiles that live on trees and who eat small insects.

The map on the accompanying page provides a birds-eye view of a section of the Australian rainforest. Each of the letters on the map represents a single individual of a particular species of animal (c=cassowary, g=gecko, p=python, and t=tree kangaroo.)

Procedure

1. Place the rainforest map on a flat surface. Flip a quarter onto the map. If the quarter does not land fully on the map, re-flip it.
2. Without moving the quarter, draw a circle around it in the map (in pencil) to show where it landed.
3. Pick the quarter up and count the number of animals of each type (that is, letters g, t, p, or c) within the circle. If a letter is on the line of the circle, include it in your count if at least half the letter falls within the circle.
4. Record your results in the Table 1 provided on the next page in the column titled "Sample 1".
5. Repeat the coin flip two more times. Record your resulting animal count for each flip in the appropriate column of Table 1.
6. Find the mean, mode, and median for the sample population of each animal per circle and also record these in Table 1.
7. Next, calculate the area of one of the circles you drew. (Hint: use the formula $A= 3.14*r^2$.) Use a metric ruler and record your result here: _____
8. Measure the area of the entire map within the boundary lines (using the same units as in the previous step) and record your result here: _____
9. You now know the area of one of your circles and the area of the entire map. You also know the average number of each type of animal per circle. Insert these numbers into the following equation to develop an estimate of the total population of each species of animal for the area shown on the map and record your results in Table 2.

Estimated total population/average population per circle = area of entire map/area of circle

Table 1

	Sample 1	Sample 2	Sample 3	Mean	Mode	Median
Tree kangaroos						
Cassowaries						
Pythons						
Geckos						

10. To obtain a more accurate estimate, share your results with three other groups of classmates. Copy down their results in Table 2 and compare them with your own. Find the average (mean) of the population estimates of the four groups (including your own) for each animal and record each average in the far right column of Table 2.

Table 2
Comparison of Total Population Estimates Among Classroom Groups

	Your Group	Group 1	Group 2	Group 3	Mean
Tree kangaroos					
Cassowaries					
Python					
Geckos					

Questions
Answer the questions below on a separate sheet of paper.

1. Discuss your results from Table 1. Which animal species is most common? Which is rarest?

2. How close were your estimates of total population for each species to the mean of the four groups?

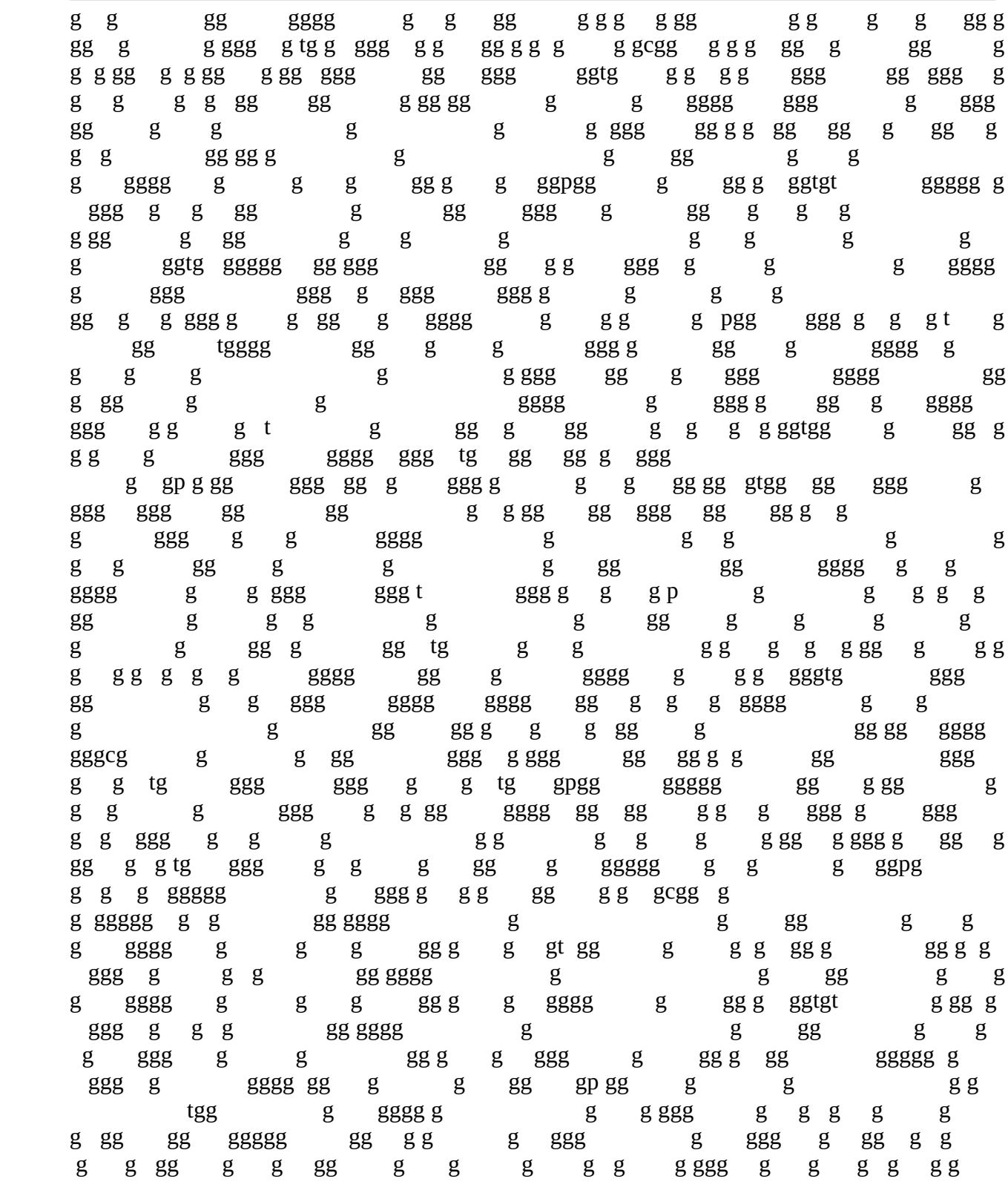
3. How accurate do you think your estimates were? How could you improve their accuracy?

4. What was the value of flipping the quarter three times and averaging the count for three circles, rather than just using the count from the first flip?

5. Why did different groups get different estimates? What is the value of taking the mean of several estimates?

6. Explain the advantages and disadvantages of estimating a population of organisms rather than counting each individual member of that population.

How Many Animals? **Rainforest Map**



Key: c=cassowary; g=gecko; p=python; t=tree kangaroo