The Great Elephant Census

hhmi | BioInteractive

Scientists at Work
Student Worksheet

OVERVIEW

This worksheet complements the short video "The Great Elephant Census" from the *Scientists at Work* series.

PROCEDURE

1. Prior to watching the video, read the questions below.
2. Watch the video.
3. If working with a partner or in a small group, discuss and answer the questions below. If working alone, think about and answer the questions below.

QUESTIONS

1. What are the two main threats to African elephant populations?

   Scientists estimate that African elephants are being lost at a rate of ________/day.

2. What are two principal research questions that will be addressed by the Great Elephant Census?

3. Logistics are the details that must be handled to plan and organize a complicated activity or event that involves many people. Give three examples of logistics that the organizers of the census need to address.

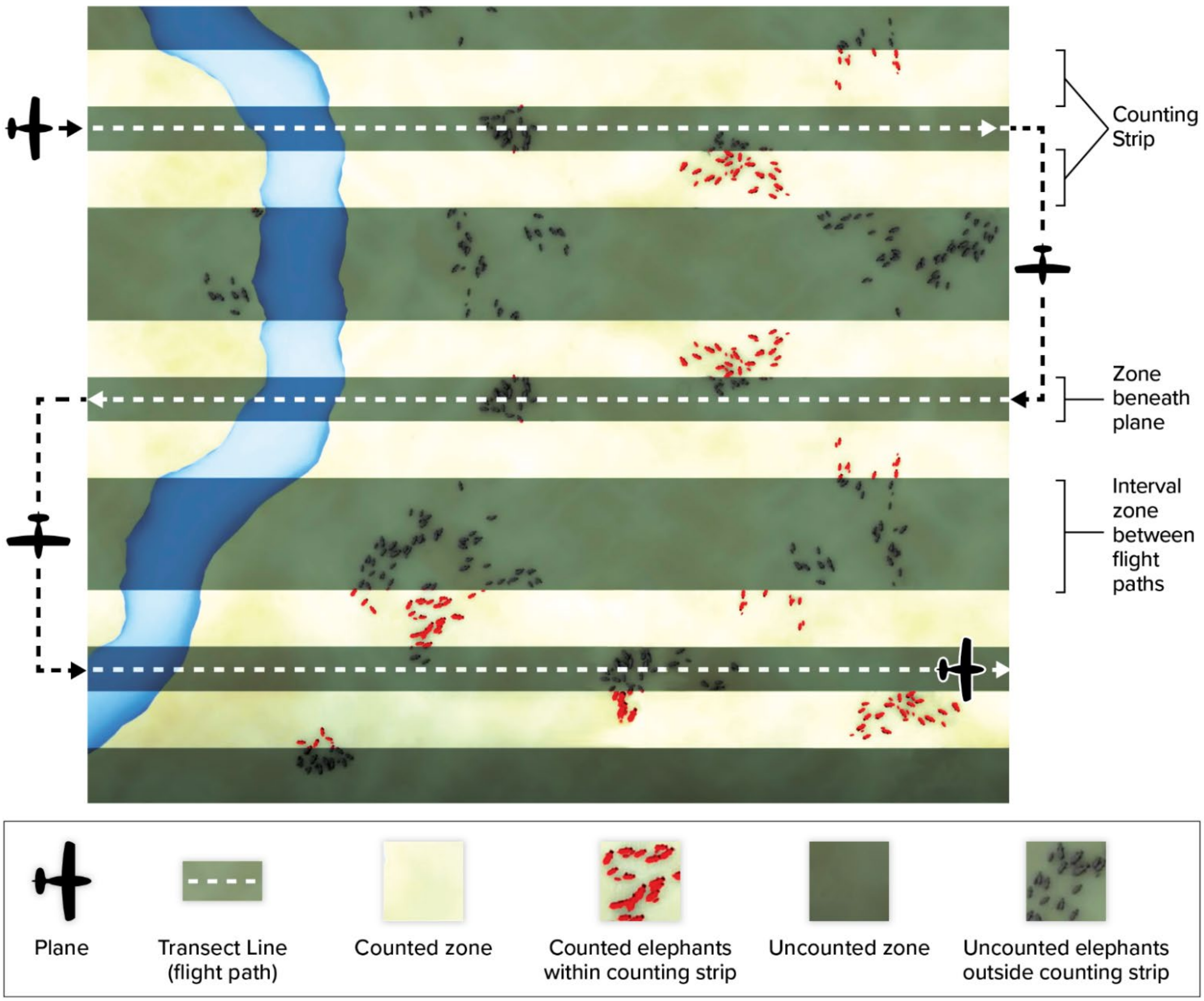
4. How will the results from the project be used?

5. Dr. Mike Chase's team has chosen to use a sample count method to estimate the total elephant population size. Why did they choose sampling over a total count of each elephant?

6. Accurate counts are critical because they are used to estimate the total population. List three things that the researchers do to ensure accurate sample counts.

7. What technology is the team using to determine which elephants are inside and outside the strip? What human limitation makes this necessary?

8. Apply what you learned from the film:



The Great Elephant Census involved over 100 scientists working in many countries. Within each country, they divided survey areas into regions, called strata, of varying shapes and sizes. Teams then flew along transect lines to estimate the number of elephants in each stratum. The dotted lines in the diagram represent the transects that a plane follows during an aerial survey of each stratum. The counting strips are 150 meter-wide areas on either side of each transect where elephants are counted. The following table shows the data that were collected for one stratum.

Transect	Transect length (km)	Width of counting strip (km)	Counting strip area (km^2)	# of elephants spotted in counting strips	Elephant density in counting strip (#/km^2)
A	9.1	0.3	2.7	1	0.37
B	22.5	0.3	6.8	4	0.59
C	27.2	0.3	8.2	7	0.86
D	22.8	0.3		0	
E	32	0.3	9.6	0	0
F	21.4	0.3	6.4	0	0
G	29.6	0.3	8.9	4	0.45
H	20.2	0.3	6.1	5	0.83
I	22	0.3	6.6	0	0
J	9.2	0.3	2.8	0	0
K	4.6	0.3		4	
Average Elephant Density for Stratum (round to nearest hundredth)					

a. Calculate the missing values in the data table. Here are a few formulas to help you out:
   - Area = length × width
   - Population Density = # of animals/area
   - Average = sum of all of the densities/# of transects

b. The total stratum area is 803.7 km^2. Using the mean elephant density for the stratum that you calculated, calculate an estimated # of elephants that could be found in this stratum.

c. What might explain the wide range of elephant densities among the different transects of the stratum? Give two reasons, one that relates to elephant behavior and one that relates to the survey design.