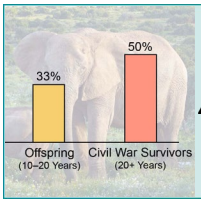


Analyzing Data on Tuskless Elephants

hhmi | BioInteractive

Activity
Student Handout

INTRODUCTION

A survey of African savanna elephants revealed that populations declined by 30% between 2007 and 2014. As of 2014, about 350,000 savanna elephants were living in Africa. Their current rate of decline is 8% per year, primarily due to illegal killing called poaching.

Why are so many elephants being illegally killed? And how is this poaching affecting elephant populations? You will explore these two questions by examining data from several studies and watching a Scientists at Work video about elephants living in Gorongosa National Park in Mozambique.

PART 1: Examining Data

Table 1 shows the numbers of elephants that were illegally killed in a region of Zambia from 2007 to 2013. The elephants were categorized based on descriptions of their carcasses; these descriptions allow researchers to infer why the elephants were killed.

The first four rows show categories of elephants that originally had tusks. The fifth and sixth rows show categories of elephants that naturally do not have tusks, or are tuskless. Individual rows show whether meat and/or tusks were taken from the elephants after they were killed; researchers can infer that these elephants were killed for their meat and/or tusks.

Examine the data and then answer the questions after the table.

Table 1. Elephants killed illegally in North Luangwa Valley, eastern Zambia, 2007–2013 (Nyirenda *et al.*, 2015).

Elephant type	Description of carcass	Number killed each year							Totals
		2007	2008	2009	2010	2011	2012	2013	
Tusks naturally present	• Meat and tusks taken	3	2	2	4	6	6	4	27
	• Meat and tusks not taken	0	0	0	2	1	0	5	8
	• Meat intact but tusks taken	1	4	7	4	7	27	25	75
	• Meat taken but tusks intact	0	0	2	2	3	0	8	15
Tusks naturally absent (tuskless)	• Meat taken	0	0	1	0	2	0	1	4
	• Meat intact	0	0	0	0	0	0	0	0
	Total number of elephants illegally killed	4	6	12	12	19	33	43	129

1. How did the total number of elephants that were illegally killed change from 2007 to 2013?

2. In general, did most of the elephants that were illegally killed have tusks, or were they naturally tuskless?

3. Calculate the total number of elephants that appear to have been illegally killed between 2007 and 2013 for:
   a. only their meat

   b. only their tusks

   c. both their meat and tusks

4. Calculate the percentages of the illegally killed elephants between 2007 and 2013 represented by each group of elephants in Question 3. Show your work.
   a. percentage of elephants killed only for their meat

   b. percentage of elephants killed only for their tusks

   c. percentage of elephants killed for both their tusks and meat

5. Use the evidence above to make a claim about the **main reason elephants were illegally killed** in this region.

6. Suggest some ways to reduce the number of elephants that are illegally killed each year.

PART 2: Video Activity

7. Watch the *Selection for Tuskless Elephants* video until time 1:46 and answer the following questions.
   a. What did Joyce Poole observe about the elephant population in Gorongosa National Park in Mozambique?

   b. What happened in Mozambique from 1977 to 1992?

   c. How were the elephants in Gorongosa National Park affected by this event?

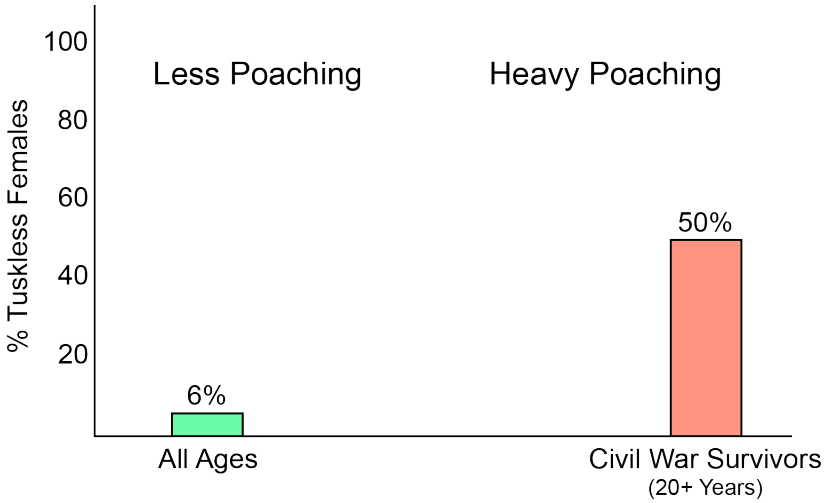
8. Resume watching the video until time 4:03 and answer the following questions:

a. Select all the descriptions that apply to the trait of "tusklessness."

- ☐ occurs naturally in elephant populations
- ☐ does not occur in nature
- ☐ is common among most elephants
- ☐ is more prevalent in males than females
- ☐ is more prevalent in females than males
- ☐ is inherited

b. Poole says that there is strong selective pressure for male elephants to have tusks. Explain what that means.

9. Resume watching the video until time 4:29, right after you reach the graph that looks like the one below.



a. Describe what the bar on the left is showing.

b. Describe what the bar on the right is showing.

c. Explain why the bar on the right is much higher than the bar on the left.

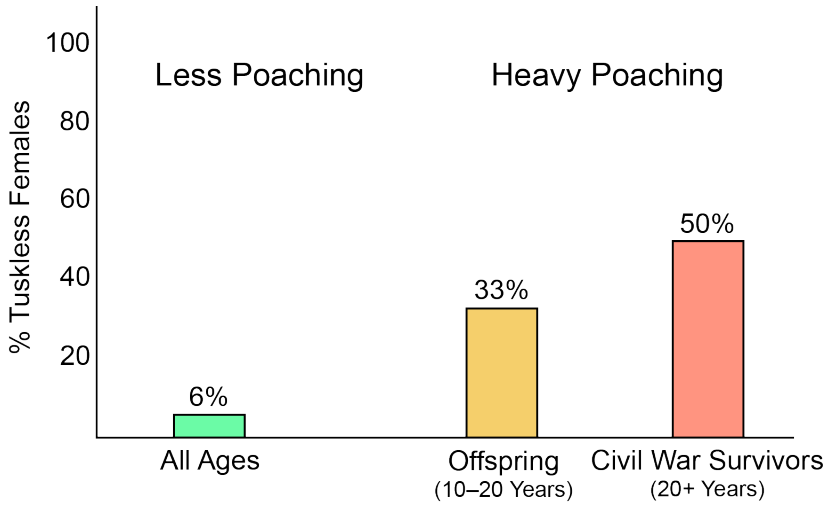
10. The civil war in Mozambique ended in 1992. Based on the data above, predict whether the percentage of tuskless females born after the civil war was:
    a. more or less than the percentage of tuskless females that were civil war survivors (bar on the right)
    b. more or less than the percentage of tuskless females in populations with less poaching (bar on the left)

11. Explain your reasoning for the answers above:
    a.

    b.

PART 3: Continued Analysis

12. Continue watching the video until time 4:56, soon after you reach the graph that looks like the one below.



a. You made a prediction in Question 10 about tuskless female elephants born after the civil war ended. These elephants would be 10–20 years of age when Poole collected her data. Does the data in the graph above support your prediction? Explain why or why not.

b. Why might tusklessness be less common in 10- to 20-year-old elephants than in elephants over 20 years of age?

Finish watching the video and answer the following questions.

13. Poole noticed a high proportion of tuskless female elephants in Gorongosa. What was the selective pressure that increased the proportion of tuskless females?

14. No tuskless males have been found in Gorongosa. Why would there be a difference between male and female elephants when it comes to having tusks?

EXTENSION: Claim-Evidence-Reasoning Activity

Examine the table below.

Table 2. Tusklessness in different elephant populations across Africa (Steenkamp *et al.*, 2007). In populations experiencing controlled culling, humans legally removed a restricted number of elephants to prevent overpopulation. These elephants were usually chosen randomly. In populations experiencing poaching, humans illegally killed an unrestricted number of elephants. These elephants were usually killed for their tusks.

Level of human activity	Population	Adult females			Adult males	
		Total number	Number tuskless	Percent tuskless	Total number	Number tuskless
Minimal human activity	Kaudom	73	0	0%	38	0
	Moremi	29	1	3.4%	15	0
	Chobe	66	0	0%	20	0
	Amboseli	197	3	1.5%	20	0
Controlled culling	Etosha	39	1	2.6%	6	0
	Kruger	104	0	0%	24	0
High levels of poaching	South Kafue	86	2	2.3%	3	0
	North Kafue	91	0	0%	20	0
	Vwaza	19	3	15.8%	0	0
	South Luangwa	70	17	24.3%	0	0
	North Luangwa	86	23	26.7%	8	0

Complete the "Claim-Evidence-Reasoning" chart below. Cite evidence based on the data above or in the *Selection for Tuskless Elephants* video.

Claim: In general, the prevalence of female tuskless elephants is highest in areas with heavy poaching.
Evidence:
Reasoning: