

# Earth Day Science Symposium

## African Elephant

### Instructions for Pre/Post Question Sets

#### Introduction

Pre/Post Questions are tools for guiding inquiry and assessing student learning. Students answer the questions before they prepare their EDSS data sets for presentation and again after the activities are completed.

Students are not expected to score high points the first time they answer the questions. As they work with their data sets, they will be practicing the skills needed to improve their answers in the second round.

#### Contents

Question sets are presented on two-page reproducible handouts (double-sided copies will help save paper). The answer key on pages 2–4 includes rubrics for grading the constructed answer questions. Use one or both of the question sets—the more time you invest, the more students learn and the more opportunities you have for assessment.

Answer Key	2
Question Set 1	5
Question Set 2	7

#### Scheduling, Time, Materials

Schedule the first round (Pre) a few days in advance of starting the EDSS activity. Plan on 30–40 minutes for each question set. The only materials you'll need are two copies of each question set and a pencil for each student.

#### New Mexico Science Benchmarks, Grades K–4

Scientific Thinking and Practice, **Standard I, Benchmark I** – Use scientific methods to observe, collect, record, analyze, predict, interpret, and determine reasonableness of data; **Benchmark II** – Use scientific thinking and knowledge and communicate findings; **Benchmark III** – Use mathematical skills and vocabulary to analyze data, understand patterns and relationships, and communicate findings.

Life Science (Understand the properties, structures, and processes of living things and the interdependence of living things and their environments), **Standard II, Benchmark I** – Know that living things have diverse forms, structures, functions, and habitats.

#### New Mexico Science Benchmarks, Grades 5–8

Scientific Thinking and Practice, **Standard I, Benchmark I** – Use scientific methods to develop questions, design and conduct experiments using appropriate technologies, analyze and evaluate results, make predictions, and communicate findings; **Benchmark III** – Use mathematical ideas, tools, and techniques to understand scientific knowledge.

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Life Science (Understand the properties, structures, and processes of living things and the interdependence of living things and their environments), **Standard II, Benchmark I** – Explain the diverse structures and functions of living things and the complex relationships between living things and their environments.

### New Mexico Math Benchmarks, Grades K–8

Algebra: **Benchmark A.1** – Understand patterns, relations, and functions; **Benchmark A.3** – Use mathematical models to represent and understand quantitative relationships; **Benchmark A.4** – Analyze change in various contexts.

Data Analysis and Probability: **Benchmark D.1** – Formulate questions that can be addressed with data and collect, organize, and display relevant data to answer them; **Benchmark D.2** – Select and use appropriate statistical methods to analyze data; **Benchmark D.3** – Develop and evaluate inferences and predictions that are based on data.

**For More Information:** [www.earthsbirthday.org/nm](http://www.earthsbirthday.org/nm)

## Answer Key

### Question Set 1

The total possible score for all three questions is 8. Grade according to your usual scale (multiply the student's total score by 12.5 to convert to a percentage).

1. The maximum possible score is 4 points, one for setting up the table as shown below, one for each correct label (Year, Elephants), one for entering all of the years, and one for entering the correct number of elephants for each year. **Students will estimate the numbers of elephants. Amounts between the ranges shown should be counted as correct.**

Year	Elephants
1984	6,500–7,500
1986	3,500–4,500
1990	7,500–8,500
1995	7,500–8,500
1998	10,000–10,200
2004	16,000–17,000

2. The maximum possible score is 2 points. The correct answer is **no, Melissa isn't right** because **the graph doesn't show every year from 1984–2004**. Give one point for "no" and one for the correct reason.

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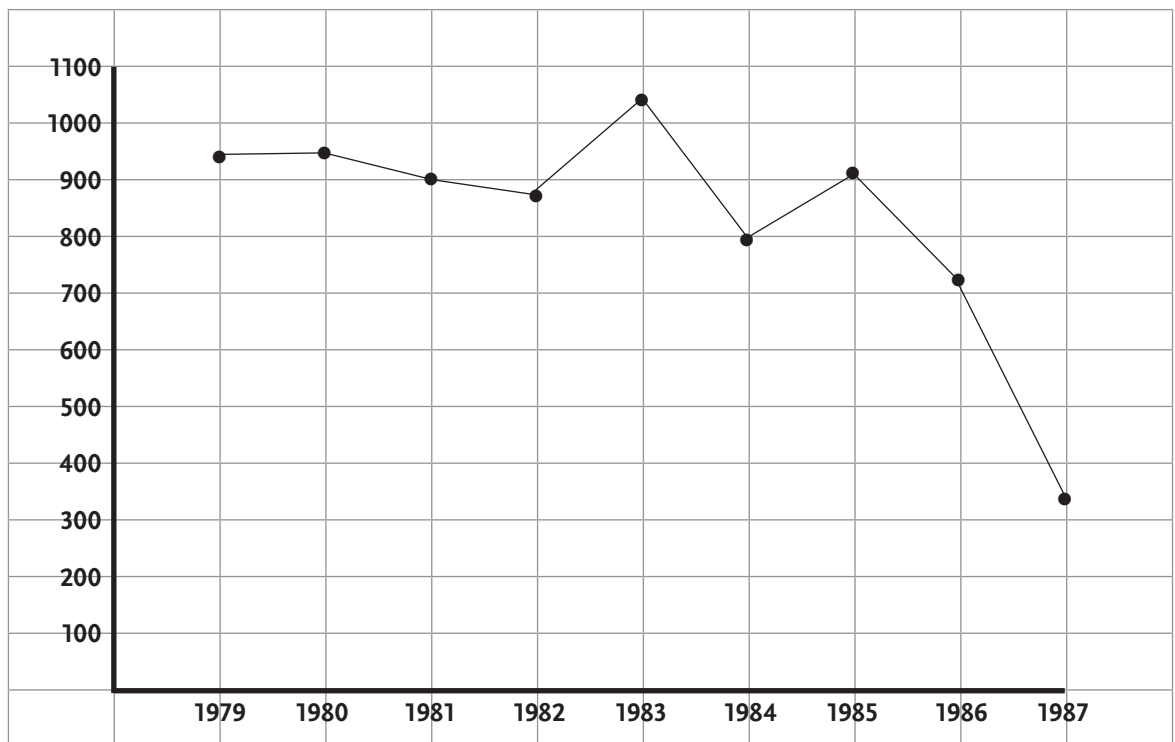
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3. The maximum possible score is 2 points, one each for **any two of the following**:
  - The date when killing elephants for ivory was made illegal
  - Elephant populations for all or most years after the date it was made illegal to kill them
  - Elephant populations for all of Africa (not just Namibia)

### Question Set 2

The total possible score for all three questions is 6. Grade according to your usual scale (multiply student's total score by 16.67 to convert to a percentage).

1. The maximum possible score is 3 points, one for correctly labeled axes, one for correctly plotted data points, and one for a line that connects the data points. **Simplify grading** by laying the student's work on the graph below. Data points should line up approximately correctly.



2. The maximum possible score is 1 point. The two possible answers are listed below with the correct explanations. The explanation given for a “yes” answer is the only possible correct one. Students may have additional or other reasons to back up a “no” answer; anything reasonable should earn the point.

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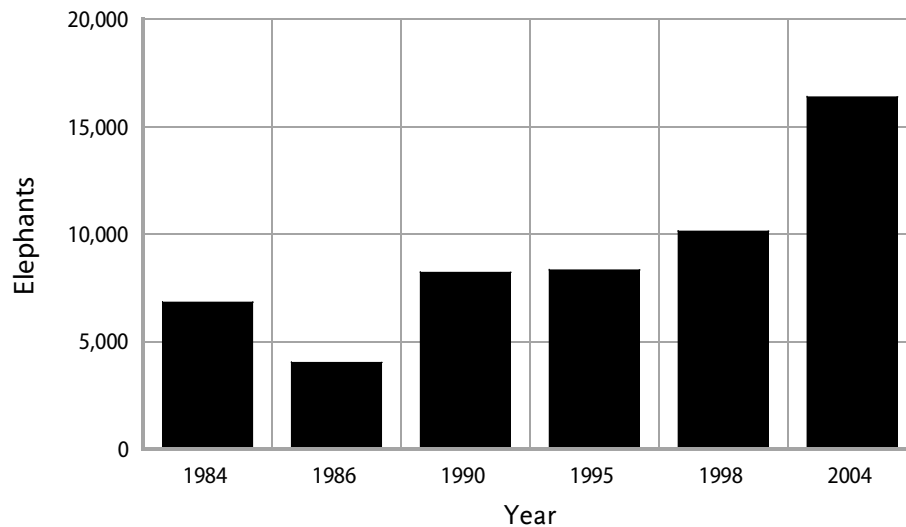
- Yes, because there is a trend (exports are going down) and it makes sense to **predict** that the trend will continue (exports will keep going down). You would have to **prove the prediction** by getting more data.
  - No, because there is no data after 1987 and the amounts may have gone up again.
3. The maximum possible score is 2 points, one for each of **any two of the following** good answers. (Students may come up with more. Give a point for any reasonable answer.)
- The graph doesn't cover all of the last 30 years. Exports might have gone up in years that aren't shown.
  - We don't know how many elephants were killed to get the ivory that was exported. The amount of ivory tells us the weight of the tusks, not how many tusks were taken. Some elephants have bigger tusks than others.
  - Just because the ivory was exported in one year doesn't mean that the elephant was killed in that year. Maybe it was old ivory from elephants killed before it was illegal.
  - Some elephants may have been killed whose ivory was never exported.
  - Maybe someone found a lot of dead elephant skeletons and exported the ivory from them.
  - Maybe someone found a way to take the ivory from an elephant without killing it. (**This answer should score a point only in the pre-activity round.** Students should know that elephants cannot survive without their tusks when they answer the question the second time.)

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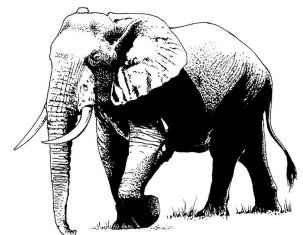
## African Elephant

Melissa watched a video about African elephants with her class. She learned that elephant populations rose after laws were passed to prevent killing elephants for their ivory. She wanted to be certain that this was true, so she did some research. She found the following graph showing populations in one country.

Elephant Populations in Namibia, 1984–2004

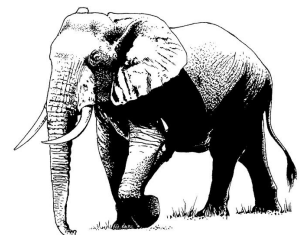


1. In the space below, record the data shown on the graph in a data table. Read the graph carefully and estimate the numbers for populations.



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2. Based on the graph, Melissa concluded that from 1984 to 2004, the number of elephants in Namibia has gone up *in every year* except for 1986. Is she right? Please explain why or why not.
  
  
  
  
  
  
  
  
  
  
3. The next day, Melissa told her teacher that she needed to find more information. List two pieces of information that she could use to answer the question, *Did African elephant populations go up after laws were passed against killing them for their ivory?*
  - a)
  
  
  
  
  
  
  
  
  
  
  - b)



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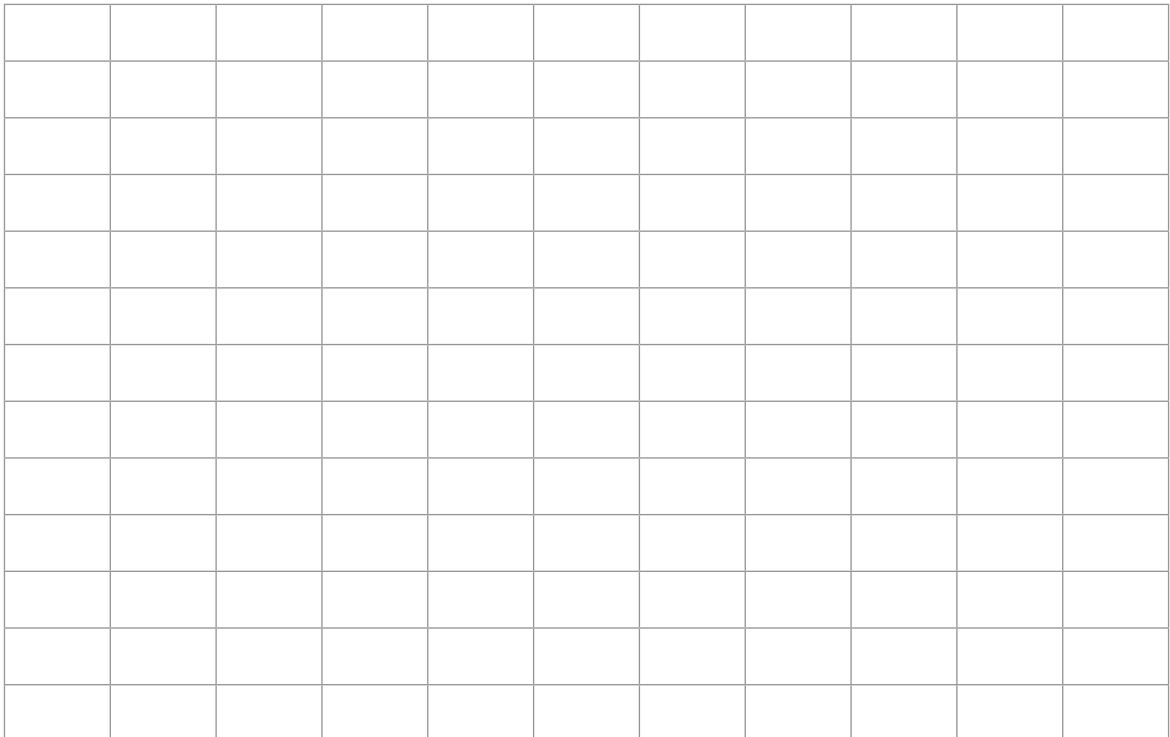
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June and Miguel wanted to know if the number of African elephants that are killed for their ivory increased or decreased in the last 30 years. They went to the library and found the following data.

Elephant Ivory Exported from Africa, 1979–1987

Year	Ivory Exports (thousands of kg)	Year	Ivory Exports (thousands of kg)
1979	944	1984	798
1980	952	1985	912
1981	905	1986	719
1982	890	1987	331
1983	1032		

1. Plot this data on a line graph. Make the graph as complete as possible.



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2. Based on the graph, June and Miguel concluded that the amount of elephant ivory exported from Africa decreased from 1979 to 1987. Should they also conclude that the exports continued to decrease after 1987? Explain why or why not.
  
  
  
  
  
  
  
  
  
  
3. Miguel said that *the data shown on the graph does not tell whether the number of African elephants killed each year for their ivory increased or decreased*. List two reasons why this could be true.
  - a)
  
  
  
  
  
  
  
  
  
  
  - b)

