Name: ______________________________ Date: ______________ Period: ____
Team: ____

SKEETERS ARE OVERRUNNING THE WORLD

How does the size of the population change over the time? In this module, you use a simple model to shed light on some complicated issues.linear.avi,exp2.avi

Introduction

At last count, more than 5.4 billion people inhabited the Earth. If each of us laid head to toe, we would make a chain of humanity long enough to wrap around the equator 250 times.

How many people can live on Earth without destroying the environment? How many people can our planet successfully feed? Several organizations studying the ever-increasing human population are concerned with just these questions.

While foretelling the future is never a sure bet, you can gather information about the past and present, find any existing patterns, and use these patterns to make predictions.

Graph can be useful tools for determining patterns. For example, Figure 1 shows the world population since 1650.

(Power Point Presentation with the graphs and questions for discussion.)
world Pop. Slide show.ppt

EXPLORATION

Statistics like those shown in Figure 1, along with an appropriate mathematical model, allow researchers to make forecasts about population trends. For example, scientists at the United Nations predict a world population of at least 8.2 billion by the year 2020.

To help make predictions in real-world situations, researchers often use experiments known as **simulations.** The results of the simulations are gathered and analyzed. This data is then compared with known information abourt the actual population. If the result seems questionable, the simulation may be revised. This modeling process can be summarized by the following five steps:

1. creating a model
2. translating the model into mathematics
3. using the mathematics
4. relating the results to the real-world situation
5. revising the model

In the following exploration, you investigate this modeling process using a population of Skeeters.

a. Obtain a large, flat container with a lid, a sack of Skeeters, and several sheets of graph paper.

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b. Before beginning the simulation, read Steps 1-7 below and predict how you think the number of Skeeters will change.

1. Place two Skeeters in your container. This is the initial population.
2. After closing the lid, shake the container.
3. Open the lid and count the number of Skeeters with the marked side up.
4. Skeeters reproduce asexually (by themselves). Reproduction is triggered when the marked side of a Skeeter is exposed to light. Add one Skeeter to the container for each mark counted.
5. Record the total number of Skeeters now in the container. This is the end of one "shake".

   The end of each shake represents the end of one time period. The number of Skeeters present at the end of a shake is the total population at that time. (Remember that at shake 0, the number of Skeeters was 2)
6. Design a method of recording and organizing your data.
7. Repeat Parts 2-5 for 10 shakes.

c. 1. Create a scatterplot to display the data you recorded. Represent the shake number on the x-axis. Select a scale for each axis that will allow you to make predictions for shake numbers through 20.
2. Describe any patterns you see in your data.

d. 1. Use the pattern described in Part c to predict the number of Skeeters after shake 20.
2. How large a box would be necessary to hold this population? Explain how you came to this conclusion.
3. Predict how many shakes it would take for the Skeeter population to reach 1000. Describe how you reached your prediction.

Discussion 2

a. Discuss any similarities or differences you observe between your scatterplot and those of your classmates.
b. How did the number of Skeeters in your population change during the exploration?
c. Consider your scatterplot as describing the change in the population of Skeeters over time. Use this idea to explain the shape of the graph.
d. What other types of living creatures might show the same pattern of population growth as the Skeeters?
e. What limitations might this simulation have in modeling a real-world population?