

### Graphing Exponential Growth

While exponential growth often has a low growth rate (as in savings accounts), it can also have a dramatic growth rate. One example is the world flu pandemic of 1918–1920 in which 3–5% of Earth’s population died. Another is the chain reaction that occurs during nuclear fission. Example 3 describes yet another example—that in which a species multiplies rapidly.



In the Australian grain belt, mouse population levels are normally low. Favorable seasonal conditions, however, can trigger extensive breeding. Mouse plagues erupt about every three years there.

#### EXAMPLE 3 Graphing Exponential Growth

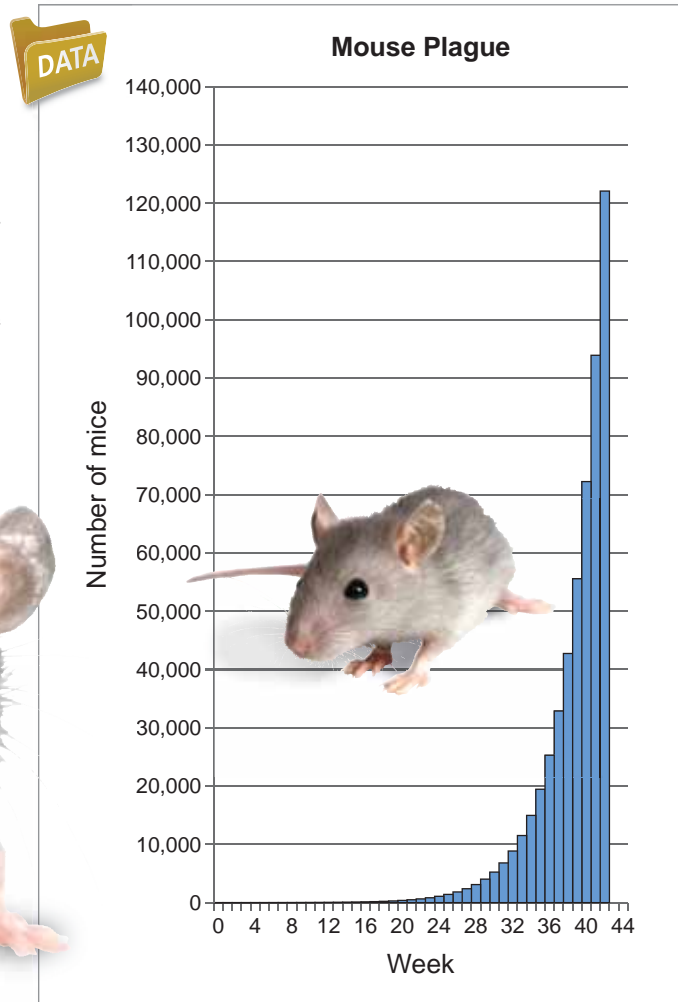
In Australia, mice breed from August to May, which is about 42 weeks. For reasons that are not entirely known, every 3 or 4 years, the mouse population explodes and produces a plague of millions of mice. One breeding pair of mice and their offspring can produce 500 mice in just 21 weeks, which is a rate of 30% per week. At this rate, how many mice can one breeding pair produce in 42 weeks? Graph the results.

#### SOLUTION

Use a spreadsheet to evaluate the formula

$$A = 2(1 + 0.3)^n$$

from  $n = 0$  to  $n = 42$ . The population after 42 weeks is about 122,082. Then use the spreadsheet to graph the results as shown.



#### ✓ Checkpoint

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How many mice can be produced by 1000 breeding pairs in 42 weeks?