# Bugs, Bugs, Everywhere Bugs

Imagine that a bug population has invaded your classroom.
One day you noticed 16 bugs. Every day new bugs hatch, increasing the population by 50% each week.

In the first week the population increases by 8 bugs.

In a table, record the total number of bugs at the end of each week for 4 weeks.

| Bugs, Bugs, Everywhere Bugs | | | |
|---|---|---|---|
| WEEKS ELAPSED | TOTAL NUMBER OF BUGS | INCREASE IN THE NUMBER OF BUGS FROM PREVIOUS WEEK | RATIO OF THIS WEEK'S TOTAL TO LAST WEEK'S TOTAL |
| START (0) | | | |
| 1 | | | |
| 2 | | | |
| 3 | | | |
| 4 | | | |

The increase in the number of bugs each week is the population's rate of change per week. Calculate each rate of change. What are the units?

Does the rate of increase show a linear pattern? Why or why not?

Let x represent the number of weeks elapsed and let y represent the total number of bugs. Graph the data using (0,16) for the first point.

Connect the points with line segments. Describe how the slope changes from point to point.

Calculate the ratio of the number of bugs each week to the number of bugs the previous week. Record it in the table.

How do the ratios compare? Explain what the ratios tell you about the bug population growth.
What is the constant multiplier for the bug population?

How can you use this number to calculate the population when 5 weeks have elapsed?

Write a recursive routine that models the populations growth for the growing number of bugs.

Describe what each part of this calculator command does.

By pressing ENTER a few times, check that your recursive routine gives the sequence of values in your table.

Use the routine to find the bug population at the end of weeks 5 to 8.

What is the population after 20 weeks?  After 30 weeks? What happens in the long run?