

# Bugs in Groups: Dividing into Groups of Equal Size

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**Description:** Students explore and connect part-whole relationships in multiplication and division as they order a collection of bugs into groups of equal size and consider the number of groups and the number of bugs left over. Concepts of factors, remainders, and the commutative property of multiplication all arise in students' work with the model.

**Technology Strength:** The engaging model invites students to interact and provides immediate feedback. The ease of using the model encourages students to experiment, make conjectures, and test their ideas.

**Objectives:** Explore and connect part-whole relationships in multiplication and division; solve problems involving multiplication and division and explain reasoning

**Prerequisites:** Experience identifying things that come in groups of equal size; experience representing multiplication situations with numbers and words; ability to use skip counting and repeated addition to find how many

**Suggested Grade Level:** 3 to 4

**Sketchpad Level:** Beginning

**Suggested Duration:** 60 minutes

**Suggested Classroom Setting:** Whole Class, Student Pairs. This activity, designed for use by student pairs, can be easily modified for whole-class use.

**Preparation:** Review the Activity Notes. Preview the student sketch. Work through the steps on the worksheet and make a copy of the worksheet for each student. Make extra copies of the table (the last page of the worksheet). You may wish to make several transparencies of the table for use in the Summarize discussion.

**Materials:** None

**Student Worksheet(s):** Bugs in Groups

**Student Sketch:** Bugs in Groups.gsp

**Presentation Sketch:** None

**Vocabulary:** Divide, multiply, remainder

**Acknowledgement:** This activity is based on a Sketchpad model created by Nick Jackiw and an activity created by Nathalie Sinclair.

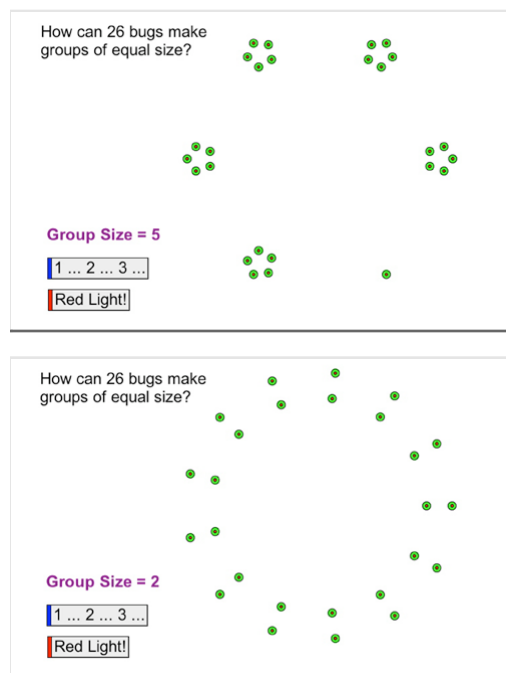
**Sketchpad Version:** GSP5

## Using the Sketch:

A collection of bugs (represented by circles) moves freely about the screen until students order the bugs to arrange themselves in groups of a specified size. Students experiment with different group sizes and consider the number of groups created and the number of bugs left over. Pressing *1 . . . 2 . . . 3 . . .* sets the bugs in motion, and pressing *Red Light!* orders the bugs into groups. In the first illustration here, the value of the *Group Size* parameter is 5, so the 26 bugs have moved into groups of five.

To experiment with another group size, students change the value of the *Group Size* parameter, press *1 . . . 2 . . . 3 . . .* and then press *Red Light!* The second illustration shows the result of grouping the 26 bugs in groups of 2.

In another version of the model, students are able to experiment with grouping other numbers of bugs by changing the value of a *Bugs in All* parameter.



## Sketch Tips:

Sketch Tips show skills needed in this activity, and the step at which the skill is first used.

Sketch Tip	Tip Sheet or Tip Video
Step 1: Open, print, and save a document	Working with Documents
Step 1: Change to a different page using page tabs	Moving Between Pages
Step 2: Change the value of a number (parameter)	Changing Parameters