Making Means: Data Distribution and Averages

Description: Students drag data points on a number line and observe how the mean of their values changes. Students can add, remove, and drag the data points to different locations to create examples of data sets with a given mean.

Technology Strength: With the model performing the calculations, students focus on conceptual understanding of the mean and can easily experiment with different distributions of data points on the number line.

Objectives: Gain insight on how the mean behaves depending on the distribution of the data values; predict the effect on the mean when data are added, removed, or changed

Prerequisites: Familiarity with mean as a measure of center

Suggested Grade Level: 6 to 7

Sketchpad Level: Beginning

Suggested Duration: 45 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.

Materials: None

Student Worksheet(s): Making Means

Student Sketch: Making Means.gsp

Presentation Sketch: None

Vocabulary: Mean, data point, data set, number line
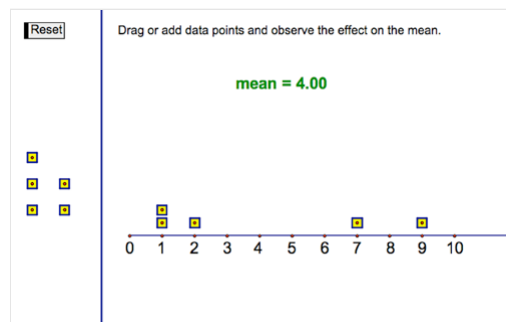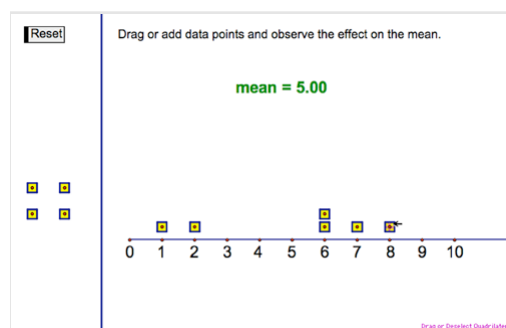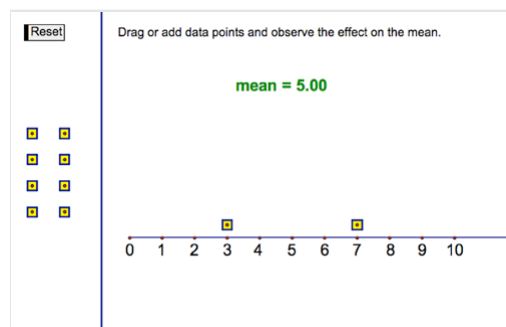
Sketchpad Version: GSP5

Using the Sketch:

The sketch opens with data points at 3 and 7 and the calculated mean is 5.00, as shown in the first illustration. Additional data points are available on the left side of the sketch. Pressing *Reset* returns all the data points to their original locations.

As data points are added, moved, or removed, the calculated mean changes accordingly. Students first drag the original data points and then add new ones while keeping the mean equal to 5.00, as shown in the second illustration.

Students then create many different data distributions to meet various criteria described on the worksheet. For example, in one step they are asked to place five data points anywhere on the number line, except at 4, so that they have a mean of 4. One possible arrangement is shown in the third illustration. Students also make predictions and then test them by moving or adding data points.

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: Change to a different page using page tabs	Moving Between Pages
Step 2: Select, deselect, and drag objects with the **Arrow** tool	Using the Arrow Tool