Dividing and Subdividing: Fractions on the Number Line

Description: Students locate fractions less than 1 along a number line using virtual tools and a strategy of dividing and subdividing. The challenge is to find more than one way to locate a given fraction.

Technology Strength: The stretchy fraction tools support students' intuitive strategy of dividing and subdividing to create fractional parts. Students partition the number line accurately and are able to make divisions of a part of a whole-unit interval rather than of the entire interval (the usual procedure when folding paper fraction strips).

Objectives: Create fractional parts by using a strategy of dividing and subdividing; develop mental models of a linear representation of fractional parts; apply understanding of equivalent fractions; understand how factors of a fraction's denominator are related to a fraction as a part of a part

Prerequisites: Understanding that a fraction can have multiple names and that equivalent fractions are representations for the same amount

Suggested Grade Level: 3 to 6

Sketchpad Level: Beginning

Suggested Duration: 90 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. Make a copy of the worksheet for each student.

Materials: None

Student Worksheet(s): Dividing and Subdividing

Student Sketch: Dividing and Subdividing.gsp

Presentation Sketch: None

Vocabulary: Equivalent fraction, number line, interval, tick mark
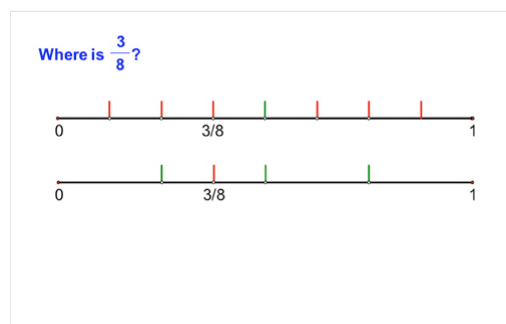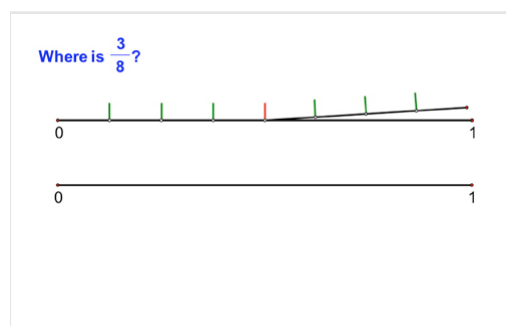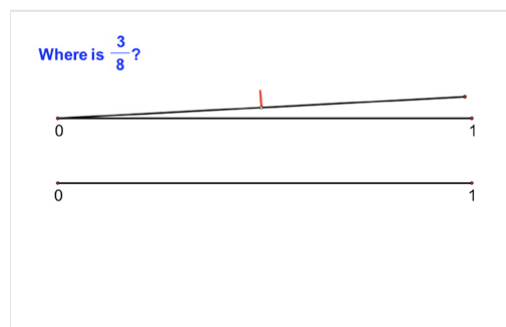
Sketchpad Version: GSP5

Using the Sketch:

Using the Custom Tools menu, students choose from a list of 'stretchy fraction' tools that allow them to divide intervals into accurate fractional parts. Each custom tool consists of a segment. The different tools have different parts: halves, thirds, fourths, fifths, or sixths.

In the illustrations here, students want to locate 3/8 on the interval 0 to 1. As shown in the first illustration, they choose the **Halves** custom tool, move the pointer to 0, and click to attach the tool. As they move the pointer, the stretchy tool appears as a segment with a red tick mark at the location of 1/2. By aligning the endpoint of the stretchy tool with the point at 1 and clicking, students will pinpoint the location of 1/2 on the number line.

In the second illustration, having located 1/2, the students decide to locate eighths by using the **Fourths** tool twice. They first divide the interval from 0 to 1/2 into fourths, and then divide the interval from 1/2 to 1 into fourths. When done, they will use the **Text** tool to label the point at 3/8.

Students go on to find the location of 3/8 in other ways, recording their methods on number lines. In the last illustration, the second number line shows a new solution. Students start by dividing the interval from 0 to 1 into fourths (the green tick marks) using the **Fourths** tool, and then divide the interval from 1/4 to 2/4 in half (the red tick mark) using the **Halves** tool.

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 1: Choose a custom tool from the Custom Tools menu	Using Custom Tools
Step 1: Undo actions using **Edit	Undo**	Undoing and Redoing
Step 1: Label an object with the **Text** tool	Using the Text Tool