

Lesson 2.4: Fraction Slider - Part 1

Objectives

In this lesson, students will:

- ❖ Review what fractions are and how to place them on a number line
- ❖ Practice planning a programming project before coding it

Agenda

1. Overview	5 mins
2. Review of Fractions	15 mins
3. Demonstration	5 mins
4. Student Activity: Creating a Plan	20 mins
5. Wrap Up and Reflections	5 mins

Preparation

- Projector for demonstration
- Become familiar with the solution project. Comments in the code explain the code thoroughly.
- Print student activity worksheets (one per student pair)

Resources & Links

- Solution project: <https://scratch.mit.edu/projects/544000050>
- Starter Project: <https://scratch.mit.edu/projects/288557906>
- For reference purposes, video link for placing fractions on a number line: <https://tinyurl.com/y8vl89mk>

1. Overview

Over the course of three lessons, students will program a fraction slider using Scratch. Students are given a starter project to which they will iteratively add code until the fraction slider is complete.

Today's lesson is broken down into these main activities:

1. Review of fractions and how to place a fraction on a number line
2. Teacher demonstration of project so students know what they will be creating
3. Students create a plan of how to approach coding this project
4. Teacher demonstration and instruction of program sections followed by student activities to code those sections in their project

Explain to students how the lesson will take place before you get started.

2. Review of Fractions

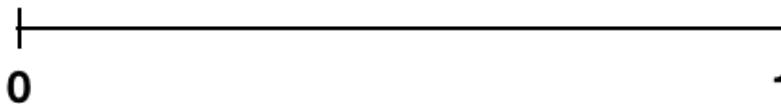


Engage students in an interactive class discussion and instruction:

Write some fractions of the board and prompt students to call out what they are. Ask students what the top number is called (numerator) and the bottom number (denominator).

$$\frac{3}{4} \quad \frac{1}{2} \quad \frac{8}{10}$$

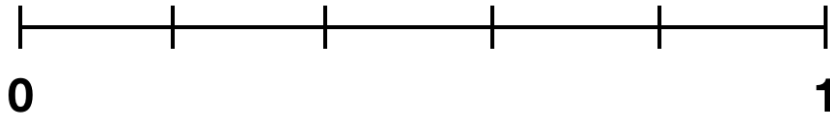
If we want to represent a fraction on a number line, how would we do that?
Draw a number line as shown below.



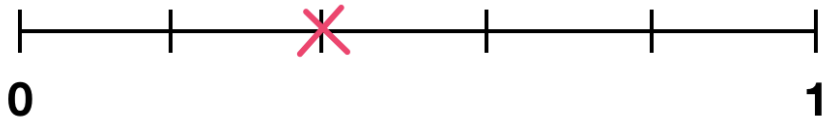
For example, how do we know where to place $\frac{2}{5}$ on the number line?

Prompt a volunteer to divide the line and place the location for $\frac{2}{5}$.

Explanation: We break up the line into 5 equal parts with tally marks. Why 5? The denominator number, each line represents $\frac{1}{5}$.



Then we count the number of tally marks we want as indicated by the numerator, in this case 2. So counting from left to right, we mark the location of $\frac{2}{4}$ on the number line. (see below)



What if you are not good at dividing a line into equal parts? It gets harder as the denominator gets bigger. If we know, or measure the length of the line, we can divide the line into parts that are exactly the same length.

How do we do that? **Prompt** students for answers.

Let's say our line is 10 inches long. We take the length of the line and divide it by the denominator to know how far apart each tally mark on the line needs to be:

$10 \div 5 = 2$ We draw each tally mark on the line 2 inches apart.

Student Activity:



Write some fractions on the board ($\frac{5}{7}$, $\frac{2}{4}$, $\frac{1}{6}$, ...) and tell students to draw them on a number line.

3. Demonstration



Demonstrate the fraction slider using the solution project so students know what they will be creating. The project page describes how the slider works. Run it multiple times.

Solution project: <https://scratch.mit.edu/projects/544000050>


During the demo, point out the following as it is important for the next activity:

1. Notice how every time I click the green flag, we get a different fraction.
2. Notice how every time I click the green flag, the dragonfly starts at the 0 point.
3. Notice that after the game starts, the tally marks are automatically drawn on the number line. The number of sections on the number line match the denominator number.
4. When I press the left arrow, the dragonfly goes to the left, but does not pass the 0 point. When I press the right arrow, the giraffe goes to the right, but does not pass the 1 point.

4. Student Activity: Creating a Plan



Instruct students that planning a program before coding is very helpful to avoid mistakes and to be more efficient when coding. In this activity, students’ practice writing a plan for a program.

Display the solution project and click on the green flag so students can see all the parts of the fraction slider. (Be sure to display the enlarged stage by clicking on  in the upper right corner)

Students work in pairs for this activity. Distribute the student activity worksheet and instruct students to create a brief plan of how they would code this project with only the demo they saw. They can come up with their own plan, or follow the list of questions to help them organize their thoughts.

Instruct students to take turns taking the lead role and collaborator role to come to a consensus on each question for the plan or if using their own plan, coming up with plan descriptions.



Student Plan Follow Up Discussion

- How was it being the lead to come to consensus and how was it being the collaborator?
- How many sprites did you come up with?
- Do you need variables? What do they represent?
- When are the tally marks drawn on the number line?

5. Wrap Up and Reflections



Reflection Points:

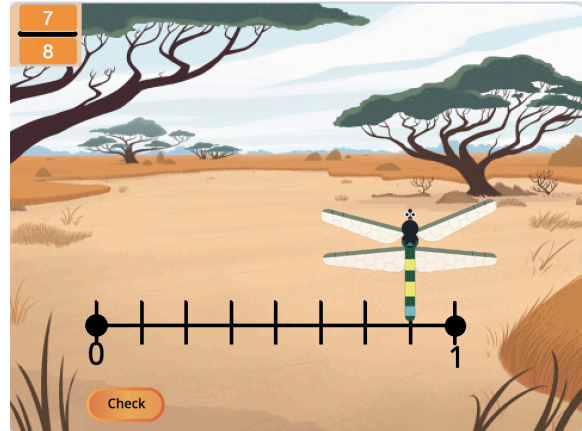
- What is a fraction?
- Why is planning a program important? What is helpful about it?
- What was challenging about today's activity?

Student Activity: Creating a Plan

What to do:

Create a plan of how you would code this project.

- 1) How many sprites do you think you need? _____. Hint: the number line is part of the backdrop.
- 2) List each sprite and what you think it does.



Sprite	What does it do
Tally mark (line)	Draws the tally marks on the fraction line. The number of tally marks is the same as the denominator (bottom number) .
Check button	

- 3) Which events move the Dragonfly? Which Scratch block will you use?

4) List 3-4 things that need to be coded to complete the project

1. The numerator and denominator need to be initialized (set) to random numbers when the program starts

2. _____

3. _____

4. _____
