**Fractions Using a Number Line**

Grade 3

*Adapted from Contexts for Learning Mathematics: Investigating Fractions, Decimals, and Percents*

Standards addressed by this series of lessons: 3.NF.2, 3.NF.2a, 3.NF.2b, 3.NF.3a, 3.NF.3c

**Day One Outline**

**Materials Needed:**

Large chart paper

Interactive Math notebook

Measuring Tapes

Markers

**Investigation**

* Students will be planning a course for a walk-a-thon
	+ Pose this problem to students…
		- Third grade is planning a Walk-A-Thon to raise money for United Way. Your class is in charge of planning the course that the walkers will take. There needs to rest stops, drink stops, and a snack stop. The course will be 4 miles long. The course should be marked with:
			* Snack stops at every ¼ of the course
			* Rest stop at ½ of the course
			* Drink stops at every 1/8 of the course
			* Mile markers at each mile of the course
* Ask students to work in small groups to plan the course on chart paper. Distribute measuring tapes to the groups and have them draw a four foot course on the chart paper (where 1 foot is 1 mile on the scale). As students work, move around to support and confer as needed. A variety of strategies are likely to be used, including the following:
	+ Halving: using landmark fractions and taking a half- for example, finding fourths by halving the half or finding eights by halving fourths.
	+ Dividing by the denominator ( for example ¼ of 4 feet is 1 foot, ½ of 4 feet is 2 because 4 divided by 2 is 2)
	+ Adding pieces- for example, 3/8 is 1/8 more than 2/8
	+ Using equivalence strategies

**Things to keep in mind…**

* + Note the strategies that students are using. Remember to pay particular attention to the students for whom you do not have evidence of their thinking.

**Differentiating Instruction**

For students who are struggling, stay in the context. Have them fold the measuring tape to find the marks and discuss with them how many portions are being made.

**Wrapping up the day…**

Once students have mapped out their course, collect posters for use on day 2. Students will share their thinking and critique the reasoning of others during the discussion on day 2. Big ideas around equivalence may have come out today. Students start to see fractions not only as unit fractions, but start to develop a measurement model for fractions. This is in contrast to fair sharing ideas. They should show that several of the stop occur at the same places on the path, and that these common points are equivalent fractions.

Give students 5-10 minutes to write down their thinking in their interactive math notebooks. They need not recreate everything they did on their poster, but instead they comment on the math they did today. The can reflect on what was difficult for them that day and further reflect on the task so that they will be ready to discuss their work in discussion the following day.

**In preparation for Day 2**

Look over posters students made. Look at what big ideas students are showing on their posters. Plan out what questions you want to ask and how you want the conversation to flow. Look for what students struggled with and decide who will share and in what order.

**Day 2**

**Materials Needed:**

Posters from Day 1

Sticky notes

Interactive Math notebooks

**Beginning Day 2**

Give students back their posters from the day before. Have them bring their Interactive Math notebooks. Ask them to answer these three questions in their notebooks:

* What locations have multiple landmarks?
* What do you notice about the relationships of the markers?
* What strategies did you use (and find most helpful) to determine the locations?

Once students have had sufficient time to think about and answer these questions, display posters around the room and have students do a gallery walk. Ask students to review all the posters and see if they agree with where everyone has placed the markers. Students should record their questions and/or comments on sticky notes and place them on the posters. As students discuss make notes about the big ideas they are discussing, especially about equivalent fractions, which you would like to bring up in the whole group discussion. The goal is to focus on equivalent fractions. Post a list of equivalent fractions (where multiple landmarks are) and establishing ways to be sure they are equivalent. You will also be discussing relationships, such as the fact that fourths occur at every other eight. Keep equivalence in mind as you observe the gallery walk so that you can decide which students’ ideas should be the focus of the discussion.

**Discussion**

Bring students together to discuss the 3 questions. As students report a list of all the locations that had multiple markers (question #1), record them on large chart paper.

Once all the equivalent fractions are up on a chart, shift the discussion to the patterns and relationships that the students noticed (questions #2). Some students may have noticed that once all the eights were placed for the miles, the fourths and halves were already done. Discuss why that happened. Encourage students to notice that 8 is a multiple of 2 and 4.

Other students may have noticed that the snack stations were at every other drink stations and that the rest stops were at every other snack stations and every fourth drink station. Encourage students to examine why this pattern occurred: how are fourths, halves, and eights related?

After the discussion, have students reflect in their notebooks 1 or 2 big ideas that they learned today.