OER In Mathematics Professional Development Project

Lesson Plan

Topic of the lesson:

Using a number line to locate fractions.

Standard(s)/Learning Result(s):

NUMBER: Rational Number
   Compare signed rational numbers and place them on a number line.

Goal(s) of the Lesson:

What do you want the students to know and be able to do? What overarching questions do you want them to be able to answer?

We want students to be able to develop an understanding of fractions and fraction equivalence. They also need opportunities to estimate with fractions. A critical tool to assist in the development of fractions is the use of number lines. Number lines can be used to illustrate the magnitude of fractions as well as the relationships between and among fractions, decimals, and percents.

- Students should be able to locate and compare fractions with the same denominator on a number line. (including whole numbers, mixed numbers, and improper fractions)
- Students should locate and compare fractions with different denominators on a number line. (including recognizing equivalent fractions)

Context

What should students know to engage in the lesson?

Students should have experience with fraction notation. They should have some experience with various forms of fractions including proper, improper, mixed numbers, and whole numbers.

Associated Student Difficulties

Describe known misconceptions (overgeneralizations, common errors, and misunderstandings) associated with the content in this lesson?

Students often treat fractions as the composition of two whole numbers where the numerator and denominator are treated separately rather than seeing the fraction as a quantity with one value and one discrete location on the number line. Due to this, students often see a fraction such as ¼ as larger than ½ because 4 is greater than 2. Students may only have a part to whole conception of a fraction so they may not be able to locate the fraction on a number line but may understand it in another context.

Planning for Differentiation

Describe how the lesson design incorporates a plan for differentiation.

Students grouped across abilities and degrees of understanding (not same ability groupings) to minimize students with similar misconceptions within the same group.

The applets can be adjusted to provide a number of different values on the number line. You can provide students with a range of different examples to locate and/or compare.

Pre/Post Assessment

Review what you want students to know and be able to do. How will you determine what they know and don't know? How will you determine that they have met the target? (Describe the pre/post assessment)

Pre Lesson Probe: Administered to determine if students can locate numbers on a number line. Distracters are included to elicit common misunderstandings.
 - Review results to determine specific instructional interventions.
Post Lesson Assessment:
- Administered to determine if students changed their ability to locate and interpret fractions on a number line.

Materials & Resources

Describe any tools and resources that are needed to support the lesson.

- Pre-Assessment

- Student Exploration

Technology Tools / Applets

What technology tools, applets, and/or resources you will use for this lesson?

- Where is the fraction (1) Applet: http://maine.edc.org/file.php/1/tools/WhereIsTheFraction1.html
- Projector
- Laptops
- Smartboard (optional)

What management strategies will you utilize during the lesson?

- Load the applet on the teacher computer before having students launch the applet
- Put the link on the classroom wiki (Or blog, Portaportal, or other management site…)

Teacher Notes:

Lesson Description

PREPARATION	*What resources will you need? What type of preparation is needed before you can begin the lesson?* - Clickers, Laptops - Print Exploration/Recording Sheet for Locating Fractions - Print Pre and Post Lesson Probes (Or make sure the probes are in an online administration site such as Google Forms) - Approximate Time: 1 1/2 hours

	LESSON	**QUESTIONS FOR LEARNERS**	**NOTES / REFLECTIONS**
INTRODUCTION	Steps of the lesson: learning activities (and time allocation) • Students complete the probe for the pre-assessment (10 min). • Students use the clickers/online administration tool to get class results on each question from the probe. Teacher explains the significance of the results (5 min). • Teacher picks out the questions from the probe that have the most discrepancy (5 min).	What is the significance of the information gathered by using the clickers? What do the percents/numbers represent and mean to the class? How can we use this information?	1) Review probe prior to instruction, make observations about misconceptions 2) Clicker set up, have student data put into graphs
CORE INSTRUCTION	• Students answer the first few questions from the exploration (5 min). [Questions 1-7] • Class discussion on the first few questions from the exploration (5 min). • Students use the applet to answer the questions from the exploration (25 min).	Where is ¼ located in relation to ½? Is it less than or greater than ½? Explain your thinking/justify your reasoning. Look at points A (1/8) and D (7/8). Which of these fractions is closer to 0? 1? Where is 3/8 in relationship to ¼? Where is 3/8 in relationship to ½ ?	Point out the location in relationship to 0, 1, ½. These are critical benchmarks for students to use to locate fractions.

		Lesson	Questions for Learners	Notes / Reflections
Core Instruction (cont.)		• Class discussion of the questions in the exploration (10 min). • Class discussion on the final part of the exploration to come to a generalization (10 min). • Students complete the probe again for the post assessment (10 min). • Teacher and students go over the solutions to the probe (10 min). • Final wrap up over lesson (10 min).	Stop students after completing 2 rows of the table in Part II in order to get them to discuss the relationships among the fractions in each row then elicit the conversation related to the two number lines… If 1/5 is less than ¼ and below 1/10 is less than 1/5, how do ¼ & 1/10 compare? Which is closer to 1, ¾ or 4/5ths?	Have students notice that the number line from 0 to 1 can be divided into a number of different "equal size" parts…4 equal parts or 8 or 10…
Closure		- Students will retake the probe: - Students will complete on paper first - Students then will complete using clickers.	Have students summarize what they noticed about the locations of numbers - relative to benchmarks…0, ½, 1 - relationships among unit fractions in relationship to one another (1/8, 1/5, ¼...) - Other common fractions with the same numerator (3/5, 3/6, 3/7…) (Lesson 2 – Recognizing equivalent fractions on the number line)	Review data Reflect on remaining areas of difficulty Determine next instructional steps