

OER In Mathematics Professional Development Project

Lesson Plan

Topic of the lesson: Integer Operations	Standard(s)/Learning Result(s): 7 ALGEBRA: Symbols and Expressions Students create and evaluate expressions. - Operating with Integers
Goal(s) of the Lesson: <i>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?</i> We want students to be able to understand the meaning and effects of arithmetic operations with integers. In particular, we want students to be able to add and subtract integers. Initially, with the support of a number line, we want students to make generalizations about adding and subtracting with integers. Then we want students to use what they have learned to add and subtract integers beyond the scope of a -10 to 10 number line.	
Context <i>What should students know to engage in the lesson?</i> Students should have prior experience with whole numbers and whole number operations including some awareness of numbers less than zero. Additionally, the vast majority of students at middle level bring prior experience with negative numbers from real life experience such as loss of money, below zero temperatures, and moving in opposite directions.	
Associated Student Difficulties <i>Describe known misconceptions (overgeneralizations, common errors, and misunderstandings) associated with the content in this lesson?</i> Students think you can't subtract a larger number from a smaller number. Students may have over-generalized rules (such as two negatives make a positive) and then misapply them. When using a number line model, students may have difficulty locating numbers if the scale is not provided.	
Planning for Differentiation <i>Describe how the lesson design incorporates a plan for differentiation.</i> Students grouped to prevent students with similar misconceptions within the same group <ul style="list-style-type: none">- Mobile activity (walking the number line)- Frequent checks after skill sets to determine readiness to move on, understanding of content- Directions on using the applet are presented in written form (handout) as well as visually (pictures in handout as well as using the projector), and verbally (the teacher will go over applet use).- Values of the numbers in the problems that are provided are different	



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 understand the reasoning behind adding and subtracting integers.

Post Lesson Assessment: Administered to determine if students understand the reasoning behind adding and subtracting integers.

Both the pre and post assessment include students adding and subtracting integers, determining whether a result will be negative or positive, and determine whether expressions are greater than, less than, or equivalent. Items elicit known misconceptions through the choice of numbers in the example.

Materials & Resources

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

- Number Line Cards
- Student Exploration

Technology Tools / Applets

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

- Walking the Number Line Applet: <http://maine.edc.org/file.php/1/tools/IntegerWalkNumLine2.html>
- Clickers
- Projector
- Laptops

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, ...)

Teacher Notes:



Lesson Description

Preparation	<i>What resources will you need? What type of preparation is needed before you can begin the lesson?</i>
	- Clickers, Laptops, Number Line Cards
	- Print Exploration/Recording Sheet for adding and subtracting integers,
	- 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	<p>Steps of the lesson: learning activities (and time allocation)</p> <p>1) Students complete pre lesson assessment the day prior to the assessment (10 minutes).</p> <p>2) Preview integers (10 minutes).</p>		<p>1) Review probe prior to instruction, make observations about misconceptions</p> <p>2) Clicker set up, have student data put into graphs</p> <p>3) Picture of tree/dog/child on board (Engage prior knowledge)</p>
Core Instruction	<p>1) The teacher will demonstrate how to walk the number line with the first example from the exploration (2 minutes).</p> <p>2) Students are split into pairs. Students will receive the exploration and one student will walk the number line while the other writes (for adding integers ONLY) (5 minutes).</p> <p>3) After adding integer examples have been completed, students will stop walking the number line and go back to desks. Students will input their information from the probe utilizing the clicker and software. Students will go to the front of the exploration, open laptops, and go to Firefox. The teacher will preview how to use the applet using the projector and handout (15 minutes).</p>		



	Lesson	Questions for Learners	Notes / Reflections
Core Instruction (cont.)	<p>4) Students will check their predictions about addition examples from page three using the applet (individually) (20 minutes).</p> <p>5) Students will independently complete addition expressions beyond the 10 to -10 scope (15 minutes).</p> <p>6) The teacher will then initiate a discussion about student observations in regards to adding integers (10 minutes).</p> <p>7) Students will go back to the walking number line (on the floor). One student will walk the number line while the other writes (for subtracting integers) (5 minutes).</p> <p>8) After subtracting integer examples have been completed, students will stop walking the number line and go back to desks.</p> <p>9) Students will check their predictions about subtraction examples using the applet (individually) (6 minutes)</p> <p>10) Students will complete pages six and seven of the applet individually. The class will join together to discuss answers (20 minutes).</p>		
Closure	<p>Students will retake the probe:</p> <ul style="list-style-type: none"> - Students will complete on paper first - Students then will complete using clickers. 		<p>Review data</p> <p>Reflect on remaining areas of difficulty</p> <p>Determine next instructional steps</p>

