

Figure 8.15. Operating on Integers Lesson Plan – Day 5

Standards:

Understand that positive and negative numbers are used together to describe quantities having opposite directions or values.

Apply and extend previous understandings of addition and subtraction to add and subtract rational numbers (*Integers only in this unit*); represent addition and subtraction on a horizontal or vertical number line diagram.

Highlighted Standards for Mathematical Practice:

SMP2: Reason abstractly and quantitatively

SMP5: Use appropriate tools strategically

SMP6: Attend to precision

SMP8: Look for and express regularity in repeated reasoning.

Know:

- Vocabulary: absolute value, integer, negative, number system, opposite, positive, zero pair
- The layout of a number line
- How to model integers and integer operations with two-colored counters and number lines
- Notation

Understand:

- A negative in mathematics always means “the opposite.”
- Mathematical operations apply to and follow the same patterns within our number systems and mathematical disciplines.

Be able to Do:

- Model integers and integer operations in different ways
- Apply and compute with integers

Whole Class

1. Review some of the addition explanations from closure yesterday. Transition to the idea of subtraction.

2. Model “Pick Up Put Down” game. So far, this game will be played only thinking about adding the values of each new hand, but will record both addition and subtraction equations.

Small group activity:

With partners or triads, play Pick Up, Put Down.

Ask groups if they can recognize any kind of pattern with subtracting integers as compared to adding integers.

Whole Class:

1. What patterns or relationships did you see between adding and subtracting integers?
2. Model subtraction with number line making sure that movement on the number line is defined by a negative sign meaning opposite (that is, subtracting a positive number moves the opposite way from adding, and subtracting a negative number moves the opposite way from subtracting a positive, or the opposite of the opposite of adding).
3. Model subtraction with counters showing how to add zero pairs if you need to subtract a positive or negative that is not available to “take away.”
4. Practice with blocks of numbers to show that subtraction is really “adding the opposite.” e.g. $8 + (-4)$ and $8 - 4$; $4 + (-9)$ and $4 - 9$; $3 + 4$ and $3 - (-4)$; etc.

Closure (Differentiated by Readiness): All: How would you explain the relationship of adding and subtracting integers? Give examples and use at least one of the models (number line or counters). Use any format you like to make your explanation understandable even to your parents.

Challenge: What is the role of adding zero pairs with counters when subtracting? When do you need to do that? Solve: $3 - (-5) =$

On track: How can you explain why subtracting a negative number is just like adding the absolute value of the number? Solve: $3 - 5 =$

Struggling: Which model for subtracting do you like the best so far, and why? Solve: $3 - 5 =$

Formative Assessment – Pick up Put down work sheets

Check for Understanding: Closure activity