

Integer Addition

Summary

Students will add integers, solve application problems, and predict the effects of operating with integers as an increase or decrease of original value.

Main Core Tie

Mathematics Grade 7

[Strand: THE NUMBER SYSTEM \(7.NS\) Standard 7.NS.1](#)

Materials

Two color counters

Algeblocks

Paper and scissors for a foldable

Playing cards

Worksheets: [Adding Integers Using Algeblocks](#), [Adding Integers On A Number line Record worksheet](#), [Adding Integers On A Number Line Practice](#).

Background for Teachers

Enduring Understanding (Big Ideas):

Operations with integers

Essential Questions:

What models or situations can be represented by the addition of integers?

How can we find the sum of two integers?

Skill Focus:

Adding integers

Vocabulary Focus:

Integers, sum, zero pair

Ways to Gain/Maintain Attention (Primacy):

Stories, music and movement, graphic organizer (foldable), discussion, cooperative learning, game

Instructional Procedures

Starter:

Add without using a calculator: $2/5 + 1/2$

Which problem does this model represent

$1/2 + 1/4$

$1/2 - 1/4$

$1/2 \times 1/4$

d. $1/2 \div 1/4$

What do all these expressions have in common?

$5 + -5$

$-7 + 7$

$20 + -20$

Lesson Segment 1: What models or situations can be represented by the addition of integers

For each of the situations or models, ask students to predict whether the result will be an increase or decrease of the original number.

Tell the students a story such as the following:

A water ski dare devil wants to reach a record parasail height. Her parasail lifts her up and up until she is 60 feet above the water. Suddenly, her parasail rips, and she plummet down to the lake. The sail begins to drag her under until she reaches a depth of 12 feet below the surface before she is able to release her chute and swim upwards. A large yacht is floating above her. The crew of the yacht ask if she needs help and throws her a rope. She ties the rope around her, and is dragged up 15 feet to the safety of the deck.

As you tell the story, draw stick figures to illustrate and label appropriate integers such as 60, -12, 0 and 15. Ask students how they could decide how many total feet she had traveled. Discuss the need for performing operations such as addition with integers. Tell students part of their assignment today will be to write their own integer story and an addition problem to represent the story line.

Counters:

Review with students about additive inverses (pairs of numbers whose sum is 0 or "zero pairs"). Tell students you will be putting some counters on the overhead to model addition problems (or Algeblocks on the Basic Mat. See attachment to sketch and draw Algeblocks) . Their task is to find what the total number of counters will be if you take away all the zero pairs on the overhead. On the overhead use two-color counters, or sketch plus and minus signs to model integer addition problems as follows:

$5 + 2$ +++++ ++	no zero pairs, so the total is 7
$-3 + -5$ - - - - - -	no zero pairs, so the total is -8
$5 + -2$ +++++ - -	two zero pairs, so the total is 3
$3 + -6$ +++ - - - - -	three zero pairs, so the total is -3

Algeblocks: Use the Basic Mat and Algeblocks to model the problems shown on the worksheet. All zero pairs are taken away from the mat. When there are no blocks to take away, zero pairs must be put on the mat as instructed in the Algeblocks lessons binder.

Number line: Have a student stand along a posted number line. Ask the student to walk forward 1 step, then backward 1 step. Remind students that 1 and -1 are additive inverses, so their sum is 0. They could be called a "zero pair". Repeat this with 2 and -2, 5 and -5. Help students see that walking forward can be undone by walking backward and vice versa. Sometimes you will need to move beyond the zero pair-beyond zero. Q. Where would the student end up if the student moves forward three steps then backward four steps? Moves backward 5 and forward 7? If there are more steps in one direction than another, the student will pass by zero.

A number line can be used to model integer addition. Select a student to be the walker for a model problem. The teacher writes an integer addition problem on the overhead and has the "Walker" stand at first number in the problem. Ask students how many steps from zero that first number is. Teacher draws an arrow from zero to the first number and records that number of steps above the arrow on a number line. Then, the class sings the Walking The Number Line song (below) as the walker moves the steps suggested by the second number. Teacher draws an arrow from the first number along the number line as indicated by the second number and records the steps on that arrow. The teacher then asks the class where the "Walker" has ended up and records that number.

After a couple of problems have been demonstrated, each team will work together to complete the "Adding Integers On The Number Line Record" worksheet (attached) by selecting one person to be a Walker. The Walker stands by the team facing the positive side of the number line. The Team directs the walker to walk through the problem. The students sketch each problem on their paper just as modeled. Have the teams select a new Walker for each problem.

Walking The Number Line (to A' Louetta)

On a number line, move from 0 to the first number in the expression. Face the positive direction. Sing the song and move as directed by the operation and the second number in the expression. A subtract sign tells you to turn around before beginning to walk.

To add a POSITIVE, we will just walk FORWARD

To add a POSITIVE, walk FORWARD just like this.

(Start at the first number and walk forward the distance of the second number.) Where do we end up?
 To add a NEGATIVE, we will just walk BACKWARD
 To add a NEGATIVE, walk BACKWARD just like this.
 (Start at the first number and walk backward the distance of the second number.) Where do we end up?

After the record is complete, discuss these questions with students.

Q. How can you know by looking at the integers whether you will end up on the negative side of zero or on the positive side of zero? (Remind them that if there are more steps in one direction than the other, the Walker will pass by zero ending up on the other side of zero)

Q. How can we know how far to the left or right of zero we will end up? (Discuss that the difference between the number of steps in one direction and the number of steps in the other direction is how far we end up on the other side of zero.

Lesson Segment 2 (Summarize/Apply):

Have the students make a four-flap foldable to begin writing rules for integer operations that looks like this:

Addition	Subtraction	Multiplication	Division
Rules and Example for Operations With Integers			

Help students write the rules for addition under the appropriate flap and give three examples. The foldable can be put in their journal.

Addition Rules:

Positive + positive = positive (just add them)

Negative + negative = negative (just add them)

Positive + negative = (find the difference between the digits or take away all zero pairs. The will be that of the greater number of steps

Game: Using red playing cards as negative integers, black playing cards as positive integers, Ace as 1, Jack as 11, Queen as 12, King as 0, play Integer Addition War or Integer Addition Snap. Two players compete. Half the deck of cards are dealt to each player.

Integer Addition War

Each player lays down two cards. The player with the greatest sum wins all four cards. These cards are set aside to count at the end of the game. When all cards have been played, the player with the most cards wins.

Integer Addition Snap

Cards are placed face down in a pile in from of each player. Each player takes the top card from his/her pile and lays that card down face up as the opponent is doing the same. The first player to say the correct sum of the two cards wins the two cards. These cards are set aside to count at the end of the game. When all cards have been played, the player with the most cards wins.

Select application problems from a text to apply addition of integers in real world settings.

Assign students to write a story that can be represented using integer addition.

Assessment Plan

Observation, performance task, journal, questions.

Bibliography

This lesson plan was created by Linda Bolin.

Authors

[Utah LessonPlans](#)