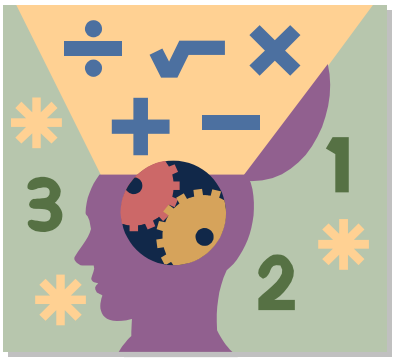

#9933
INTEGER OPERATIONS--INTO THE NEGATIVE ZONE!: PART 1--ADDING AND SUBTRACTING

BENCHMARK MEDIA, 2002
Grade Level: 6-12
19 mins.

DESCRIPTION

Focuses on adding and subtracting positive and negative numbers, or integers. Begins by showing common examples of negative numbers and uses manipulatives to clarify the problems. After each phase, presents a short quiz.

ACADEMIC STANDARDS

Subject Area: Mathematics

- Standard: Understands and applies basic and advanced properties of the concepts of numbers
  - Benchmark: Understands the characteristics and properties (e.g., order relations, relative magnitude, base-ten place values) of the set of rational numbers and its subsets (e.g., whole numbers, fractions, decimals, integers) (See INSTRUCTIONAL GOALS 1, 2, and 3.)
  - Benchmark: Understands the role of positive and negative integers in the number system (See INSTRUCTIONAL GOALS 2.)
  - Benchmark: Uses models (e.g., number lines, two-dimensional and three-dimensional regions) to identify, order, and compare numbers (See INSTRUCTIONAL GOALS 4.)
- Standard: Uses basic and advanced procedures while performing the processes of computation
  - Benchmark: Adds, subtracts, multiplies, and divides whole numbers, fractions, decimals, integers, and rational numbers (See INSTRUCTIONAL GOALS 4 and 5.)

INSTRUCTIONAL GOALS

1. To define the term *integers*.
2. To introduce the concept of negative numbers.
3. To show how to write positive and negative numbers.
4. To illustrate visually how to add and subtract positive and negative single-digit numbers.

VOICE (800) 237-6213 **TTY** (800) 237-6819 **FAX** (800) 538-5636 **E-MAIL** info@cfv.org **WEB** www.cfv.org
Funding for the Captioned Media Program is provided by the U.S. Department of Education

5. To explain simplified rules for adding and subtracting positive and negative numbers, including how to interpret two signs next to each other in an addition or subtraction.

BACKGROUND INFORMATION

Negative numbers are widely used in everyday life. They are also necessary for mathematical theory. Acquaintance with negative numbers, and the ability to perform operations that employ negative numbers, is necessary both for further studies in mathematics and for solving everyday problems. It is worth mentioning that some of the concepts to which students are introduced in the course of this lesson are generalized in other mathematical applications (for instance, the notion of the inverse operation and the additive inverse).

VOCABULARY

1. adding
2. answer
3. backwards
4. calculation
5. equals
6. forwards
7. integers
8. negative
9. number line
10. opposite
11. positive
12. sign (+/–)
13. subtracting
14. temperature
15. zero

BEFORE SHOWING

1. Brainstorm everyday examples of numbers less than zero, such as temperatures or golf scores.
2. Discuss that subtraction is not always possible within the set of positive numbers. There must be negative numbers to answer some problems. For example:
   a. There is no positive number x such that $x + 5 = 3$.
   b. How can we answer the question: "What balance will be left on John's credit card if he owes $5,000 and all that he has to pay with is $3,000?"?
3. Discuss possible solutions to the two problems above. Explain how you figured it out, and defend your answer.
4. Explain that there will be problems to solve throughout the video, so paper and pencil will be necessary.

DURING SHOWING

1. View the video more than once, with one showing uninterrupted.
2. Pause to allow students time to complete the problems shown on the screen. Discuss solutions, and then check the answers by continuing the video.
3. Additional pauses may be desired to review content after presentation of particular concepts.

AFTER SHOWING

Discussion Items and Questions

1. Give examples of the use of numbers below zero in everyday life.

VOICE (800) 237-6213 **TTY** (800) 237-6819 **FAX** (800) 538-5636 **E-MAIL** info@cfv.org **WEB** www.cfv.org
Funding for the Captioned Media Program is provided by the U.S. Department of Education

2. Describe what negative numbers are.
3. Explain how to add positive and negative numbers.
4. Discuss subtraction of positive and negative numbers.
5. Explain the use of a number line for adding and subtracting positive and negative numbers.
6. Discuss the "rules" for adding and subtracting positive and negative numbers. When you have two signs together in an addition or subtraction, how can they be written?
   a. + + = ?
   b. + – = ?
   c. + = ?
   d. – = ?

Applications and Activities

1. Create a life-size number line, as shown in the video. Practice adding and subtracting positive and negative numbers by turning and walking forwards or backwards.
2. Discuss and use examples to solve these questions:
   a. Can the sum of positive and negative numbers be positive? Negative?
   b. Can the sum of positive numbers be positive? Negative?
   c. Can the difference of two positive numbers be positive? Negative?
   d. Can the difference of two negative numbers be positive? Negative?
3. Create individual number lines on card stock. Use these number lines to practice adding and subtracting positive and negative numbers individually.
4. Practice ordering the numbers from –9 to +9.
   a. Using index cards, make number cards from –9 to +9. Mix the cards up.
   b. Tape one card to the back of each student while they are in a line. Don't allow the students to see their own card, but they can see their classmates' cards.
   c. The students must get themselves in the correct numerical order from least to greatest without communicating their numbers to each other.
   d. To make this more interesting, make a double set of cards, divide the students into two teams, and which ever team finishes first wins.
5. Play a variation of the card game WAR to practice addition.
   a. Use a regular deck of playing cards. Assign values to the face cards (J = 11, Q = 12, and K = 13) or remove them.
   b. Each pair of students deals the cards as if playing WAR–the whole deck evenly. Students do not look at the cards.
   c. Each player flips up two cards and adds the two numbers, announcing the sum to their partner.
   d. The player with the highest sum wins the trick. If the students disagree on an answer, the teacher can be the referee.
   e. Play for a set time, and the player with the most cards wins, or play until one player possesses *all* the cards.
   f. To practice adding positive and negative integers, identify one color of cards as negative and the other as positive. Play the game the same way.

VOICE (800) 237-6213 **TTY** (800) 237-6819 **FAX** (800) 538-5636 **E-MAIL** info@cfv.org **WEB** www.cfv.org
Funding for the Captioned Media Program is provided by the U.S. Department of Education

6. Locate word problems for adding and subtracting single-digit positive and negative numbers. Practice solving them as a group and individually.
7. Working in small groups or in pairs, create math word problems for addition and subtraction. Trade problems with another group and solve each other's problems.
8. Write an essay about how inconvenient life would be without negative numbers.
9. Create posters for a bulletin board showing the rules and examples of adding and subtracting positive and negative numbers.

SUMMARY

The key concepts explained are: negative numbers, integers, and addition and subtraction of integers. Several examples of the use of negative numbers are offered. The notation for negative numbers is explained. Addition and subtraction are illustrated with a block of wood in which the smooth surface represents zero, holes drilled represent negative numbers, and wooden pegs removed represent positive numbers, so that the sum of a positive peg and a negative hole is zero (a wooden peg fits into a hole leaving a smooth surface–zero). The video explains by visualizing that subtracting say, –3 (removing 3 holes) is the same as adding +3 (inserting 3 positive plugs into 3 holes). Addition and subtraction can also be visualized by using the number line. The addition of a positive number (say, +3) is represented as a movement to the right (by 3 units). Conversely, the addition of a negative number (–3) is represented as a movement to the left (by 3 units). Correspondingly, the subtraction of a positive number is represented as a movement to the left, and the subtraction of a negative number is represented as a movement to the right.

CMP RELATED RESOURCES

- *Integer Operations–Into the Negative Zone!: Part 2--Multiplying and Dividing* #9934
- *Basic Math: Integers and Addition* #10139
- *Basic Math: Subtracting Integers* #10143

World Wide Web

The following Web sites complement the contents of this guide; they were selected by professionals who have experience in teaching deaf and hard of hearing students. Every effort was made to select accurate, educationally relevant, and "kid safe" sites. However, teachers should preview them before use. The U.S. Department of Education, the National Association of the Deaf, and the Captioned Media Program do not endorse the sites and are not responsible for their content.

VOICE (800) 237-6213 **TTY** (800) 237-6819 **FAX** (800) 538-5636 **E-MAIL** info@cfv.org **WEB** www.cfv.org
Funding for the Captioned Media Program is provided by the U.S. Department of Education

Mrs. Glosser's Math Goodies™

- **LESSONS ON INTRODUCTION TO INTEGERS**

http://www.mathgoodies.com/lessons/vol5/intro_integers.html

Mrs. Glosser's Math Goodies Web page reviews the concepts of positive and negative integers and then provides practice online. Scroll down to the bottom, and click on "Adding Integers" or "Subtracting Integers" for more practice. All pages use a horizontal number line for a model.

- **SIGNED INTEGERS**

http://www.math.com/school/subject1/lessons/S1U1L10GL.html

Multiple-page Web site with explanations of positive and negative integers using a number line and online practice examples. Use the menu bar on the left to choose "Adding and Subtracting Integers" for more practice.

Education 4 Kids®

- **FLASHCARDS FOR KIDS!**

http://www.edu4kids.com/math/math.php

Math problems are presented online for students to practice at the computer. Choose the operation. Users are given feedback on correct and incorrect responses and scores when completed.

- **MATH FORUM: ASK DR. MATH**

http://forum.swarthmore.edu/dr.math/

"Ask Dr. Math" allows users to e-mail questions to Dr. Math and access archived material. For more materials that relate to this video, click on "Elementary" and then "Addition" or "Subtraction," or choose "Middle School," then "Negative Numbers."

- **LINE JUMPER**

http://www.funbrain.com/linejump

FUNBRAIN.COM™

Use this interactive number line to solve addition problems with positive and negative integers to +/–16.

VOICE (800) 237-6213 **TTY** (800) 237-6819 **FAX** (800) 538-5636 **E-MAIL** info@cfv.org **WEB** www.cfv.org

Funding for the Captioned Media Program is provided by the U.S. Department of Education