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Grade 6

## **Adding and Subtracting Integers**

### **Objective:**

1a. The student will add and subtract integers with the aid of colored disks.

### **Procedures:**

Let's review: What is an integer? Integers are whole numbers and their opposites. Some examples of integers are +3, -3, 0, and +16. Next, the teacher will discuss the meaning of opposites or additive inverses. Example: 2 and -2 are opposites. Using the number line, show the students that opposites are the same distance from zero on the number line. Check for the understanding of additive inverses (opposites) by asking: What is the opposite of 4? Of -6? Of  $-\frac{2}{3}$ ? Of 0? After answering, the student will locate the numbers and their opposites on the number line at the board.

\*\*Describe addition as the union of two or more sets. Ask: What is the opposite of 5? Allow the student to answer. What happens when you add 5 to its opposite? The teacher will discuss that the sum of any number and its opposite is "zero." Ex.  $2 + (-2) = 0$  or  $-5 + 5 = 0$ , etc. At this point the teacher will establish the yellow disks as (+1) and the red disks as (-1). Ask: How can we represent "zero" using the disks? Now explain that 1 red disk combined with 1 yellow disk represents zero.

\*\*Next, show how to add integers with the same signs. Work several examples with the students. The students will work in pairs as the teacher guides them in using the disks. Ex.  $2+5$ : Place 2 yellow disks in one set and 5 yellow disks in the second set. The student will add by combining the two sets and reading their answer.

Ex. 1) 2 yellow disks + 5 yellow disks = 7 yellow disks. So, positive 2 plus positive 5 = positive 7.

Ex. 2)  $-4 + (-2)$ : Place 4 red disks in one set and 2 red disks in the second set on the overhead projector. After combining the two sets, you have a new number 6, and since the disks are red, the answer is negative.

Four red disks + two red disks = six red disks

Negative (red) + Negative (red) = negative (red)



2) **-6-(-2)**: Place 6 red disks on the overhead projector. Remind students that the 6 and 2 are negative. Now take away 2 red disks. What remains? Four red disks. So,  $-6-(-2)=-4$

The students will practice using the following examples: a)-5-(-3) b)9-4 c)8-2 d)-7-(-3) e)-6-(-1)

**\*\*Subtraction with different signs:**

**Use 5-7.** Place 5 yellow disks on the overhead projector. Say: “What do I do to subtract 5-7? The teacher is leading the students to say “take away 7 disks.” How can you take away 7 yellow disks if you don’t have 7 yellow disks? Ask: How many more yellow disks do you need? How can I get 2 more yellow disks? Explain that you cannot add 2 yellow disks (+2) to the problem. So ask, “What number can I always add to a number that leaves the value unchanged?” zero How do you represent zero with the disks? Allow the students time to respond. The response should be to stack one yellow and one red creating a black(=0) to the problem without changing the problem. Ask: Do I have enough disks to solve the problem? No The students should respond by saying that another yellow disk is needed. How do you get another yellow disk? The teacher will lead the students in saying add 1 red and 1 yellow creating a black(=0). On the overhead are 5 yellow disks and 2 black disks. Have the students separate each black stack into 1 red and 1 yellow (unstuck). Make sure that the students understand that the black represents 1 yellow (+1) and 1 red (-1) which is called a zero pair. Now you have 7 yellow disks and 2 red disks on the overhead projector. Tell the students to take away 7 yellow disks. You have 2 red disks. So,  $5-7=-2$ . The student will complete the following practice items: a) 4-7 b) -2-(-4) c) -6-2 d) 6-3 e) 3-8

**Note:** This lesson is designed to help students add and subtract integers by modeling the problems and the answers using colored disks. Showing addition of integers on the number line is another method that could be used to help model problems and their answers.

**Materials**

30 colored disks for each pair of students (15 red and 15 yellow)

30 colored disks for the teacher (15 red and 15 yellow)

\*\*If you do not have colored disks, you may use red and yellow construction paper to make colored tiles.

Overhead projector

A printed number line (taped to the board)

Activity sheet (attachment 1)

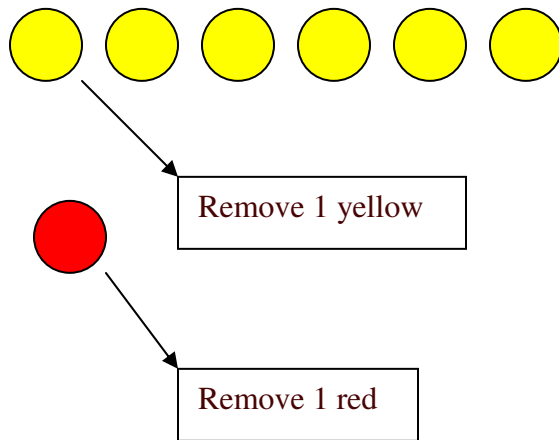
## References:

Scott Foresman (1991) Exploring Mathematics

Middle School Mathematics Training (2005) *Lesson Plans and Activities*

## Assessment:

1. The student will complete performance tasks of using the colored disks to model addition and subtraction of integers.
2. Each student will complete an activity sheet for a grade (attachment 1). Use positive and negative disks ( or tiles) to solve addition and subtraction of integers. The student will read each problem, model it with disks, and draw a model to represent each answer on their activity sheet. Ex.  $6 + (-1) =$



Once you remove 1 red and 1 yellow disk, which is a zero pair, there are five yellow disks remaining. So,  $6 + (-1) = 5$

## Attachment 1

Read each problem, model it with disks, and draw a model to represent each answer of the following problems:

1.  $6 + (-1)$

2.  $(-2) + (-5)$

3.  $2 + (-7)$

4.  $4 + (-3) + (-1)$

5.  $-4 + 7 + (-3)$

6.  $-4 + (-6)$

7.  $9 - 10$

8.  $8 - (-3)$

9.  $-2 - (-6)$

10.  $4 - 6$

11.  $-8 - (-3)$

12.  $-2 - 5$

13.  $1 - 4$

14.  $-3 - (-6)$

15.  $-4 - 4$