I2T2
Final Project

Addition of Integers
“In the Chips”

Grade 7

Laura Bauer
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The students will be able to:

- Develop and use a chip model for representing addition of integers
- Interpret mathematical sentences
- Develop algorithms for adding integers
- Follow a set of directions to enable them to navigate a computer program
**NYS Standard 3: Mathematics**

Key Idea 3: Operations

Key Idea 4: Modeling/Multiple Representations

Key Idea 7: Patterns/Functions

**NYS Standard (MST) 1, 2, 4, 5, 6 & 7: Technology**

Key Idea 3: Operations

Key Idea 2: Technological Tools

Key Idea 3: Computers as a Tool

**Materials and Resources**

*Required time:* 40 minutes (including time it takes to walk to the computer lab and back down to the regular classroom for the next period class)

**Materials:**
- Overhead projector
- Transparency markers
- Red and black transparency chips (chips or tiles in two colors—designating one for positive integers and the other for negative integers)
- Computer lab computers (20 -30)
- Stanford Bright Sticks Wet Erase Fluorescent Window markers
- National Library of Virtual Manipulatives for Interactive Mathematics CD
Background on previous lessons:
The week before this lesson, the students were locating, comparing and ordering positive and negative numbers on a number line. Most students understand the relationship between positive and negative numbers and their opposites (additive inverse). In the later part of the week, the students developed and used a number line model for representing addition of integers.

Outline of activities:
- To begin I will remind the students of the past strategy we used the week before. In this unit the students used the directed distance model with the number line to visualize adding and subtracting integers.
- In the launch part of the lesson, we will use colored chips to develop a strategy for adding integers. The chip model uses black chips to represent positive integers and the red chips to represent negative integers. Since I do not have black transparency chips I will use dark purple chips to represent the black positive integers for purposes of the launch activity.
- During the explore part of the lesson, the students will be working on a computer program that reinforces the chip model for adding integers. While practicing this strategy the students should identify two rules for adding integers. If the signs are the same... and if the signs are different... what will happen?
- During the closure part of the lesson, we will form two rules for adding integers and write them on the windows. Two problems will be posted on the window. Have the students demonstrate and explain their solutions.
**Launch:**

Discuss the context of describing funds as “in the black” or “in the red.” Discuss that each chip, red or black, represents 1 unit. To use this model we will begin with a blank chipboard. We will place the appropriate number of chips on the board to represent each addend. If the integer is positive we will place that number of black chips on the board and if the integer is negative we will place that number of red chips on the board. Using the chip model also requires an understanding of opposites. For example, \(+1\) (one black chip) and \(-1\) (one red chip) are opposites because added together, they equal zero \((+1 + (-1) = 0)\).

Model a real life scenario that the students may relate to. For example, Linda owes her sister $6 for helping her cut the lawn. She earns $4 delivering paper with her brother. Is she “in the red” or “in the black?” Ask for volunteers to help write a mathematical number sentence to solve this problem. It should look like: \(-6 + 4 = -2\). Next I will reproduce this number sentence on the overhead projector with the chips as follows. The students should be able to communicate that we will need six red chips and four black chips. (see figure 1) Next, we will pair two opposite chips, simplifying the board by removing a black/red chip pair (see figure 2). The remaining unpaired chips will represent the sum of \(-2\). Finally, I will ask the students to identify a situation where they have been “in the black” or “in the red,” and use the chip model to solve the mathematically sentence.

**Figure 1**

![Figure 1](image1)

**Figure 2**

![Figure 2](image2)
Explore:

The students will use a computer program from the National Library of Virtual Manipulatives for Interactive Mathematics CD. Under level 3-6 there will be an addition chip model program that will already be loaded onto each computer and ready to roll. I will quickly model this program by gathering all the students over to one computer. At the top of the screen there are a set of directions for the students to follow in case they need assistance. The students will be given a number sentence and an empty chipboard. With the mouse the students will click and drag the correct number of red and black chips on the board to represent the addends and press the continue button. At this point a new set of directions will appear. The student will pair the red and black chips by clicking and dragging a red chip on top of a black chip or visa versa, which will cause the pair to disappear. The unpaired chips will represent the sum in which the students will type into the answer box that will pop up. After entering their answer, a “check” button will appear which will provide feedback. The students should work on this for 10-15 minutes and begin to formulate rules for adding integers.

There are some factors that may not be easily observed on the videotape that may have affected the recorded instruction. Six out of the sixteen students that will be in the video have special needs. I may introduce the accelerated group of students to another program, which involves subtracting integers (located in level 7-8); while I allow those who require more practice with adding integers continue working in the original program of adding integers. I will make this determination as I walked around and conference with groups/ individual students.
**Summarize:**

Ask the students to reveal the two rules they discovered and write them on the window.

Rules for adding integers:
If the signs are the same, ADD and keep the sign
If the signs are different, SUBTRACT and keep the sign of the bigger number.

Two problems (one word problem and one number sentence) will be posted on the windows. Using these rules, I will ask for volunteers to solve the problems on the window while the rest of the class solves them at their seats.

1.) \(-6 + 4 = \)

2.) Julie earns $12 babysitting. She has $9 in her piggy bank. Is she “in the red” or “in the black?” Show your work.

The students will read their problem aloud and demonstrate and explain their solutions to the class.

http://math.buffalostate.edu/~it/