

Algebra/Geometry Institute Summer 2002

Lesson Planning Guide 1

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School: W. A. Higgins Jr. High

Grade Level: 7—Compensatory Mathematics



1 Teaching objective(s)

Objectives—The student will use models including the number line to compare and order integers.

At completion of this lesson, students will be able to model integers, and compare and order integers with **at least** 70% accuracy.

2 Instructional Activities

1. The teacher will start the lesson by instructing each student to obtain a newspaper from the front of the classroom. Each student will locate several examples of integers from the newspaper. The teacher will ask the following and discuss the responses: “How would you describe an example of a negative integer? a positive integer?”
2. The students will make a list of quantities found in the newspaper in which positive and negative numbers are used. Examples may include temperatures above or below a zero value, times before or after a certain event, etc.
3. The teacher will use Celsius thermometers to provide a concrete foundation for the concept of integers and the number line.
4. The teacher will instruct students how to read a thermometer by discussing *scale*, or evenly spaced divisions, marked on the thermometer. The students should notice that there are a number of larger divisions, which are subdivided into smaller divisions. The teacher will ask students what the larger and smaller division lines stand for. (The larger divisions are multiples of 5 or 10, and the smaller divisions are multiples of 1.)
5. The student will sketch a thermometer with a scale ranging from -30°C to 30°C on a piece of graph paper. They will practice finding the location of integers by marking each of the following temperatures with a dot on their thermometer sketch: a) 15°C , b) -10°C , c) -5°C , d) 28°C , e) -17°C , and f) 0°C .

6. The students may be unsure about when to use a positive or negative sign. The teacher will explain to the students that negative numbers need a negative sign, and positive numbers do not need a plus sign because numbers without a sign are positive. For example, +2 and 2 both mean “positive 2”. The teacher will also explain that the number 0 is neither positive nor negative.
7. The teacher will ask the student if they think a thermometer will work when laid flat on a table or turned upside down. The students will create a horizontal number line by using a straightedge and ruled notebook paper. The teacher will emphasize that a number line, like a thermometer, should have evenly spaced divisions. On a normally oriented thermometer, the temperature increases from bottom to top. The scale of the thermometer is thus a vertical number line. On a horizontal number line, the numbers increase from left to right. Negative numbers are to the left of zero, and positive numbers are to the right.
8. The teacher will have students work with a partner and draw number lines for the following sets of numbers: multiples of 5 between -10 and 15 , and even integers between -20 and 20 . The student will mark each number with a dot. One student will take the role of reader/checker to read the problem and check the answer, and the other student can take the role of sketcher/reporter to draw the number lines and report to the class.
9. When the students have plotted numbers on the scale divisions of their number lines, the teacher will ask them what they think the spaces between the divisions stand for. The teacher will ask, “What kind of numbers are represented by division marks on their lines?” The teacher will explain to the students that the whole numbers, including positive numbers, negative numbers, and zero, are called **integers**.
10. The students will draw arrows on both ends of their number lines, and ask them what they think the arrows show. The teacher will explain that they show that the line keeps going in both directions. The students should understand that the integers are an infinite set of numbers in both the positive and the negative direction.
11. The teacher will ask the students to think of pairs of opposite words. The examples may include hot/cold, good/bad, happy/sad, and wet/dry. The teacher will ask the students to create a new number line on ruled paper and to mark dots for a pair of integers that are opposites, such as 4 and -4 . The students will fold their number line at 0 so that one side of the number line falls directly on top of the other side. The students will write a description of what they observe from their folded number line and what this means. If the number line is scaled properly, the dots should lay on top of one another. This shows that the opposites are equal distances from zero.

12. The student will take out their journals, and describe the mathematics seen in the photograph on the overhead. (Photograph provided will show Death Valley (-282ft.) and Mount Everest (29,028 ft.)).

3 Materials and Resources

Overhead projector
Pencil
Notebook
Textbook—*Mathematics-Applications and Connections, Course* (Glencoe,1995)
Newspapers
Thermometers
Rulers
Photograph of high and low elevations
Journals
Graph paper
Adapted from 2002 Algebra and Geometry Institute lesson on integers (6/10/02)

4 Assessment

Teacher observation of student participation
Peer evaluation
Student product—number lines that were drawn
Journal writing

5 Enrichment (Optional)