NUMBER JUMPS
OTIMMS 8th Grade Lesson Study

PASS objectives: 1.1a, 1.1 b, 2.1a, 5.1

Objective: The student will gather data from an ordering integers exercise and then organize that data in a graph to discover patterns.

Materials: Lesson lab sheet (2 pages-attached), stop watch or other timing device, and pencils.

Procedure:

1. Teacher distributes instruction sheet to students and explains procedure to group.
    A. Students will be timed at varying periods while connecting integers from least to greatest in sequential order. Students must circle each number before connecting it to the next number (see Practice 1 on student sheet).
    B. Each trial will vary in lengths with the following times:
        Trial 1: 8 seconds
        Trial 2: 11 seconds
        Trial 3: 5 seconds
        Trial 4: 9 seconds
        Trial 5: 7 seconds
        Trial 6: 4 seconds
        Trial 7: 10 seconds
        Trial 8: 8 seconds

    Teacher may choose to explain to students that the time for each trial will vary, but students should not be told the length of the trial until all trials have been conducted.
    C. When time is called for each trial, students should "star" (or otherwise indicate) the last number reached. The next trial should begin as soon as possible so that motor memory can be maintained.
    D. Once all trials have been conducted, students should return to Trial 1, mark their ending number on the number line and determine the number of connections made by counting the number of jumps. Student can then record the jump number and time (given by teacher) at the top of each trial box.
    E. After all trial information has been recorded, students can transfer the data to the T-chart on the back of the instruction sheet. (Teachers should NOT assist students in organizing data in either the chart or on the graph—this is a discovery opportunity).
    F. After completing the T-chart students should organize their data on the graph provided. **This is an opportunity for the teacher to introduce line of best fit.**

2. Teacher will guide students through Practice 1 and 2 at the bottom of the student instruction sheet. Please note: Practice 1 has been started for the student to show procedure. The student should continue when time begins. Practice 2 can be started and completed by the student. 15 seconds should be given for each Practice. Students should mark the ending point on each number line. The teacher can demonstrate how to make jumps on the number line.

3. Teacher will distribute the Lesson Lab Sheet to students and begin Trials as outlined in instructions above.

4. As students complete individual graphs, teacher can instruct them to post them for shared learning.

5. Once all students graphs are posted, students can take a "gallery walk", looking at and discussing graphs with classmates. Teacher can lead a whole group discussion with "What do you notice?"

Questions:

1. Looking at your graph, make a prediction about how many connections would be made in 3 seconds? In 13 seconds? In 16 seconds?
2. What does the origin (0,0) on the graph tell you?
3. How does the time given relate to the number of jumps?
4. What would need to happen in the trials for a horizontal line to result on your graph? What is the slope of this line?
5. Explain how different slopes can occur with the trials (negative slope, undefined).

Extension Suggestions:

Create a new set of trials using the less dominate hand. Compare the graphs. Compare the slopes. Or, graph the two data sets on the same graph and discuss systems and solution.

Write the equation of the line for the graph.

Find the slope of the line for the graph.

Suggested Task Rubric:

10 pts. Participation
_____ Student actively engaged
_____ Trial data collected
10 pts. Accurately represented data table
_____ Headings
_____ Data pairs (not necessarily in sequential order)
20 pts. Accurately represented graph
_____ Title
_____ Axes Labeled
_____ Appropriate intervals
_____ Data correctly displayed
60 pts. Reflection responses (3)
_____ Ideas are connected to data and/or graphs.

Student Instruction Sheet:

Objective: You will gather data from an ordering integers exercise and then organize that data in a graph to discover patterns.

Points to consider as you work:

*How can you use the table to show your data?

*How will you show time and number of jumps on your graph. Which is your dependent variable and which one is your independent variable?

*What patterns do you notice in your table?

*Begin your graph at (0,0) and draw one straight line that comes close to all the points you have plotted. This is called a “line of best fit”.