

Lesson Plan: 7.NS.3

Objective: All students will solve real-world and mathematical problems involving the four operations with rational numbers and make sense of their results in the context of the problem.

Task: Investing in Haley Inc.

SMPs Addressed:

SMP 1: Students will make sense of data from a chart, will predict a solution before jumping into the problem, and will come up with a plan for approaching the problem before doing any calculations. Students will explain their reasoning to a partner.

SMP 2: Students will take the problem out of context in order to some representation of the profit/loss each month and perform the appropriate operations to find overall profit and average profit per month. Students will make meaning of their solution by putting it back in the context of the problem.

SMP 3: Students will create arguments for their approach to solving the problem and also to their solution, and will share with a partner or small group. Students will critique others' reasoning for their approach and solution to the problem.

SMP 4: Students will model this real-world problem with a table of some kind.

SMP 6: Students will communicate precisely with one another during collaboration, and will accurately label their values within the table. When calculating the average profit per month, students will need to decide to which place value it is appropriate to round given the context.

Lesson:

Introduce the chart

1. Teacher reads the description of the chart out loud as students read along.
2. Think time: Students re-read the description of the chart again to themselves and try to make meaning of what the chart represents. (45 sec) Be clear that students should not yet proceed to the prompt.
3. Partner talk: Students talk with their partner and try to answer the questions "what is does this chart represent" in their own words. (1 min)
4. Class share out: Teacher calls on non-volunteers and has them explain what the chart represents in their own words. Teacher should restate the students' responses or have other students restate the statements of their peers. It is important that students understand that the increase or decrease is relative to the previous month. It will also be important to ask clarifying questions during this time to ensure whole class understanding of the context:
 - a. What do you mean by profit?
 - b. Can you give me an example of profit in real life?
 - c. What unit of money are we dealing with here? Why do we write it as "3.3 million?" What would it look like if I wrote 3.3 million out in expanded form?

Diving into the prompt

1. Teacher reads the prompt aloud as students follow along. (no writing yet)
2. Individual time: Students read the prompt on their own and underline/highlight/annotate in order to identify important information from the prompt. (1 min)
3. Pair: Students compare their “important information” with their partner and revise as appropriate (30 sec).
4. Share out: Teacher calls on non-volunteers to have students explain what they thought was important and why they thought so. Teacher makes a list to record student contributions. Once list is composed, teacher calls on a couple students to see if they would change anything about the list and why.

Formulating a plan

1. Teacher poses the question: “How do you think you might get started with this problem? What strategy might you use?”
2. Think time: Students think through the problem and must write down a sentence explaining how that they think they might start this problem and why. Emphasize that they don’t have to be “right” in this. They just need to come up with an idea of how they might start. (2 min., but adjust as you see if they need more time)
3. Group Share: Students quickly move into their groups of four and identify each person as an “a”, “b”, “c”, or “d.” Starting with “c”, each student shares out their strategy for approaching the problem (only that person talks). Teacher has them switch presenters each 30 seconds.
4. Students come to a consensus as to how their group will approach this problem.

Doing the Task

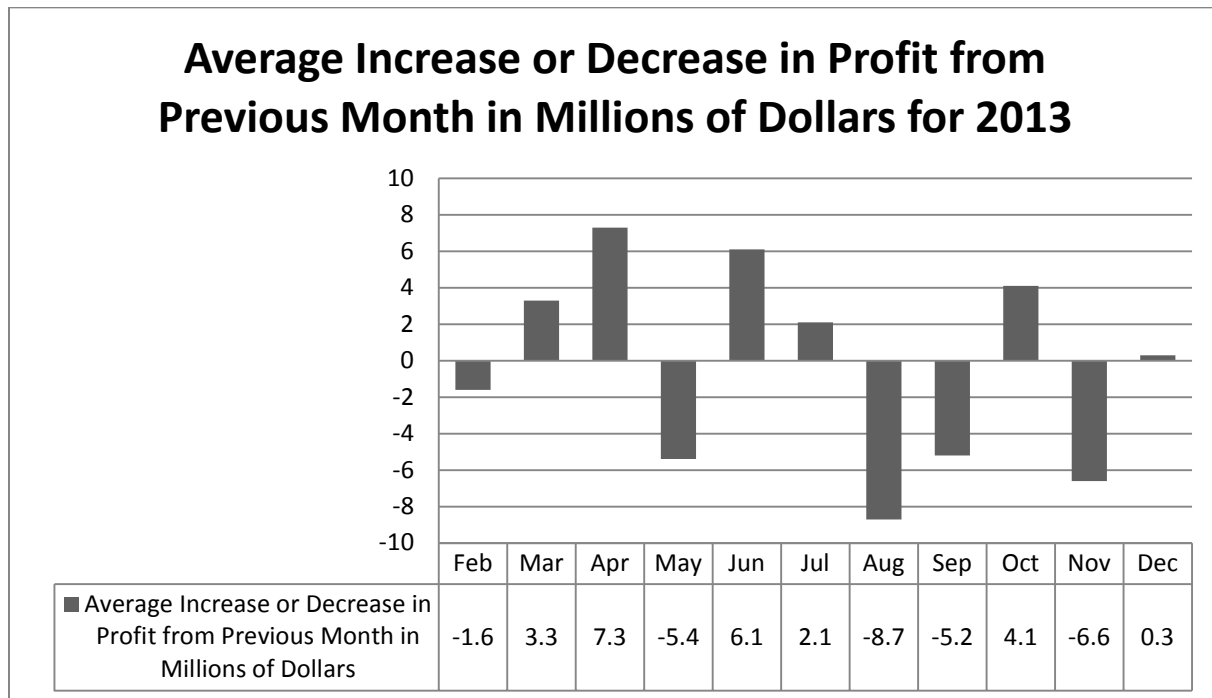
1. Teacher circulates throughout the room as students work and asks questions to both check for understanding and guide their learning. Some possible questions:
 - a. Explain to me how your group decided to approach the problem. Why?
 - b. I see that for February, you have -.5 written down. What does that mean? What is -.5 million? So, at this point in the year, has the company made money or lost money?
 - c. How are you going to decide if you should invest in this company? How are you going to figure that out?
2. As groups finish with the first prompt, they should move on to finding the average profit per month. Some guiding questions for this part:
 - a. What does it mean by average? What measure of average are you going to use? Why?
 - b. How do you find the mean?
 - c. Do you think the average will be positive or negative? Why?
 - d. I see that you got a repeating decimal. How are you going to represent that value? Is rounding appropriate? Why or why not? If so, what place value are you going to round to and why?
 - e. Possible extension question: What is the average increase or decrease in profit per month for 2013? How do you make sense of that?

Closure/Independent Work

Students will individually write a summary of the day’s work that addresses how they approached the problem, their findings, and how those findings influenced their decision to invest or not invest in Haley INC.

Profits for Haley Inc. This year

The following chart represents increase or decrease in profits for this company from month to month. For example, in May, the company made 5.4 less in profit than they did in April (not a 5.4 million dollar loss).



Mr. Haley owns a very unstable business in which his profits greatly vary from month to month. The above chart displays this year's increases and decreases in profits in millions of dollars in relation to the previous month. If Haley Inc. made a profit of 1.1 million dollars in January 2013, would it be wise to invest in this company? Use mathematics to explain why or why not.

What is the average profit/ loss per month in 2013?

All work should be done on a separate piece of paper