

Title:	New Science Lab
Grade:	6
Claim(s):	<p>Claim 4: Modeling and Data Analysis Students can analyze complex, real-world scenarios and can construct and use mathematical models to interpret and solve problems.</p> <p>Claim 3: Communicating Reasoning Students clearly and precisely construct viable arguments to support their own reasoning and to critique the reasoning of others.</p> <p>Claim 2: Problem Solving Students can solve a range of well-posed problems in pure and applied mathematics, making productive use of knowledge and problem-solving strategies.</p>
Assessment Target(s):	<p>Claim 4 A. Apply mathematics to solve problems arising in everyday life, society, and the workplace. D. Interpret results in the context of a situation.</p> <p>Claim 3 B. Construct, autonomously, chains of reasoning that will justify or refute propositions or conjectures. E. Distinguish correct logic or reasoning from that which is flawed and—if there is a flaw in the argument—explain what it is.</p> <p>Claim 2 A. Apply mathematics to solve well-posed problems in pure mathematics and arising in everyday life, society, and the workplace. C. Interpret results in the context of a situation.</p>
Standard(s):	<p>Item 1 - 6.G.3 C2TA Item 2 - 6.EE.6 C3TE Item 3 - 6.RP.3c C4TA Item 4 - 6.RP.3c C2TC Item 5 - 6.EE.7 C3TB Item 6 - 6.SP.3 C4TD</p> <p>6.G.3 ,6.EE.6, 6.EE.7, 6.RP.3c, 6.SP.3</p>
Mathematical Practice(s):	1, 2, 3, 5, 6, 7
Blooms Taxonomy Level:	Analyze - 4
DOK Level:	Strategic Thinking/Reasoning - 3
Score Points:	10 points possible
Difficulty:	Medium
Resources:	N/A
Notes:	N/A
Task Overview:	The students will use mathematical concepts in multiple situations to complete the task.
Teacher Preparation/Resource Requirements:	None required
Time Requirements:	Approximately 60-80 minutes

Prework:	None
Sample Top-Score Response (Session 1)	<p>Mrs. Carver, a sixth-grade science teacher, is in charge of creating a new science lab at school over the summer. She has asked you to help her with this project. In this task, you will use your knowledge of percents and unit pricing to determine a budget and buy supplies.</p> <p>Part A</p> <p>1. Mrs. Carver wants to add wall-to-wall tile to the science lab. If she plots the layout of the science lab on a graph with the vertices $A(-7, 8)$, $B(3, 8)$, $C(3, -2)$, and $D(-7, -2)$, what is the area of the science lab?</p> <p style="text-align: center;">100 units²</p> <p>2. Mrs. Carver is trying to find out how many lab coats she had initially started the year with. Twelve of her lab coats were ruined, and she is left with 22. Salman said to use the equation $c - 12 = 22$, he said, "I'm looking for a number, c, that is 12 less than 22, so $c = 10$."</p> <p>Which statement <i>best</i> describes the flaw in Salman's reasoning?</p> <p>A. Salman's answer is right, but he should have just subtracted 12 from both sides of the equation. B. Salman's answer is wrong, but he explained the equation correctly. C. Salman's equation is set up correctly, but his explanation of what it represents is incorrect. D. Salman should have subtracted the 22 from the 12 instead of 12 from the 22.</p> <p style="text-align: center;">C. Salman's equation is set up correctly, but his explanation of what it represents is incorrect.</p>

Part B

3. Mrs. Carver also has to determine a budget for supplies. Mrs. Carver has already spent \$365.75 on glassware, such as test tubes, beakers, and graduated cylinders. She says that the purchase represents 20% of the original amount of money she was given at the beginning of the project.

What is the total amount of money Mrs. Carver was originally given at the beginning of the project for the new science supplies? How do you know?

The total budget is \$1828.75. I found this by dividing \$365.75 by 20%.

4. Mrs. Carver has decided that 68% of the remaining money will go toward new microscope kits and 32% will go toward safety equipment. Using the answer found in question 3, how much money can you spend on microscope kits and safety equipment? How do you know?

**\$994.84 for microscope kits
\$468.16 for safety equipment**

She can spend \$994.84 on microscope kits and \$468.16 on safety equipment. I found this by using my answer from #3 and finding the remaining amount of money by subtraction ($\$1828.75 - \$365.75 = \$1463.00$). Then I multiplied the 32% and 68% by the remaining amount of money.

5. Mrs. Carver has to build chairs for the new science lab. Mrs. Carver built some chairs on Thursday. On Friday, Mrs. Carver built the remaining 21 chairs. Now Mrs. Carver has a total of 44 chairs. Your classmate, Ben, set up an equation to represent the number of chairs, c , Mrs. Carver originally had. He said the equation $c - 44 = 21$ shows how to solve the number of chairs Mrs. Carver originally built on Thursday. Is he correct? If not, determine what equation he should use to solve how many chairs Mrs. Carver originally built on Thursday and then solve to find the number of chairs Mrs. Carver built on Thursday.

Ben is not correct. The new equation should be $c + 21 = 44$ because c is the initial number of chairs Mrs. Carver built on Thursday. Since she built 21 more chairs on Friday, it means we have to add c to 21 to find the overall total (44). When I solve this, I find that Mrs. Carver built 23 chairs on Thursday.

6. Mrs. Carver recorded how much time you and your classmates spent working on helping her with the science lab on Friday. The number of hours each student spent is shown below.

1, 1, 2, 2, 2, 3, 3, 3, 3, 3, 3, 4, 4, 4, 4, 4, 5, 7

She wants you to find the mean, mode, and median of the given data. How did you solve each part?

The median is 3. I found this by writing the numbers out and seeing which one was in the middle. The mean is 3.22, I found this by adding all of the numbers and dividing the sum by the number of students. The mode is 3 because there were 6 students who worked that amount of hours, and that number is repeated the most.

Scoring Rubrics for Part A:

Scoring Rubric Question 1:	
1 Point:	The student demonstrates a good understanding of plotting points and finding area using vertices of a figure. The student correctly finds the area of the science lab.
0 Points:	The student demonstrates no understanding of plotting points and finding area using vertices of a figure. The student does not find the area of the science lab.

Scoring Rubric Question 2:	
1 Point:	The student demonstrates a good understanding of setting up and understanding equations. The student correctly determines that Salman's equation is correct, but his explanation is incorrect.
0 Points:	The student demonstrates no understanding of setting up and understanding equations. The student does not correctly determine that Salman's equation is correct, but his explanation is incorrect.

Scoring Rubrics for Part B:

Scoring Rubric Question 3:	
2 Points:	The student demonstrates a thorough understanding of solving problems involving percent. The student correctly determines the total amount of money to spend, and the student correctly explains how to find the original amount of money Mrs. Carver was given at the beginning of the project.
1 Point:	The student demonstrates a partial understanding of solving problems involving percent. The student does everything else correctly but does not correctly determine the total amount of money to spend. OR The student correctly determines the total amount but does not explain it thoroughly.
0 Points:	The student demonstrates no understanding of solving problems involving percent. The student does not correctly determine the total amount of money to spend, and the student does not correctly explain how to find the original amount of money Mrs. Carver was given at the beginning of the project.

Scoring Rubric Question 4*:	
2 Points:	The student demonstrates a thorough understanding of solving problems involving percent. The student correctly determines the total amount of money to spend on microscope kits, the total amount of money to spend on safety equipment, and the student correctly explains how to calculate these totals.
1 Point:	The student demonstrates a partial understanding of solving problems involving percent. The student correctly determines the amount of money to spend on microscope kits and safety equipment but does not correctly explain how to calculate these totals. OR The student makes a calculation error in finding the amount of money to spend on microscope kits and safety equipment but does correctly explain how to calculate these totals.
0 Points:	The student demonstrates no understanding of solving problems involving percent. The student does not correctly determine the amount of money to spend on microscope kits and safety equipment and does not correctly explain how to calculate these totals.

**A student should receive full credit for this question if he or she correctly calculates with the incorrect numbers from the previous question(s).*

Scoring Rubric Question 5:	
2 Points:	The student demonstrates a thorough understanding of solving problems involving writing and solving equations of the form $x + p = q$. The student correctly determines the correct equation, explains how to find the new equation, and finds the amount of chairs Mrs. Carver built on Thursday.
1 Point:	The student demonstrates a partial understanding of solving problems involving writing and solving equations of the form $x + p = q$. The student correctly determines the correct equation, explains how to find the new equation, or finds the amount of chairs Mrs. Carver built on Thursday.
0 Points:	The student demonstrates little to no understanding of solving problems involving writing and solving equations of the form $x + p = q$. The student does not correctly determine the correct equation, does not explain how to find the new equation, and does not find the amount of chairs Mrs. Carver built on Thursday.

Scoring Rubric Question 6:	
2 Points:	The student demonstrates a thorough understanding of mean, mode, and median. The student correctly explains how to find the mean, median, and mode and correctly solves for each.
1 Point:	The student demonstrates a partial understanding of mean, mode, and median. The student correctly explains how to find the mean, median, and mode or correctly solves for each.
0 Points:	The student demonstrates no understanding of mean, mode, and median. The student does not correctly explain how to find the mean, median, and mode and does not correctly solve for each.