

MAT.03.PT.4.TOOLK.A.411 Claim 4

Sample Item ID:	MAT.03.PT.4.TOOLK.A.411
Title:	Classroom Tool Kits
Grade:	03
Primary Claim:	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.
Secondary Claim(s):	Claim 3: Communicating Reasoning Students can clearly and precisely construct viable arguments to support their own reasoning and to critique the reasoning of others. Claim 1: Concepts and Procedures Students can explain and apply mathematical concepts and interpret and carry out mathematical procedures with precision and fluency.
Primary Content Domain	Number and Operations
Secondary Content Domain(s):	Measurement and Data
Assessment Target(s):	4 A: Apply mathematics to solve problems arising in everyday life, society, and the workplace. 4 D: Interpret results in the context of a situation. 3 A: Test propositions or conjectures with specific examples. 3 B: Construct, autonomously, chains of reasoning that will justify or refute propositions or conjectures. 1 D: Solve problems involving the four operations, and identify and explain patterns in arithmetic 1 E: Use place value understanding and properties of operations to perform multi-digit arithmetic. 1 H: Represent and interpret data.
Standard(s):	3.OA.8, 3.NBT.3, 3.MD.3
Mathematical Practice(s):	1, 2, 3, 6, 7
DOK:	3
Item Type:	PT
Score Points:	12
Difficulty:	M
How this task addresses the "sufficient evidence" for this claim:	Students are asked to gather and organize data, graph the data, and use the data to solve real-world scenarios. Students will use this information from graphs to justify a conclusion.
Target-Specific Attributes (e.g., accessibility issues):	
Stimulus/Source:	Custom Created List of Tools
Notes:	Multi-part performance task; requires some TE components as part of the task.
Task Overview:	Students collect and analyze data in order to determine total

	cost of school-wide tool kits in comparison to budgets.
Teacher preparation / Resource requirements:	Teacher creates survey for students to conduct and assists students in creating table/tally chart of survey results.
Teacher Responsibilities During Administration:	Monitor individual student work
Time Requirements:	80-100 minutes

Prework: Students are to conduct a survey of the top 5 out of 7 items to include in a math tool kit and to include in a science tool kit. Students are to hand out the survey (below) to each classroom teacher at their campus by either delivering the survey to the classroom or by placing the survey in the teacher’s mailbox in the office. Teachers should be asked to return the survey within two days after receipt. Once all (or most) of the teacher surveys are returned, the class, with teacher assistance, will create a tally chart that shows the number of teachers that selected each of the 7 math tools and the number of teachers that selected each of the 7 science tools. An example of the tally chart for math tools is shown in *Part A*, and an example of the tally chart for science tools is shown in *Part B*. These charts must be completed prior to the start of Session 1.

Teacher Survey

Directions: For each tool kit, circle the top five tools, based on usefulness for the class, that you believe should be in each teacher’s tool kit.

Please return your survey to _____ by _____.

Math Tool Kit	Science Tool Kit
Clock	Thermometers
Place Value Blocks	Beakers
Calculator	Safety Goggles
Pattern Blocks	Tape Measure
Fraction Set	Magnets
Coins	Magnifying Lens
Tangrams	Compass

Tool Kits

Session 1

The teachers at your school have just completed the survey you sent to them about the tools they would like in a math and a science tool kit.

Part A

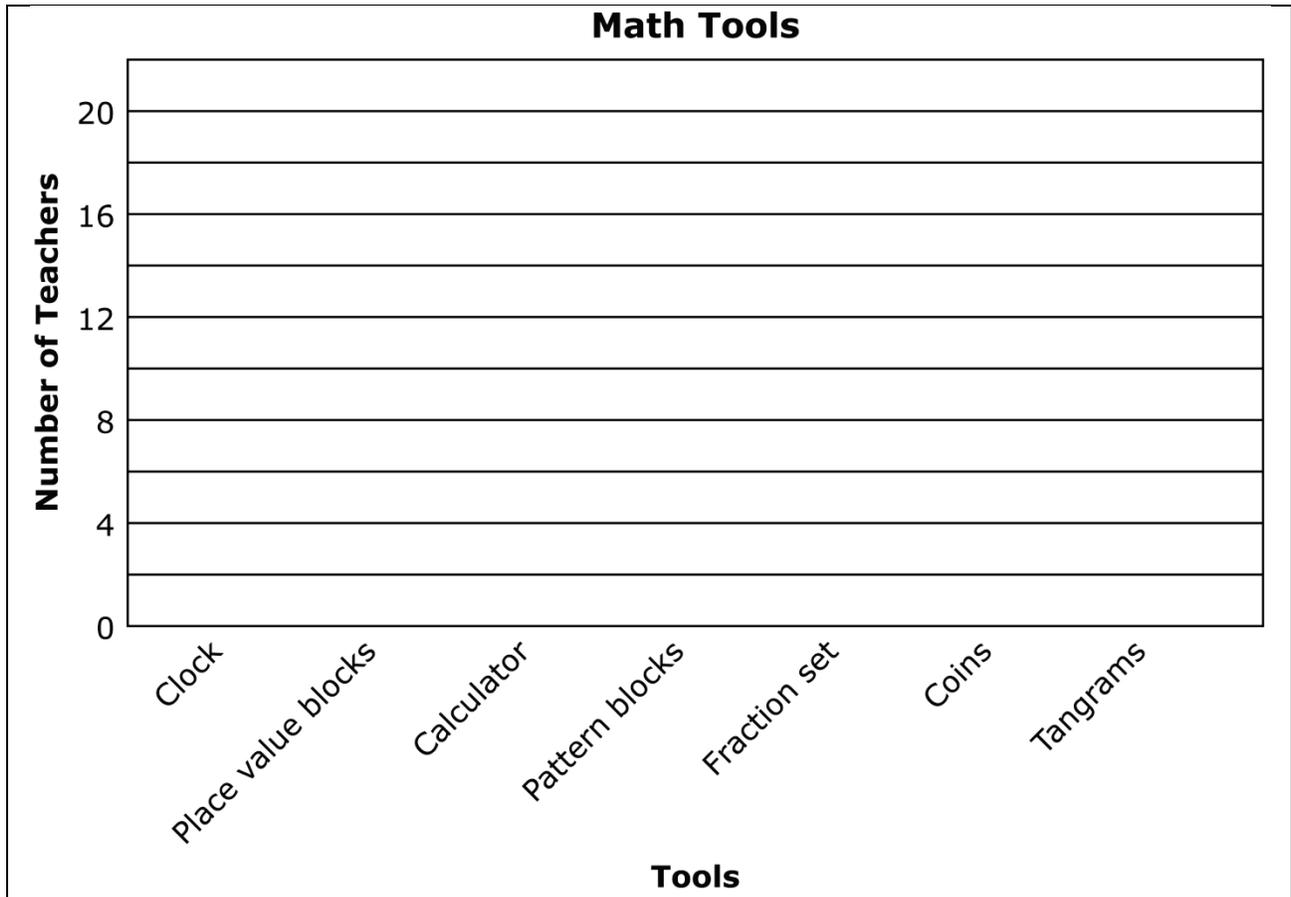
Use the Math Tools Survey Results to answer questions in *Part A* of this task.

Math Tools Survey Results

Math Tools	Tally Marks
Clock	
Place Value Blocks	
Calculator	
Pattern Block	
Fraction Set	
Coins	
Tangrams	

[Note: This tally chart is blank. A completed chart, based on the survey results from your school, must be made available to all students in order to complete their task. Both of the charts (math and science) can be combined on one sheet of paper and distributed to students prior to the start of Session 1. If too few results are obtained, please proportionally increase the numbers so it appears that at least 10 teachers responded.]

Refer to the math tools tally chart to complete the bar graph below.



Use the information from your bar graph to answer the questions below.

1. Which math tool received the most number of votes?

2. Which math tool received the least number of votes?

3. What is the difference between the math tool that received the most number of votes and the math tool that received the least number of votes?

Part B

Use the Science Tools Survey Results to answer questions in *Part B* of this task.

Science Tools Survey Results

Science Tools	Tally Marks
Thermometers	
Beakers	
Safety Goggles	
Tape Measure	
Magnets	
Magnifying Lens	
Compass	

[Note: This tally chart is blank. A completed chart, based on the survey results from your school, must be made available to all students in order to complete their task. Both of the charts (math and science) can be combined on one sheet of paper and distributed to students prior to the start of Session 1.]

Refer to the science tools tally chart to complete the picture graph below.

Science Tools

Thermometers	
Beakers	
Safety Goggles	
Tape Measure	
Magnets	
Magnifying Lens	
Compass	

Each  means 2 teachers

Use the information from your picture graph to answer the questions below.

4. Which two tools received the most number of votes?

5. What is the total number of votes these two tools received?

The key for the picture graph has changed to:
"Each  means 4 teachers".

6. Using the new key, how many  s are needed to fill in the chart for the tool selected by the greatest number of teachers?



End of Session 1

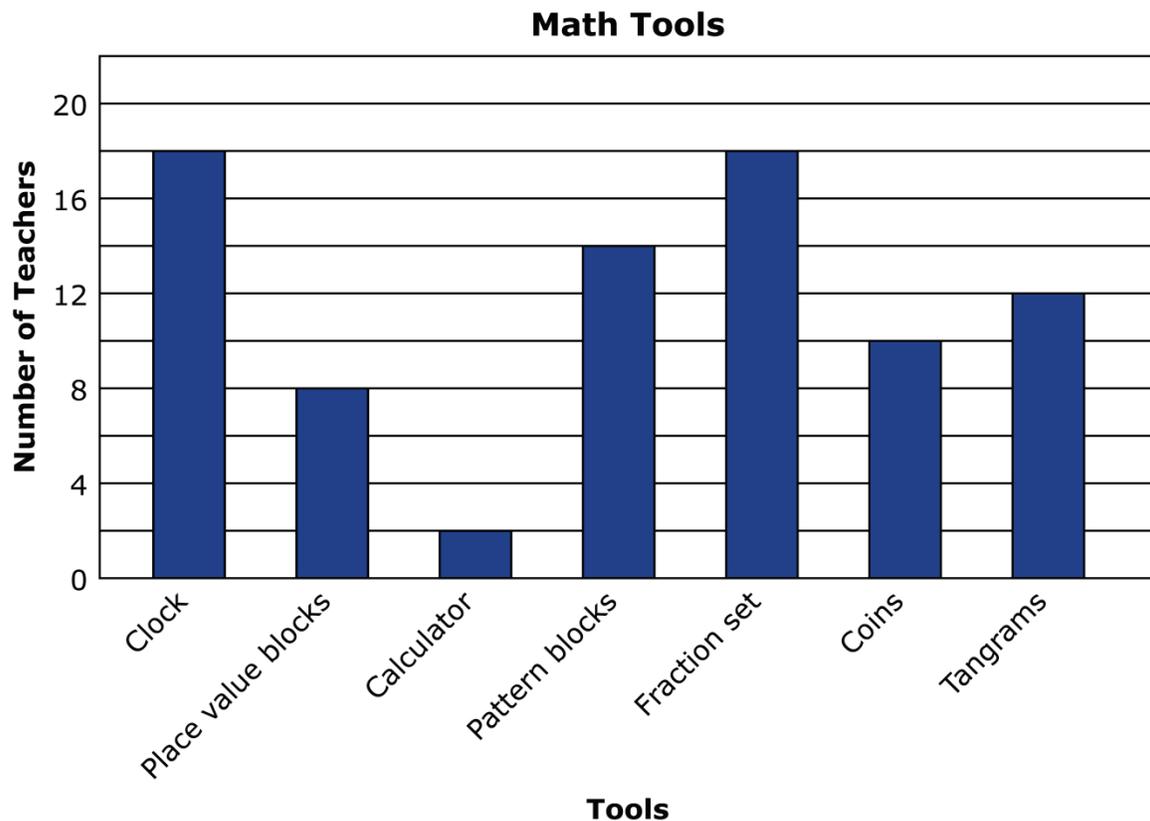
You will not be able to go back to **Part A** or **Part B** after this session.

Session 2

In Session 1, you worked with the survey results from your school. In this session, you will work with the results from Clearwater Elementary School.

Part C

Below is a bar graph that shows the results of the survey from Clearwater Elementary School.



Using this bar graph, select the five math tools in the table below that received the most number of votes.

[TE interaction: As a student clicks on a tool, the tool will be highlighted.]

Math Tools

Tools	Costs
Clock	\$4
Place Value Blocks	\$10
Calculator	\$8
Pattern Blocks	\$4
Fraction Set	\$2
Coins	\$2
Tangrams	\$1

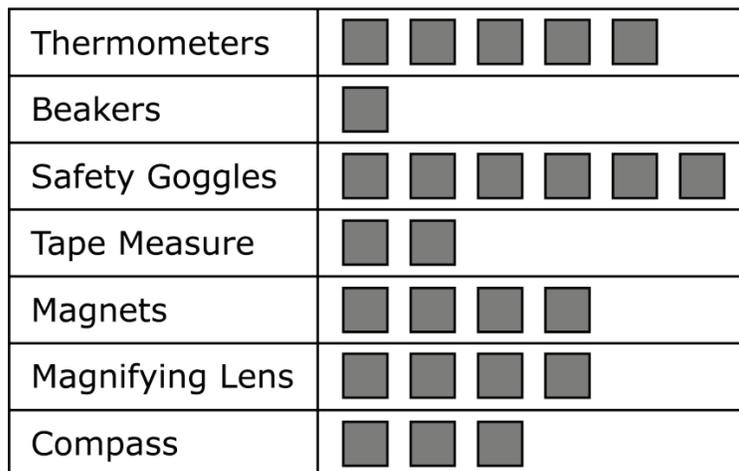
A math tool kit contains 10 each of the top 5 tools.

What is the total cost of 1 math tool kit?

\$

Below is a picture graph that shows the results of the survey from Clearwater Elementary School.

Science Tools



Each  means 2 teachers

Using this graph, select the five science tools in the table below that received the most number of votes.

[TE interaction: As a student clicks on a tool, the tool will be highlighted.]

Science Tools

Tools	Costs
Thermometers	\$2
Beakers	\$4
Safety Goggles	\$6
Tape Measure	\$4 for 5 tape measures
Magnets	\$1
Magnifying Lens	\$1
Compass	\$2

A science tool kit contains 10 each of the top 5 tools.

What is the total cost of 1 science tool kit?

\$

Part D

Look at the costs above for each tool kit. What is the total cost of 4 math tool kits and 4 science tool kits?

\$

The principal at Clearwater Elementary can spend up to \$750 to purchase 4 math tool kits and 4 science tool kits.

Is \$750 enough money to purchase 4 math tool kits and 4 science tool kits for the school? Click on your answer.

Yes

No

[Technology interaction: If the student clicks "Yes", the next question for the student will be the following: "You responded that the principal has enough money to purchase 4 math tool kits and 4 science tool kits. How much money is left over after he purchases the tool kits? Be sure to show the work needed to support your answer."]

[Technology interaction: If the student clicks "No", the next question for the student will be the following: "You responded that the principal does not have enough money to purchase 4 math tool kits and 4 science tool kits. How much more money does he need to purchase the tool kits? Be sure to show the work needed to support your answer."]

End of Session 2

*Sample Top-Score Response:***Part A**

Students should have created a bar graph to represent the information from the math tools survey results chart.

1. This answer should match the highest bar on the graph the student created.
2. This answer should match the lowest bar on the graph the student created.
3. This answer should show that students understand they need to compare the most and least math tools to solve for a difference, according to the graph they created.

Part B

Students should have created a picture graph to represent the information from the science tools survey results chart.

4. This answer should name the top two science tools according to the graph the students created.
5. This answer should show the sum of the top two science tools according to the graph the students created.
6. This answer should show that students divided the value of the top science tool by 4 and identified the number of blocks and partial blocks required. The answer may require partial blocks.

Part C

The student should select *clock, pattern blocks, fraction set, coins, and tangrams*.

Cost of 1 math tool kit \$130

The student should select *thermometers, safety goggles, magnets, magnifying lens, and compass*.

Cost of 1 science tool kit \$120

Part D

The total cost of 4 math tool kits and 4 science tool kits is \$1000.

Students should click on *no*.

Below is an explanation using numbers:

$$130 + 130 + 130 + 130 = 520$$

$$120 + 120 + 120 + 120 = 480$$

$$520 + 480 = 1000$$

$$1000 > 750$$

Grade 3 Mathematics Sample PT Form Claim 4

Below is an explanation using words:

I added 130 four times to get a total for the 4 math kits. That total is 520. Then I added 120 four times to get a total for the 4 science kits. That total is 480. I added 520 and 480 to find the total of 4 math kits and 4 science kits. That total is 1000. I know that 1000 is greater than 750, so I know the principal did not have enough money in the budget.

OR

I multiplied 130×4 to find the total of 4 math kits. That total is 520. Then I multiplied 120×4 to find the total of 4 science kits. That total is 480. I added 520 and 480 and got a total of 1000. I know that 1000 is greater than 750, so I know the principal did not have enough money in the budget.

The principal needs \$250 more.

Scoring Rubric:

Responses to this item will receive 0–11 points, based on the following:

Part A

3 points: The student demonstrates thorough understanding of how to draw a bar graph and use the information to answer questions about the graph. The student draws the correct graph using the information provided and answers all questions correctly.

2 points: The student demonstrates partial understanding of how to draw a bar graph and use the information to answer questions about the graph. The student draws the correct graph and answers one or two questions correctly, but not all three. **OR** The student makes an error in the graph, but answers the questions according to the error made in the graph.

1 point: The student demonstrates limited understanding of how to draw a bar graph and use the information to answer questions about the graph. The student draws the correct graph but does not answer the questions correctly or makes more than one error in the graph and completes one or two questions correctly, based on the error made in the graph.

0 points: The student demonstrates inconsistent or no understanding of how to draw a bar graph and use the information to answer questions about the graph.

Part B

4 points: The student demonstrates thorough understanding of how to draw a picture graph and use the information to answer questions about the graph. The student draws the correct graph using the information provided and answers all questions correctly.

3 points: The student demonstrates good understanding of how to draw a picture graph and use the information to answer questions about the graph. The student draws the correct graph and answers one of the two questions correctly.

2 points: The student demonstrates partial understanding of how to draw a picture graph and use the information to answer questions about the graph. The student draws the correct graph, but is unable to answer either question correctly. **OR** The student does not take into account the scale of 2 teachers per box, but answers the questions according to the error made in the scale.

1 point: The student demonstrates limited understanding of how to draw a picture graph and use the information to answer questions about the graph. The response contains several errors, but some understanding is shown (e.g., most of the graph is correct, answers match incorrect graph, etc.).

0 points: The student demonstrates inconsistent or no understanding of how to draw a picture graph and use the information to answer questions about the graph.

Part C

2 points: The student demonstrates understanding of how to use a bar graph and picture graph to answer questions about the graphs and how to use the four operations to calculate the total cost of a tool kit. The student correctly identifies the top-five tools for both the math tool kit and science tool kit. The student also correctly calculates the cost of one math tool kit and one science tool kit.

1 point: The student demonstrates partial understanding of how to use a bar graph and picture graph to answer questions about the graphs and how to use the four operations to calculate the total cost of a tool kit. The student correctly identifies the top-five tools for either the math tool kit or science tool kit. The student also correctly calculates the cost of either one math tool kit or one science tool kit.

0 points: The student demonstrates inconsistent or no understanding of how to use a bar graph and picture graph to answer questions about the graphs and how to use the four operations to calculate the total cost of a tool kit.

Part D

3 points: The student demonstrates thorough understanding of how to use the four operations to calculate the total for the required number of tool kits, determine whether the principal has sufficient money and justifies that decision, and to determine how much more money the principal requires.

2 points: The student demonstrates partial understanding of how to use the four operations to calculate the total for the required number of tool kits, determine whether the principal has sufficient money and justifies that decision, and to determine how much more money the principal requires. The student calculates the correct total cost and makes an incorrect judgment. **OR** The student calculates the incorrect total cost, makes a judgment based on the incorrect cost, and provides sufficient justification.

1 point: The student demonstrates limited understanding of how to use the four operations to calculate the total for the required number of tool kits, determine whether the principal has sufficient money and justifies that decision, and to determine how much more money the principal requires. The student calculates the incorrect total cost and provides insufficient justification.

0 points: The student demonstrates inconsistent or no understanding of how to use the four operations to calculate the total cost for the required number of tool kits.