4th Grade Extended Response
Mathematics

All Extended Response items should be scored using the ISAT rubric. Be sure a copy of the student friendly rubric for grades 3 and 4 is available to all students when they are writing their responses as well as when they are evaluating prompts. Model the extended response format frequently so students become comfortable with the process. Talking about what they did and why they did it promotes retention of information.

See your Pacing Guide for suggestions on how to work on the Extended Response items. Thank you.

Title	Skill Assessed	Time Frame
Chickens and Rabbits/ Birds and Cats	Algebra	September
Favorite Color	Data	October
Pick a Plan*	Multi-step, multiplication	November
New Park	Perimeter	December
Pizza Palace	Data	January
Playground*	Perimeter	February
Candy Store	Multi-step, multiplication	March
Birds and Cats	Algebra	April
Pizza Survey*	Data and Probability	May

* Use for trimester assessment. Record on Reading grid

Chickens and Rabbits

While visiting a farm, you notice that there are only chickens and rabbits in the farm yard. You can't help but wonder how many of each animal there is in the yard. But when you ask Farmer Fred how many of each animal he has, he refuses to give you a direct answer. He says there are 18 animal heads and 58 animal feet.

How many chickens and rabbits are there in the farmyard?

Show all your work. Explain in words **how** you found your answer. Tell **why** you took the steps you did to solve the problem.

Birds and Cats

While visiting a pet store, you notice that there are only birds and cats in the cages. You can't help but wonder how many of each animal there is in the yard. But when you ask the store manager how many of each animal he has, he refuses to give you a direct answer. He says there are 16 animal heads and 42 animal feet.

How many birds and cats are there in the pet store?

Show all your work. Explain in words **how** you found your answer. Tell **why** you took the steps you did to solve the problem.

Grade 4
Extended Response
October

Favorite Color Survey

Fourth grade students were asked to select their favorite.
Below are the results. What is the range of the data?

Favorite Color

Color	Number of Students
purple	(crayon)(crayon) (crayon)(crayon)(crayon)
red	 (crayon)(crayon)
green	 (crayon)(crayon)(crayon)
blue	(crayon) (crayon)(crayon)(crayon)

(crayon) = 3 students

Show all your work. Explain in words **how** you found your answer. Tell **why** you took the steps you did to solve the problem.

Pick a Plan
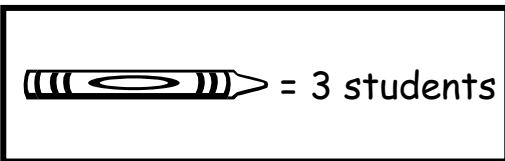
This month, Mrs. Smith's telephone bill included information about a new long distance plan being offered. The plans are listed below.

Current Plan	Monthly service fee of $4.75 Plus $.08 for each call.
New Flat Rate Plan	No monthly service fee, pay $.20 for each call.

Mrs. Smith generally makes fewer than 20 long distance calls each month. Which plan would you advice her to use to spend the lease amount of money?

Show all your work. Explain in words **how** you found your answer. Tell **why** you took the steps you did to solve the problem.

Grade 4
Extended Response
December

New Park

A new park will have a perimeter of 90 meters. It will have an odd number of sides.
Draw and label the sides of the park.

Show all your work. Explain in words **how** you found your answer. Tell **why** you took the steps you did to solve the problem.

Pizza Palace

This sign hangs over the counter at Pizza Palace. Mr. Coleman goes to the Pizza Palace every day and orders a one-topping pizza. He gets a pizza with a different topping and crust each day. How many days will it take for him to have tried all possible one-topping pizza combinations?

<div style="text-align:center">

Pizza Palace

</div>

Pizza Toppings	Types of Crust
Sausage	Original
Pepperoni	Deep Dish
Bacon	Thin and Crispy
Green Pepper	Sourdough
Onion	
Mushroom	

Show all your work. Explain in words **how** you found your answer. Tell **why** you took the steps you did to solve the problem.

Grade 4
Extended Response
February

Playground

A new playground will have a perimeter of 80 meters. It will have an even number of sides. Draw and label the sides of the playground.

Show all your work. Explain in words **how** you found your answer. Tell **why** you took the steps you did to solve the problem.

Candy Store

Solomon has $3.00 to the buy candy.
The candy sells for 50¢ a piece or 5 pieces for $2.00.
What are the most pieces of candy he can buy with his $3.00?

Show all your work. Explain in words **how** you found your answer. Tell **why** you took the steps you did to solve the problem.

Grade 4
Extended Response
April

Birds and Cats

While visiting a pet store, you notice that there are only birds and cats in the cages. You can't help but wonder how many of each animal there is in the yard. But when you ask the store manager how many of each animal he has, he refuses to give you a direct answer. He says there are 16 animal heads and 42 animal feet.
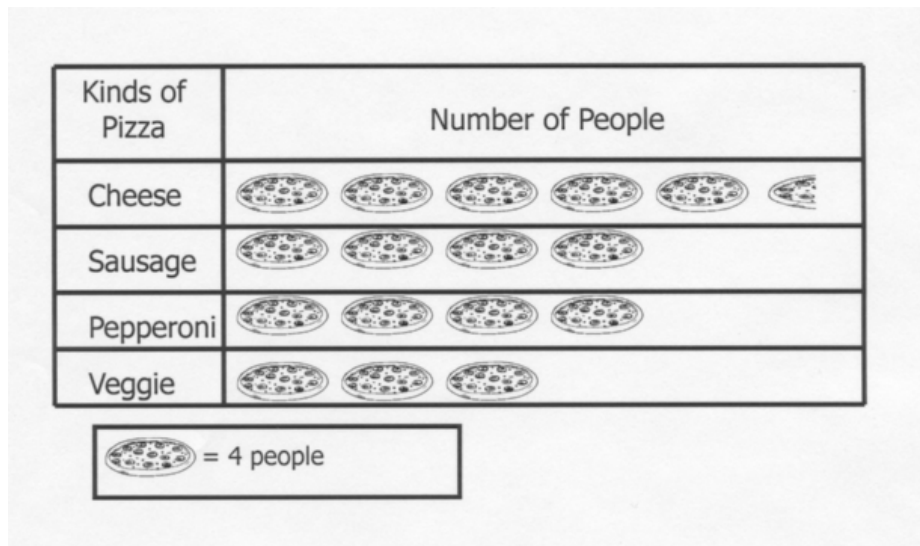
How many birds and cats are there in the pet store?

Show all your work. Explain in words **how** you found your answer. Tell **why** you took the steps you did to solve the problem.

Pizza Survey

Fourth graders were surveyed to see what kinds of pizzas they liked.
Find the range using the pictograph below.

Favorite Kinds of Pizza

Kinds of Pizza	Number of People
Cheese	🍕 🍕 🍕 🍕 🍕 🍕
Sausage	🍕 🍕 🍕 🍕
Pepperoni	🍕 🍕 🍕 🍕
Veggie	🍕 🍕 🍕

🍕 = 4 people

Show all your work. Explain in words **how** you found your answer. Tell **why** you took the steps you did to solve the problem.

Answer Keys
(And Specific Rubrics when available)
Students should write out their answers to show computation, to show what they did to solve the problem and why they did it. Use the state scoring rubric to evaluate student work. It is a good idea to evaluate prompts with teammates so you can share ideas. What follows is the numeric answer only.

September: 7 chickens and 11 rabbits
           5 cats and 11 birds

October: The range is 9

November: Best deal is the Flat Plan (Current $6.35, Flat $4.00)*

December: Students should have drawn a diagram with an odd number of sides, a total perimeter of 90 and have labeled the sides with the label meters as well as a number.

January: 24 days

February: Any shape with an even number of sides, perimeter must add up to 80
Clearly labeled meters*

March: 7 pieces of candy

April: 11 birds and 5 cats

May: the range is 10 people*

   * Denotes a specific rubric is also attached.

MATHEMATICS SCORING RUBRIC

The following rubric is used for the extended-response items for grade levels 3 through 8.

August 2005

MATHEMATICS SCORING RUBRIC: A GUIDE TO SCORING EXTENDED-RESPONSE ITEMS

Score Level	MATHEMATICAL KNOWLEDGE: Knowledge of mathematical principles and concepts which result in a correct solution to a problem.	STRATEGIC KNOWLEDGE: Identification and use of important elements of the problem that represent and integrate concepts which yield the solution (e.g., models, diagrams, symbols, algorithms).	EXPLANATION: Written explanation of the rationales and steps of the solution process. A justification of each step is provided. Though important, the length of the response, grammar, and syntax are not the critical elements of this dimension.
4	◆ shows complete understanding of the problem's mathematical concepts and principles ◆ uses appropriate mathematical terminology and notations including labeling answer if appropriate ◆ executes algorithms and computations completely and correctly	◆ identifies all important elements of the problem and shows complete understanding of the relationships among elements ◆ shows complete evidence of an appropriate strategy that would correctly solve the problem	◆ gives a complete written explanation of the solution process; clearly explains what was done and why it was done ◆ may include a diagram with a complete explanation of all its elements
3	◆ shows nearly complete understanding of the problem's mathematical concepts and principles ◆ uses mostly correct mathematical terminology and notations ◆ executes algorithms completely; computations are generally correct but may contain minor errors	◆ identifies most of the important elements of the problem and shows a general understanding of the relationships among them ◆ shows nearly complete evidence of an appropriate strategy for solving the problem	◆ gives a nearly complete written explanation of the solution process; clearly explains what was done and begins to address why it was done ◆ may include a diagram with most of its elements explained
2	◆ shows some understanding of the problem's mathematical concepts and principles ◆ uses some correct mathematical terminology and notations ◆ may contain major algorithmic or computational errors	◆ identifies some important elements of the problem but shows only limited understanding of the relationships among them ◆ shows some evidence of a strategy for solving the problem	◆ gives some written explanation of the solution process; either explains what was done or addresses why it was done ◆ explanation is vague, difficult to interpret, or does not completely match the solution process ◆ may include a diagram with some of its elements explained
1	◆ shows limited to no understanding of the problem's mathematical concepts and principles ◆ may misuse or fail to use mathematical terminology and notations ◆ attempts an answer	◆ fails to identify important elements or places too much emphasis on unrelated elements ◆ reflects an inappropriate strategy for solving the problem; strategy may be difficult to identify	◆ gives minimal written explanation of the solution process; may fail to explain what was done and why it was done ◆ explanation does not match presented solution process ◆ may include minimal discussion of the elements in a diagram; explanation of significant elements is unclear
0	◆ no answer attempted	◆ no apparent strategy	◆ no written explanation of the solution process is provided

Grade 4 Monthly Math Extended Response Prompts

GRADES 3 AND 4 "STUDENT-FRIENDLY" MATHEMATICS SCORING RUBRIC

Score Level (How many points do you earn?)	MATHEMATICAL KNOWLEDGE: (Do you know it?)	STRATEGIC KNOWLEDGE: (How do you plan?)	EXPLANATION: (Can you explain it?)
4	◆ I get the right answer. ◆ I label my answer correctly. ◆ I use the right math words to show I understand how math works. (Example: I know when to add or subtract.) ◆ I work it out with no mistakes.	◆ I find all the important parts of the problem, and I know how they go together. ◆ I show a good plan about how I got my answer. ◆ I show all of the steps I use to solve the problem.	◆ I write what I did and why I did it. ◆ If I use a drawing, I can explain all of it in writing.
3	◆ I do the problem, but I make small mistakes.	◆ I find most of the important parts of the problem. ◆ I show most of the steps I use to solve the problem.	◆ I write mostly about what I did. ◆ I write a little about why I did it. ◆ If I use a drawing, I can explain most of it in writing.
2	◆ I understand a little, but I make a lot of big mistakes. ◆ I only give part of the answer.	◆ I find some of the important parts of the problem. ◆ I show some of the steps I use to solve the problem.	◆ I write some about what I did or why I did it but not both. ◆ If I use a drawing, I can explain some of it in writing.
1	◆ I try to do the problem, but I don't understand it.	◆ I find almost no important parts of the problem. ◆ I show almost none of the steps I use to solve the problem.	◆ I write or draw something that doesn't go with my answer. ◆ I write an answer that is not clear.
0	◆ I don't try to answer the problem.	◆ I don't show any steps.	◆ I don't explain anything in writing.

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Grade 4 Monthly Math Extended Response Prompts

Scoring Level	Math Scoring Rubric — Prompt: Pick a Plan			Grade:2
	Mathematical Knowledge	Strategic Knowledge		Explanation
4	Correct answer. Clearly labeled

New Flat Rate Plan | Clear and complete strategy process clearly seen

Uses any strategy to accurately find the cost of both plans and compares them | | Clearly explains process used

Tells WHAT was done and WHY each step was done |
| 3 | Minor math errors

$4.00 instead of New Flat Rate | Clear strategy, mostly complete

Complete strategy not shown in written work, perhaps shows both plan costs, but does not compare them | | Clearly explains process used

Tells WHAT was done and begins to appropriately explain WHY each step was done |
| 2 | Some understanding
Major math errors

Solved only one of the 2 problems | Clear strategy, but not necessarily effective or appropriate

Finds the cost of only one plan | | Some explanation of the process
Tells how or why but not both or only uses inappropriate whys.(Ex: I did it because I had to) |
| 1 | Limited understanding

May have just added numbers | Unclear or unrelated strategy, inappropriate | | Minimal or unclear explanation of the process
Does not match work shown |
| 0 | No answer attempted | No apparent strategy | | No written explanation of the solution process is provided |

Math Scoring Rubric Help
Prompt:Playground

Grade: 4   TR3

Scoring Level	Mathematical Knowledge:	Strategic Knowledge	Explanation
4	**Correct answer. <u>Clearly labeled</u>** Any shape with an even number of sides, perimeter must add up to 80 Clearly labeled meters	**Clear and complete strategy process clearly seen** Draws diagram with even number of sides.	**Clearly explains process used** **Tells WHAT was done <u>and WHY</u> each step was done.**
3	**Minor math error** Ex.:Diagram is NOT labeled with meters Draws with even # of sides, but miscalculates sum Draws a rectangle and labels each side 20 sq. ft	**Clear strategy– mostly complete** Ex.: Diagram w/ even number of sides but computes incorrectly or has a correct answer but no diagram	**Clearly explains process used** **Tells what was done and <u>begins</u> to appropriately tell WHY**
2	**Some understanding** **Major math errors** Ex.:Draws and odd number of sides, but perimeter equals 80 Draws an even number of sides, but major computational errord	**Clear strategy, but not necessarily effective or appropriate** Ex.: Draws diagram with odd # of sides Labels each side 80 sq. feet	**Some explanation of the process** **Tells how or why but not both or only uses inappropriate whys** **Ex. I did this because I had to**
1	**Limited understanding**	**Unclear or unrelated strategy, inappropriate**	**Minimal or unclear explanation of process** **Does not match work shown**
0	**No answer attempted**	**No strategy attempted**	**No written explanation of the solution process attempted**

Math Scoring Rubric Help

Prompt: Pizza Survey   **Grade: 4**

Scoring Level	Mathematical Knowledge:	Strategic Knowledge	Explanation
4	**Correct answer. Clearly labeled. Appropriate terminology.** Range = 10 people Answer must have the word 'range'	**Clear and complete strategy shown.** Uses any strategy to find maximum and minimum then subtracts to find range.	**Clearly explains process used. Tells WHAT was done and WHY each step was done.** Vocabulary could include: Maximum, minimum, multiply, subtract
3	**Minor math errors:** ex. Incorrect label: 10 people 10 pizzas -or- Correct process but incorrect answer within range of 8 to 12	**Clear strategy - mostly complete** Complete strategy not shown in written work. ex.: 22-12 (how max. and min. was found is not shown in written work)	**Clearly explains process used. Tells what was done and begins to appropriately tell WHY.**
2	**Some understanding Major math errors** No understanding of key ex. 5 1/2 - 3 = 2 1/2 Gives maximum, minimum	**Clear strategy, but not necessarily effective or appropriate** ex. Subtracts min. from max. to find range but doesn't use key correctly Or Counts min. and / or max. but does not find range.	**Some explanation of the process. Tells how or why but not both or only uses inappropriate why's (ex. I did this because I had to).**
1	**Limited understanding** ex. Answer is total # of people or pizzas on graph	**Unclear or unrelated strategy, inappropriate**	**Minimal or unclear explanation of process. Does not match work shown.**
0	No answer attempted	No strategy attempted	No written explanation of the solution process attempted

Grade 4 Monthly Math Extended Response Prompts