

Inspect

CCR Performance Tasks

Math Grade 3: Extended Performance Task

Recording Data

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CCR Performance Tasks

Math Grade 3: Extended Performance Task Recording Data

Student Test Booklet

Name: _____

Name: _____

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Complete all the tasks in the test booklet.

Part A (optional): Classroom Activity

Mrs. Sanchez and her third grade class want to know more about their pets. Since they are learning how to collect and show data in math class, they decided to do a survey of their class to find out the kinds of pets they have. They recorded the findings of their survey in the tally table shown below.

Our Pets Tally Table

Pet	Tally	Total
Cat	### //	
Dog	### ###	
Hamster	////	
Rabbit	//	
No Pet	///	
Other	//	

Answer the following questions with your class.

1. What do each of the tally marks in the table show? Use pictures, numbers, and/or words.

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5. Write a multiplication number sentence that matches the division sentence you wrote in question 4. You can use pictures, numbers, and/or words to write your number sentence. Show how to find the answer to your number sentence.

As a class, use the Our Pets tally table to record the results of the pet survey in the empty picture graph below.

6. What should be the title for the graph?

7. What picture will you use for the key?

Our Pets Picture Graph

Title:	

Key: 1 _____ = _____ votes

Complete your picture graph.

Name: _____

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Our Pets Bar Graph

Make a bar graph. Use the same information from the Our Pets tally table. Answer these questions as a class.

8. What will be the title for the graph?

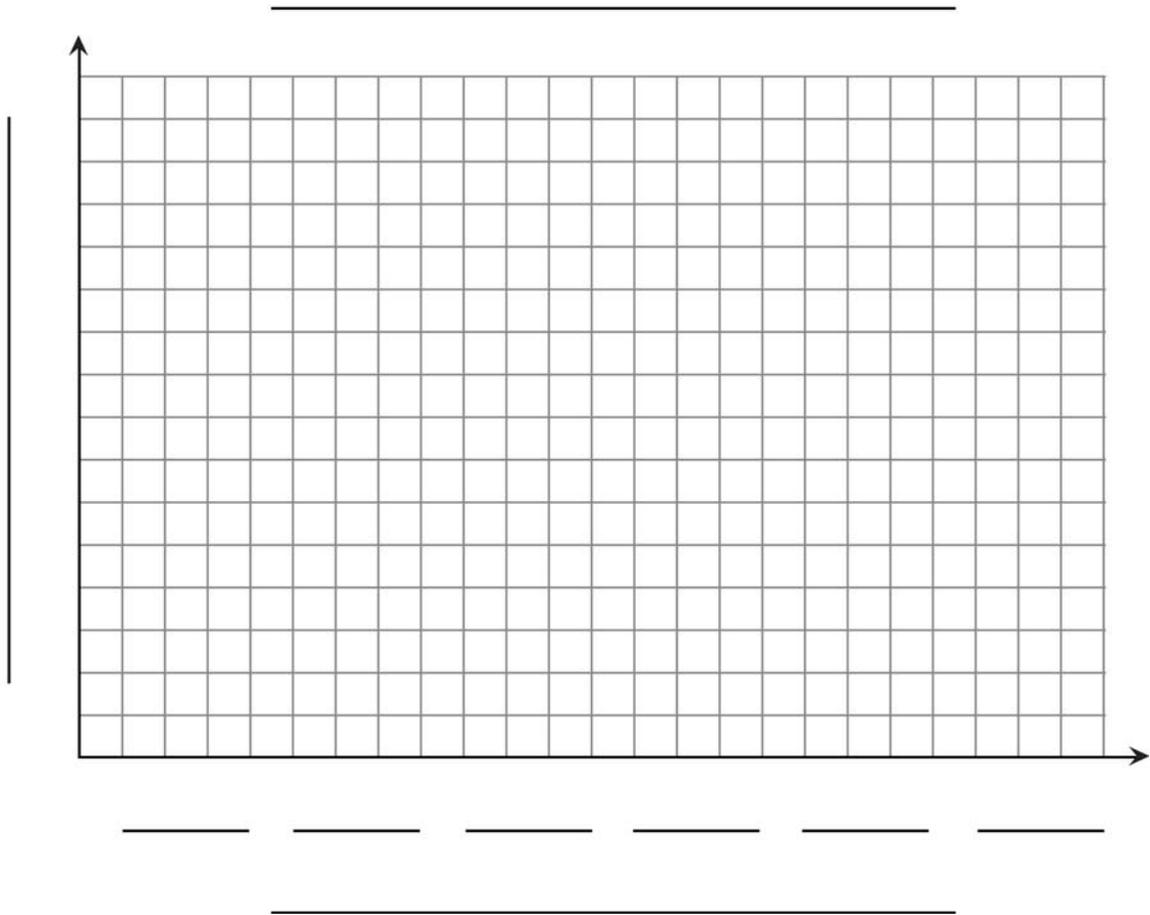
9. What will the left side of the graph show?

10. What numbers will you write in the spaces on the left?

11. What will you write in the spaces at the bottom of the graph?

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Fill in the bar graph.



Use your picture graph and bar graph to answer the questions on the next page.

Name: _____

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12. How many students have a hamster as a pet? Tell how your graphs show this using pictures, numbers, and/or words.

13. Which pet do the most students have? Tell how your graphs show this using pictures, numbers, and/or words.

14. Which pet do the fewest students have? Tell how your graphs show this using pictures, numbers, and/or words.

Name: _____

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15. How many fewer students have a hamster than a dog? Tell how your graphs show this using pictures, numbers, and/or words.

16. How many more students would have to have a cat for there to be the same number of cats as dogs? Tell how your graphs show this using pictures, numbers, and/or words.

Name: _____

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17. What if 4 times more students have no pet than is shown in your graphs? How many students would have no pet? Write a number sentence to show how you found your answer. Use pictures, numbers, and/or words.

18. Which graph do you think shows the data the best? Tell how your graphs show this using pictures, numbers, and/or words.

Part B: Find Your Own Data

As a class, go to your school library and find 10 - 15 books. The books you find should all be fiction and all be about the same subject. The subjects you can choose from are listed below.

- Sports
- Barn animals
- Insects
- Pets
- Food
- Careers

You will record the data about the different types of your subject that you found in your books on the table on the next page.

Name: _____

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Use your picture graph to answer the questions.

4. Which type was found in your books the most? Tell or show how you know using pictures, numbers, or words.

5. How does the graph show which type was found in the least number of books? Tell or show how you know using pictures, numbers, or words.

6. If you chose 4 more books that were written about the type with the least number of tally marks, how many times would that type show on the picture graph now? Write a number sentence that can help you answer the question. Use a letter for the unknown number. Then solve.

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Name: _____

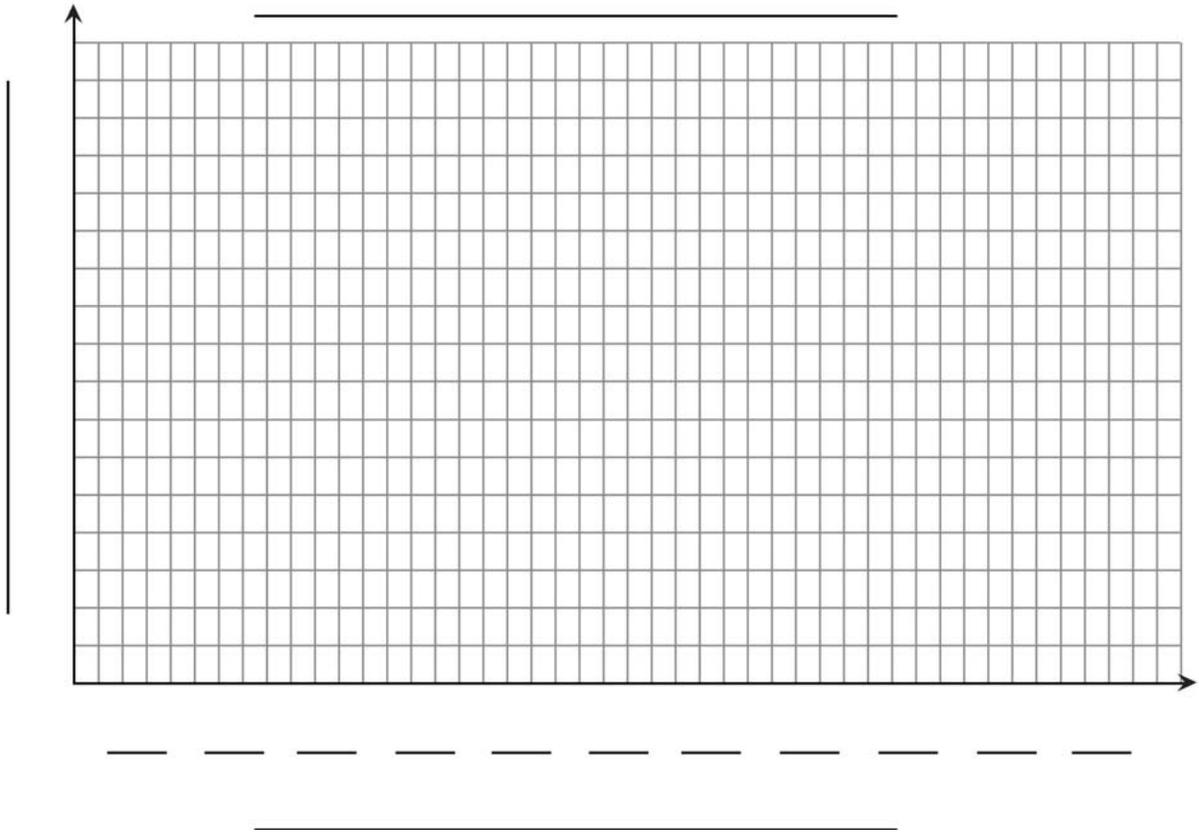
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7. "If two books that have the type with the greatest number of tally marks are subtracted from the book list, then this type would no longer have the most marks." Is this statement correct? Tell how you know.

8. If the two books that you subtracted in question 7 are taken off the list of books, would any other type change? Explain why or why not. Use pictures, numbers, and/or words.

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9. Make a bar graph, using the data in your Books About tally table. Fill in the empty bar graph below.



Name: _____

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Use your bar graph to answer the questions that follow.

10. Tell how the bar graph shows which type was written about the most in the books that you chose. Tell how the graph shows which type was written about the least in the books.

11. How many more books would you need to find so that the type with the least number has the same number as the type seen the most in your books? Write a number sentence that can help you answer the question. Use a letter for the unknown number. Then solve.

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Name: _____

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12. Write a two-step word problem that can be answered using the information in your bar graph. Write a number sentence that you can use to solve the problem, with a letter for the unknown number. Tell what the letter stands for. Then solve.

Name: _____

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Use the new bar graph to answer these questions.

1. How did you add the amounts to your graph? How can you tell which student's amount is on the graph?

2. Write an addition number sentence about one of the columns in your bar graph. Use pictures, numbers, and/or words.

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3. Did you have to add any new examples to your graph? If so, list what the new examples were.

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4. Did a column go past the grid at the top?
- If so, how can you change your graph labels so that the column stays within the grid?
 - If not, write a number sentence to show what number would need to be added to each column until they all are at the top grid line.
- Show your work using pictures, numbers, and/or words.

5. Did a column go past the grid on the left?
- If so, how can you change your graph labels so that the column stays within the grid?
 - If not, how many more types would you need to list until a column goes off the grid on the left?
- Explain how you know with pictures, numbers, and/or words.

Name: _____

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Part E: Writing Component

Write 3-5 sentences about what you found while doing research and creating graphs for this task. Answer the following questions in your writing.

- How many books did you use to do your tally table and graphs?
- Did any of your books have more than one type?
 - If yes, what was the most in one book?
 - If no, which type had the greatest total number of books?
- What was your favorite type and why?
- Which graph was easier to read?
- Which graph was easier to find information, like the most and the least?

Name: _____

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Support Worksheet for Part E, Writing Component

Use these questions to help you write about what you found while doing research and creating graphs for this task. Each answer can be made into one or two sentences in your writing.

How many books did you choose in all to do your tally table and graphs? Why?

Did any of your books have more than one type?

If yes, what was the most in one book?

If no, which type had the greatest total number of books?

Name: _____

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What was your favorite type? Why?

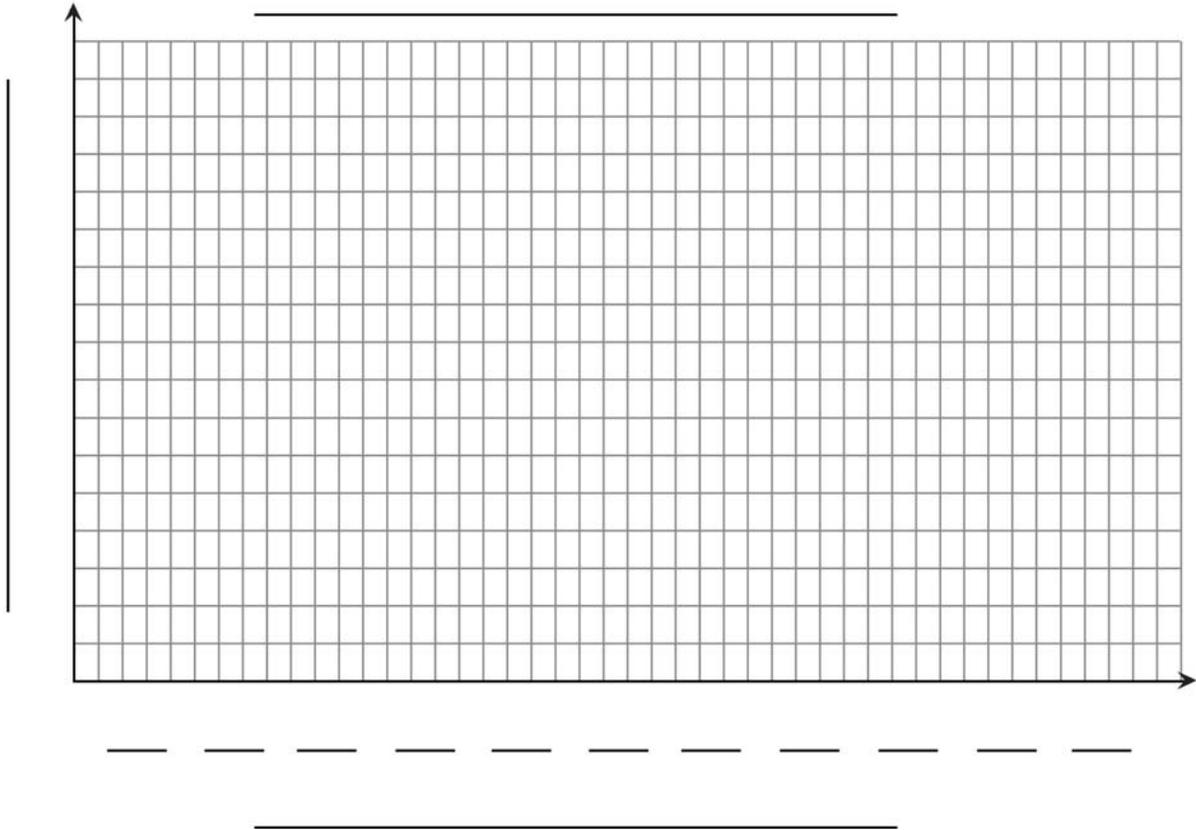
Which of the two graphs was easier for you to read? Which graph was easier to find information, like the most and the least?

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Extra Graphs

Bar Graph



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Teacher Guide

Name: _____

Task Specifications

Content Area	Mathematics
Title	Recording Data
Grade Level	Grade 3
Problem Type	Extended Performance Task
Standards for Mathematical Practices	<p>Mathematical Practice 1 (MP.1): Make sense of problems and persevere in solving them. Mathematically proficient students:</p> <ul style="list-style-type: none"> • Explain to themselves the meaning of a problem and look for entry points to its solution. • Analyze givens, constraints, relationships, and goals. • Make conjectures about the form and meaning of the solution and plan a solution pathway rather than simply jumping into a solution attempt. • Consider analogous problems, and try special cases and simpler forms of the original problem in order to gain insight into its solution. • Monitor and evaluate their progress and change course if necessary. • Explain correspondences between equations, verbal descriptions, tables, and graphs or draw diagrams of important features and relationships, graph data, and search for regularity or trends. • Check their answers to problems using a different method, and continually ask themselves, “Does this make sense?” • Understand the approaches of others to solving complex problems and identify correspondences between different approaches. <p>Mathematical Practice 3 (MP.4): Model with mathematics. Mathematically proficient students:</p> <ul style="list-style-type: none"> • Apply the mathematics they know to solve problems arising in everyday life, society, and the workplace. • Apply what they know and make assumptions and approximations to simplify a complicated situation, realizing that these may need revision later. • Identify important quantities in a practical situation and map their relationships using such tools as diagrams, two-way tables, graphs, flow-charts, and formulas. • Analyze relationships mathematically to draw conclusions. • Interpret mathematical results in the context of the situation and reflect on whether the results make sense, possibly improving the model if it has not served its purpose.
Common Core State Standards	<p>3.MD.3 Draw a scaled picture graph and a scaled bar graph to represent a data set with several categories. Solve one- and two-step “how many more” and “how many less” problems using information in scaled bar graphs.</p> <p>3.OA.7 Fluently multiply and divide within 100 using strategies such as the relationship between multiplication and division (e.g., knowing that $8 \times 5 = 40$, one knows that $40 \div 5 = 8$) or properties of operations. By the end of Grade 3, know from memory all products of two one-digit numbers.</p> <p>3.OA.8 Solve two-step word problems using the four operations. Represent these problems using equations with a letter standing for the unknown quantity. Assess the reasonableness of answers using mental computation and estimation strategies, including rounding.</p> <p>3.NBT.2 Fluently add and subtract within 1,000 using strategies and algorithms based on place value, properties of operations, and/or the relationship between addition and subtraction.</p>
CCSS Literacy in Writing-Grade 3	W.3.2.1 Provide reasons that support the opinion.

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	W.3.7 Conduct short research projects that build knowledge about a topic.
SBAC Assessment Claims	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.
PARCC Assessment Claims	Grade 3 Sub-Claim B —The student solves problems involving the Additional and Supporting Content for the grade/course with connections to the Standards for Mathematical Practice.
Depth of Knowledge	Level 3: Strategic Thinking —Level 3 items falling into this category demand a short-term use of higher order thinking processes, such as analysis and evaluation, to solve real-world problems with predictable outcomes. Stating one’s reasoning is a key marker of tasks that fall into this particular category. The expectation established for tasks at this level tends to require coordination of knowledge and skill from multiple subject-matter areas to carry out processes and reach a solution in a project-based setting. Key processes that often denote this particular level include: analysis, explain and support with evidence, generalize, and create.
Task Overview	In this task you will use what you know about measurement and number operations to collect, organize, and display data in a picture graph and bar graph, and solve problems related to the data collected. You will do research in your school library to gather data about specific topics and record the results in a tally table. You will make two kinds of graphs to display the data you collect and answer questions that require you to analyze and interpret the data in your graphs.

Student Task

Part A (optional): Classroom Activity

Mrs. Sanchez and her third grade class want to know more about their pets. Since they are learning how to collect and show data in math class, they decided to do a survey of their class to find out the kinds of pets they have. They recorded the findings of their survey in a tally table, like the one shown below.

Our Pets Tally Table

Pet	Tally	Total
Cat	### //	
Dog	### ###	
Hamster	////	
Rabbit	//	
No Pet	///	
Other	//	

Answer the following questions with your class.

1. What do each of the tally marks in the table show? Use pictures, numbers, and/or words.
2. What do the tally marks *### ###* show? Use pictures, numbers, and/or words.
3. How can you tell just by looking at the table, which pet more students have? Use pictures, numbers, and/or words.
4. Write a division number sentence to show how many times more dogs are pets than are rabbits. You can use pictures, numbers, and/or words to write your number sentence. Show how to find the answer to your number sentence.
5. Write a multiplication number sentence that matches the division sentence you wrote in question 4. You can use pictures, numbers, and/or words to write your number sentence. Show how to find the answer to your number sentence.

As a class, use the Our Pets tally table to record the results of the pet survey in the empty picture graph below.

6. What should be the title for the graph?
7. What picture will you use for the key?

Complete your picture graph.

Make a bar graph. Use the same information from the Our Pets tally table. Answer these questions as a class.

8. What will be the title for the graph?

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9. What will the left side of the graph show?
10. What numbers will you write in the spaces on the left?
11. What will you write in the spaces at the bottom of the graph?

Use your picture graph and bar graph to answer the following questions.

12. How many students have a hamster as a pet? Tell how your graphs show this using pictures, numbers, and/or words.
13. Which pet do the most students have? Tell how your graphs show this using pictures, numbers, and/or words.
14. Which pet do the fewest students have? Tell how your graphs show this using pictures, numbers, and/or words.
15. How many fewer students have a hamster than a dog? Tell how your graphs show this using pictures, numbers, and/or words.
16. How many more students would have to have a cat to have the same number of cats as dogs? Tell how your graphs show this using pictures, numbers, and/or words.
17. What if 4 times more students have no pet than is shown in your graphs? How many students would have no pet? Write a number sentence to show how you found your answer. Use pictures, numbers, and/or words.
18. Which graph do you think shows the data the best? Tell how your graphs show this using pictures, numbers, and/or words.

Part B: Find Your Own Data

As a class, go to your school library and find 10–15 books. The books you find should all be about the same subject. The subjects you can choose from are below.

- Sports
- Barn animals
- Insects
- Pets
- Food
- Careers

You will record the data about the different types of subjects that you found in your books on the next page.

1. Fill in the table with the subject you chose and the title of the books you picked. List the different types of subjects that your books were written about.
2. Fill in the tally table below with the different types of subjects that you listed in the table for question 1. Then tally the number of books you found about that type.

Part C: Make a Graph

3. Make a picture graph. Fill in the empty picture graph below. Use the data in your Books About tally table.

Use your picture graph to answer the questions.

4. Which type was found in your books the most? Tell or show how you know using pictures, numbers, or words.

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5. How does the graph show which type was found in the least number of books? Tell or show how you know using pictures, numbers, or words.

6. If you chose 4 more books that were written about the type with the least number of tally marks, how many times would it show on the picture graph now? Write a number sentence that can help you answer the question. Use a letter for the unknown number. Then solve.

7. If two books that have the type with the greatest number of tally marks are subtracted from the book list, then this type would no longer have the most marks. Is this statement correct? Tell how you know.

8. If the two books that you subtracted in question 7 are taken off the list of books, would any other type change? Explain why or why not. Use pictures, numbers, and/or words.

9. Make a bar graph, using the data in your Books About tally table. Fill in the empty bar graph below.

Use your bar graph to answer the questions that follow.

10. Tell how the bar graph shows which type was written about the most in the books that you chose. Tell how the graph shows which type was written about the least in the books.

11. How many more books would you need to find so that the type with the least number has the same number as the type seen the most in your books? Write a number sentence that can help you answer the question. Use a letter for the unknown number. Then solve.

12. Write a two-step word problem that can be answered using the information in your bar graph. Write a number sentence that you can use to solve the problem, with a letter for the unknown number. Tell what the letter stands for. Then solve.

Part D (optional): Group Activity

Once you are in your group, find your Books About tally table. Copy your tally table into the blank table below. Share your tally table with the other students in your group so that they can copy your tally marks in their table. After your table is complete, add the other student's amounts to your bar graph. Use a different color for each student.

Use the new bar graph to answer these questions.

How did you add the amounts to your graph? How can you tell which student's amount is on the graph?

Write an addition number sentence about one of the columns in your bar graph. Use pictures, numbers, and/or words.

Did you have to add a new type to your graph? If so, list what were the new types.

Did a column go past the grid at the top?

- If so, how can you change your graph labels or grids so that the column stays within the grid?
- If not, write a number sentence to show how many would need to be added to each column until they all are at the top grid line?

Show your work using pictures, numbers, and/or words.

Did a column go past the grid at the left?

- If so, how can you change your graph labels or grids so that the column stays within the grid?
- If not, how many more types would you need to list until it goes off the grid on the left?

Explain how you know with pictures, numbers, and/or words.

Exchange papers with another student in your group.

- Check that your new bar graph matches their graph.

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- Read their answers to each question and check their work.
- If you find any mistakes, give the paper back to the student and show them what you found. Make any notes to the student in the box below. Work with each other to make sure each question is answered correctly.

Part E: Writing Component

Write 3-5 sentences about what you found while doing research and creating graphs for this task. Include the following information in your writing.

- How many books did you use to do your tally table and graphs?
- Did any of your books have more than one type
 - if yes, what was the most in one book?
 - if no, which type had the greatest total number of books?
- What was your favorite type and why?
- Which graph was easier to read?
- Which graph was easier to find information, like the most and the least?

Teacher Instructions

This performance task is designed to assess student understanding of a variety of standards and claims. Students are challenged to know about measurement and number operations to collect, organize, and display data in a picture graph and bar graph, and solve problems related to the data collected. The task was designed with the understanding that all classrooms and students are different. Some students may need an extension activity, some may need to reduce the number of days planned for this task, and some may need to omit or simplify certain parts, depending on what time during the school year this task is given.

Test Definition File

Item	Correct Answer	Process Standard	Common Core Standards
1	See Scoring Rubric	Mathematical Practice 1, 3, and 6	3.MD.3, 3.OA.7, 3.OA.8, 3.NBT.2
			CCSS ELA-Literacy Standards
			W.3.2.1, W.3.7

SBAC Claims	PARCC Sub-Claims
4	B

Before the task,

- Students should review what a tally table is, and how it is used to record data. Discuss how to make a tally mark and what a tally mark can represent.
- Students should review how to record collected data in a picture graph and a bar graph, and how to interpret the data once it is recorded.
- Students should review computation skills involving whole numbers (addition, subtraction, multiplication, division).

Vocabulary:

survey
 data
 tally mark
 tally table
 picture graph
 key
 bar graph
 scale
 labels

Setting the Context:

Teacher: “Have you ever taken part in a survey? A survey is a way to get information by asking questions of different people. For example, you might ask some people to tell you what their favorite television program is, or what day of the week they like best.”

[Let students respond and share information, such as the kinds of surveys they have participated in or one that they know about.]

Tell students that there are many ways to record the results of a survey, and one way is to make a tally table. Show students an example of a tally table and have them identify what information it shows. If needed, explain how to make a tally mark by making a slash and also how the diagonal bar marks the fifth tally mark, making counting of totals easier.

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Give an introduction to the task. A suggested introduction is below. Some of the information may need to be repeated each day.

Teacher: “You will be working to make a picture graph and a bar graph about a subject that you will choose later. We will go to the library and find books about your subject. From the books, you will get information about different topics that deal with your subject. For example, if you have the subject of sports, you will find 10-15 fiction books about sports. A book you choose may have a story about baseball or may be a story about a boy who happens to play baseball with his friends. The book may contain more than one sport, so you will need to look through the entire book. If there is more than one type of sport in the book, all of the types should be found and used for the task.”

[You may want to review the difference between fiction and non-fiction. The students should find fictional books and look through the books to see if they have their subject area. You may want to discuss this with the librarians so that they can pull grade appropriate books out for the students. The title of the book does not necessarily determine if the book contains the subject. Books that have more than one type of sport, animal, insect, pet, food, or career are best (but not necessary). The more data the student can collect from their books the better their task will be.]

Teacher: “You will use the data or information that you find in your books to make two kinds of graphs. You will record each set of data first in a tally table and then use that data to make a picture graph and a bar graph. You will also answer questions, using the information in your graphs.”

Timeline:

There are three different options to choose.

Option 1: This option should take 3 days (or 3 hours with the assumption that math lessons/activities take up an hour during a school day).

Day 1: The students should find the 10-15 books that they will use for the task and complete questions 1-2 in part B*.

Day 2: The students should complete questions 3-12 in part C.

Day 3: The students should complete part E, the writing activity.

*This part of the task will require the students to spend most of the hour in the school library.

Option 2: This option should take 4 days (or 4 hours with the assumption that math lessons/activities take up an hour during a school day).

Day 1: The students should find the 10-15 books that they will use for the task and complete questions 1-2 in part B*.

Day 2: The students should complete questions 3-12 in part C.

Day 3: The students should complete part D, group activity.

Day 4: The students should complete part E, the writing activity.

*This part of the task will require the students to spend most of the hour in the school library.

Option 3: This option should take 5 days (or 5 hours with the assumption that math lessons/activities take up an hour during a school day).

Day 1: The students should complete questions 1-18 in part A, classroom activity.

Day 2: The students should find the 10-15 books that they will use for the task and complete questions 1-2 in part B*.

Day 3: The students should complete questions 3-12 in part C.

Day 4: The students should complete part D, group activity.

Day 5: The students should complete part E, the writing activity.

*This part of the task will require the students to spend most of the hour in the school library.

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Other suggestions:

Part A is an optional classroom activity. You may feel that your students need some extra support for reading and understanding a tally table and how to use the information to make a picture graph and a bar graph. As a class, lead students to answer questions 1-3 about the Our Pets tally table. Then, guide them to answer questions 4 and 5, which require them to interpret information in the table. Next, have students make a picture graph and a bar graph, using the information in the tally table. In conclusion, discuss with students answers to questions 12-18, using the information in their graphs. This task is not meant to be scored so it does not have a rubric.

The task begins in Part B and continues through Part C. The students will research their information by finding 10-15 books about sports, barn animals, insects, pets, food, or careers. It is important that at least 2 students choose the same subject if you plan on doing the optional group activity in Part D (which is also not meant to be scored). These tasks are designed for the students to make as many decisions on their own as possible. If a group of students find another subject they would like to use for the task then encourage it, but make sure they will be able to list 8 or more different types associated with the subject.

You may need to talk about different “types” for each subject before you go to the library. For example, if the subject of barn animals is chosen by a student then types of barn animals would be cow, donkey, pig, etc. The type of the subject will be what the student uses for their tally table and graphs. Explain to them when they see “type(s)” in questions that they should substitute that with their subject. For example, in question 1 “List the different types of subjects...” should be read as “List the different sports...” or “List the different careers...” If there is more than one type in a book, instruct the students to list them all on one line but they can continue to the next line if needed (they may need to skip a line under Title of Book). Students should determine if the type appears in a book at all, rather than count individual mentions of that type within a single book.

Choosing fiction books instead of non-fiction books will allow the student to go through a book (read and look at pictures) to see if their subject type is included in the book. Stress to students not to look at the title alone. A book may deal with a person going on vacation (which is not a subject given in the list) and within the story it may say the person is a sales person (career) or they play golf (sport) while on vacation.

Some students may need to review how to use a picture graph and a bar graph to compare data before beginning Part B. Talk about the parts of a picture graph, and the importance of the key. Elicit from students that a key tells how many items a picture stands for. Have them tell why it is helpful to have a picture represent more than one item. Discuss with students how a bar graph is used to compare data and how it differs from a picture graph. Talk about the scale and what its numbers show.

Some students may require more support in completing the writing activity in Part E. A support worksheet is included to assist in breaking down the question that is being asked in a more organized manner. Consider reviewing the worksheet with the whole class as a model for how to organize the information.

Extension Activity

After completion of the initial task, students can be asked to collect data from the newspaper that can be displayed in a picture graph or a bar graph. For example, they can find data for local sports teams, such as numbers of wins and losses for four or more teams, or daily high or low temperatures for a week. They can decide which kind of graph best displays their data, then choose a title, labels, and other parts needed to complete their graphs. Suggest that students write four questions that can be answered using the data in their graphs. Then invite them to share their graphs and questions with a partner or with the class.

Scoring Rubric

Part B: Find Your Own Data

4 Point Response:

The response demonstrates a high level of understanding. The response demonstrates:

- A strong ability to represent real-world data in tally tables;
- A strong ability to analyze and draw conclusions about real-world data in tally tables;
- A strong ability to communicate reasoning in a clear and concise manner;
- A strong ability to gather real-world data from personal research.

A level 4 response should include:

- A completed table for Question 1 that contains data gathered from 10-15 fiction books;
- A correct and complete tally table in Question 2 that represents the data gathered and recorded on the table in Question 1.

Sample Responses for Part A

Question 1:

Title of Book	Different <u>Barn Animals</u> That Are In My Books
The Lazy Pig	Pig, rooster, cow, sheep, horse
Little Blue Truck	Cow, pig, horse, goose, goat, sheep
Charlotte's Web	Pigs, goose, sheep
Animal Farm	Pigs, horses, donkeys, dogs, sheep, cows, hens, cat
Three Little Pigs	Pigs
I Went Walking	Duck, pig, cat, horse, cow, dog
Once Upon a Dime	Rooster, pig
Sheep on a Ship	Sheep
Sylvester and the Magic Pebble	Donkey, pig, goose
Click, Clack, Moo: Cows That Type	Cows, duck, rooster

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Question 2:

Books About <u>Barn Animals</u>		
Different <u>Barn Animals</u> That Are In My Books	Tally	Total
Pig	### III	8
Rooster/hen	IIII	4
Cow	###	5
Sheep	###	5
Horse	IIII	4
Goose	III	3
Goat	I	1
Donkey	II	2
Dog	II	2
Cat	I	1
Duck	II	2

3 Point Response:

The response demonstrates a strong understanding, but the work is incomplete or contains minor errors.

A level 3 response is characterized by:

- A strong ability to represent real-world data the student gathered from 10-15 fiction books in a completed table;
- A strong ability to analyze real-world data the student gathered from 10-15 fiction books and place the information in a tally table;
- A completed tally table in Question 2 that may contain one minor error or omission.

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2 Point Response:

The response demonstrates a basic but incomplete understanding.

A level 2 response is characterized by:

- The ability to represent real-world data the student gathered from 10-15 fiction books in a table with incomplete or missing information (or the student only gathered information from 7-9 fiction books);
- The ability to analyze real-world data the student gathered from the books listed in Question 1 by putting the information in a tally table, but some information is missing or is incomplete;
- A tally table in Question 2 that may contain two minor errors or omissions.

1 Point Response:

The response demonstrates a minimal understanding.

A level 1 response is characterized by:

- A weak ability to represent real-world data the student gathered from 10-15 fiction books in a table with incomplete or missing information (or the student only gathered information from 4-6 fiction books);
- A weak ability to analyze real-world data the student gathered from the books listed in Question 1 by putting the information in a tally table, but some information is incorrect, incomplete, or missing;
- A tally table in Question 2 that has more than two minor errors or omissions, but is not completely incorrect.

0 Point Response:

There is no response, or the response is off topic.

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Part C: Make A Graph

4 Point Response:

The response demonstrates a high level of understanding. The response demonstrates:

- A strong ability to represent real-world data in picture graphs and bar graphs;
- A strong ability to analyze and draw conclusions about real-world data in tally tables, picture graphs, and bar graphs;
- A strong ability to communicate reasoning in a clear and concise manner;
- A strong ability to use knowledge of number and operations concepts to solve real-world problems.

A level 4 response should include:

- A picture graph correctly drawn in Question 3, using data in the tally table from Part B;
- Correct and complete responses to Questions 4-8, using data from the picture graph;
- A bar graph correctly drawn in Question 9, using data in the tally table from Part B;
- Correct and complete responses to Questions 10-12, using data from the bar graph.

Sample Responses for Part B

Question 3:

Title: Different Barn Animals That Are In My Books	
Pig	○ ○ ○ ○
Rooster/Hen	○ ○
Cow	○ ○ ◐
Sheep	○ ○ ◐
Horse	○ ○
Goose	○ ◐
Goat	◐
Donkey	○
Dog	○
Cat	◐
Duck	○

Key: 1○ = 2 animals

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Question 4:

I know that pigs were the barn animals that were in the most books I chose. I know this from looking at the picture graph because the row for pigs has the most pictures.

Question 5:

There were 2 barn animals that were in the fewest of my books. I can see from the picture graph that cats and goats were in the fewest of my books because those animals have the least number of pictures.

Question 6:

If I added 4 more to goats then it would show as $2\frac{1}{2}$ circles on the picture graph. This would mean there are 5 goats. If I use the letter g to be the new total of goats then I can write the number sentence $g = 1 + 4$, which is $g = 5$.

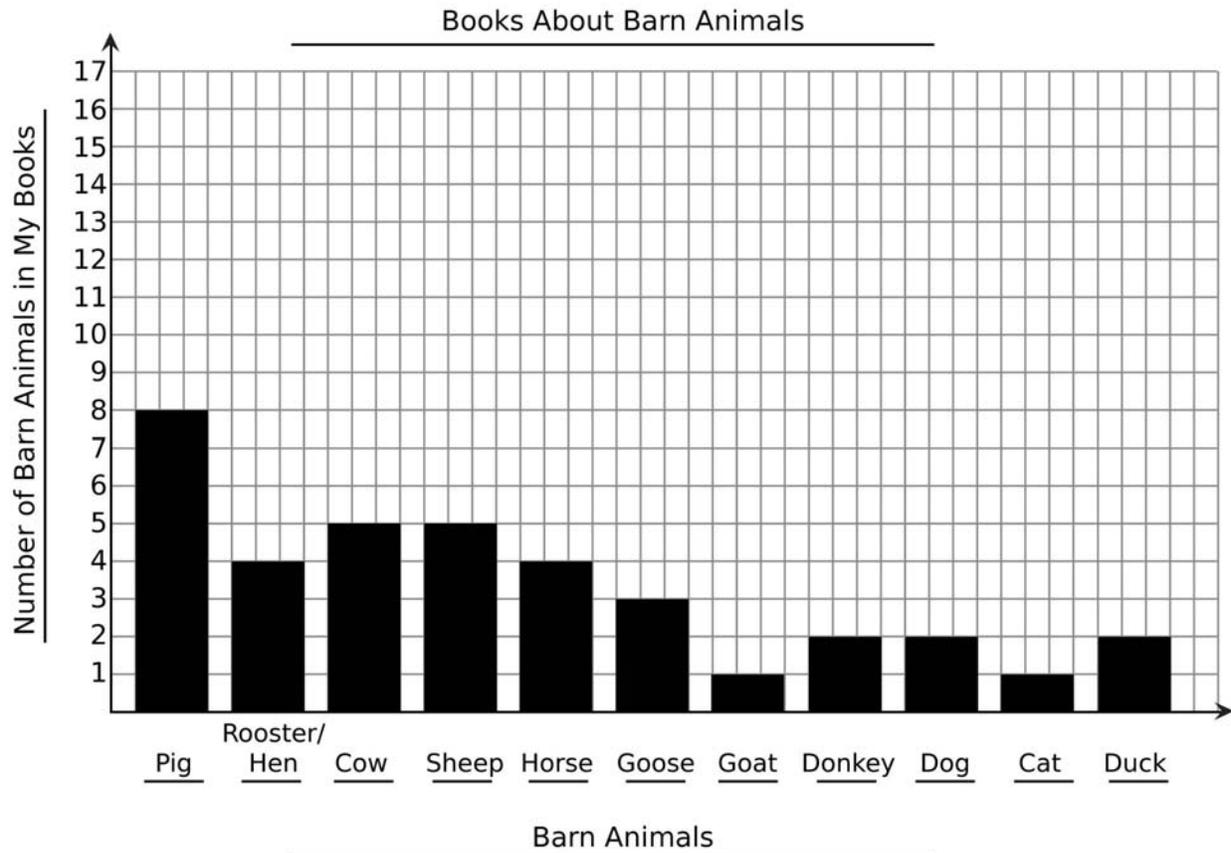
Question 7

The statement is not correct. If 2 books are subtracted from the barn animal with the most pictures, the pig, I would still have 6 pigs which are more than the next animal, cow or sheep. The pig would have 3 circles and the cow or sheep will still have $2\frac{1}{2}$ circles. But some of the books have pigs, sheep, and cows so the number of sheep or cows may change. Pigs would still have the most. $8 - 2 = 6$; $6 \text{ pigs} > 5 \text{ sheep (or cows)}$.

Question 8:

Yes, other animals would need to be subtracted and would change the total. There are only 2 books that had just one barn animal; Three Little Pigs and Sheep on a Ship. If I removed Three Little Pigs and Once Upon a Dime as my books in Question 7, then only pigs and roosters would need to be removed. I would need to subtract 2 from pigs and subtract 1 from rooster.

Question 9:



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Question 10:

I know that pigs were in the most books because its bar is at 8, and is higher than all the others. I also know that cats and goats were in the fewest books because the bar for both of them is at 1, which is the lowest of all the bars.

Question 11:

I would have to find 7 books that were only written about cats or goats but did not have any pigs or other barn animals. If I chose a book with cats or goats and it also had pigs, then there would still be more books about pigs. If the book had other barn animals it could make one of the other barn animals have more. But if I could find 7 books only about cats or goats, then I would have 8 books about them which would equal the number of pig books. I will use c as a letter for the number of cat books I need to find to equal the number of pig books. $8 = 1 + c$; $1 + 7 = 8$, so $c = 7$.

Question 12:

The number of horses plus the number of ducks minus the number of goats is equal to what barn animal? I will use b for the barn animal I am trying to find. There are 4 horses, 2 ducks, and 1 goat on my bar graph. $4 + 2 - 1 = b$; $4 + 2 = 6$, so $6 - 1 = b$; $6 - 1 = 5$, so $b = 5$. There are 5 cows and 5 sheep on the graph. The answer is either cows or sheep.

3 Point Response:

The response demonstrates a strong understanding, but the work is incomplete or contains minor errors.

A level 3 response is characterized by:

- A drawn picture graph in Question 3, using data in the tally table from Part B, that may contain one minor error;
- A strong understanding of how to analyze and draw conclusions about real-world data in picture graphs, which is demonstrated in the answers to Questions 4-8;
- A strong understanding of number and operations concepts, which is demonstrated by developing solution strategies to answer Questions 4-8, but a minor calculation error is made or the work shown is incomplete;
- A drawn bar graph in Question 9, using data in the tally table from Part B, that may contain one minor error;
- A strong understanding of how to analyze and draw conclusions about real-world data in bar graphs, which is demonstrated in the answers to Questions 10-12;
- A strong understanding of number and operations concepts, which is demonstrated by developing solution strategies to answer Questions 10-12, but a minor calculation error is made or the work shown is incomplete.

2 Point Response:

The response demonstrates a basic but incomplete understanding.

A level 2 response is characterized by:

- A drawn picture graph in Question 3, using data in the tally table from Part B, that may contain two or more minor errors;
- A basic understanding of how to analyze and draw conclusions about real-world data in picture graphs, which is demonstrated in the answers to Questions 4-8;
- A basic understanding of number and operations concepts, which is demonstrated by developing solution strategies to answer Questions 4-8, but two or more minor calculation errors are made or the work shown is incomplete;
- A drawn bar graph in Question 9, using data in the tally table from Part B, that may contain two or more minor errors;
- A basic understanding of how to analyze and draw conclusions about real-world data in bar graphs, which is demonstrated in the answers to Questions 10-12;

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- A basic understanding of number and operations concepts, which is demonstrated by developing solution strategies to answer Questions 10-12, but two or more minor calculation errors are made or the work shown is incomplete.

1 Point Response:

The response demonstrates a minimal understanding.

A level 1 response is characterized by:

- A drawn picture graph in Question 3, using data in the tally table from Part B, that may contain one major error or omission but is not completely incorrect;
- A weak understanding of how to analyze and draw conclusions about real-world data in picture graphs, which is demonstrated in the incorrect or incomplete answers to Questions 4-8;
- A weak understanding of number and operations concepts, which is demonstrated by developing solution strategies to answer Questions 4-8, but a major calculation error is made or the work shown is incomplete or missing;
- A drawn bar graph in Question 9, using data in the tally table from Part B, that may contain one major error or omission but is not completely incorrect;
- A weak understanding of how to analyze and draw conclusions about real-world data in bar graphs, which is demonstrated in the incorrect or incomplete answers to Questions 10-12;
- A weak understanding of number and operations concepts, which is demonstrated by developing solution strategies to answer Questions 10-12, but a major calculation error is made or the work shown is incomplete or missing.

0 Point Response:

There is no response, or the response is off topic.

Part E: Writing

4 Point Response:

The response demonstrates a high level of understanding. The response demonstrates:

- A strong ability to analyze and draw conclusions about real-world data in picture graphs and bar graphs;
- A strong ability to communicate reasoning in a clear and concise manner;
- A strong ability to use knowledge of number and operations concepts to solve real-world problems.

A level 4 response should include:

- A paragraph of 3-5 sentences that clearly explains the number of books the student used for their tally table and graphs; how many of the books had more than one type or the total number of types; their favorite type and why; which graph was easier to read and why.

3 Point Response:

The response demonstrates a strong understanding, but the work is incomplete or contains minor errors.

A level 3 response is characterized by:

- A paragraph of 3-5 sentences that explains the number of books the student used for their tally table and graphs; how many of the books had more than one type or the total number of types; their favorite type and why; which graph was easier to read and why, but 1-2 ideas are incomplete or incorrect due to minor errors made in interpreting data in the graphs.

2 Point Response:

The response demonstrates a basic but incomplete understanding.

A level 2 response is characterized by:

- A paragraph of 3-5 sentences that demonstrates a basic explanation of the number of books the student used for their tally table and graphs; how many of the books had more than one type or the total number of types; their favorite type and why; which graph was easier to read and why, with 2 or more ideas being incomplete or incorrect due to minor errors made in interpreting data in the graphs.

1 Point Response:

The response demonstrates a minimal understanding.

A level 1 response is characterized by:

- A paragraph of about 3 sentences that demonstrates a weak explanation of the number of books the student used for their tally table and graphs; how many of the books had more than one type or the total number of types; their favorite type and why; which graph was easier to read and why, with the majority of the ideas being incomplete or incorrect due to minor errors made in interpreting data in the graphs, or completely missing.

0 Point Response:

There is no response, or the response is off topic.