

## MAT.05.PT.4.SCHFE.A.272 Claim 4

Item ID:	MAT.05.PT.4.SCHFE.A.272
Title:	School Festival
Grade:	05
Primary Claim:	<b>Claim 4: Modeling and Data Analysis</b> Students can analyze complex, real-world scenarios and can construct and use mathematical models to interpret and solve problems.
Secondary Claim(s):	Claim 1: Concepts and Procedures Students can explain and apply mathematical concepts and carry out mathematical procedures with precision and fluency.
Primary Content Domain	<b>Number and Operations in Base Ten</b>
Secondary Content Domain(s):	Number and Operations—Fractions
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.  1 D: Perform operations with multi-digit whole numbers and with decimals to hundredths.  1 E: Use equivalent fractions as a strategy to add and subtract fractions.
Standard(s):	5.NBT.5, 5.NBT.6, 5.NF.2, 5.NF.6, 4.NF.3, 4.NF.4, 3.MD.3, 3.MD.1
Mathematical Practice(s):	1, 2, 3, 4, 6, 8
DOK:	4
Item Type:	PT
Score Points:	18
Difficulty:	H
How this task addresses the “sufficient evidence” for this claim:	The student uses concepts of number and operations in base ten and fractions to accomplish tasks required of a committee member as part of planning an end of the year festival. The work is supported by calculations and explanations of reasoning.
Target-specific attributes (e.g., accessibility issues):	Accommodations may be necessary for students who have fine-motor-skill challenges and language-processing challenges.
Stimulus/Source:	<a href="http://www.verybestbaking.com/recipes/18476/Original-NESTL%C3%89-TOLL-HOUSE-Chocolate-Chip-Cookies/detail.aspx">http://www.verybestbaking.com/recipes/18476/Original-NESTL%C3%89-TOLL-HOUSE-Chocolate-Chip-Cookies/detail.aspx</a>
Notes:	Multi-part task
Task Overview:	Students are asked to plan various aspects of a school festival within budget constraints.
Teacher preparation / Resource requirements:	Teacher preparation: This task can be done in 1 or 2 sessions depending on instructional time constraints.  Resources: Materials/time to complete various independent

	tasks. The answer documents that are a part of the assessment are included at the end of this sample.
Teacher Responsibilities During Administration:	Monitor individual student work; provide resources as necessary.
Time Requirements:	Scored sections of this task should take no more than 90 minutes.

Prework: (May be blank)

## School Festival

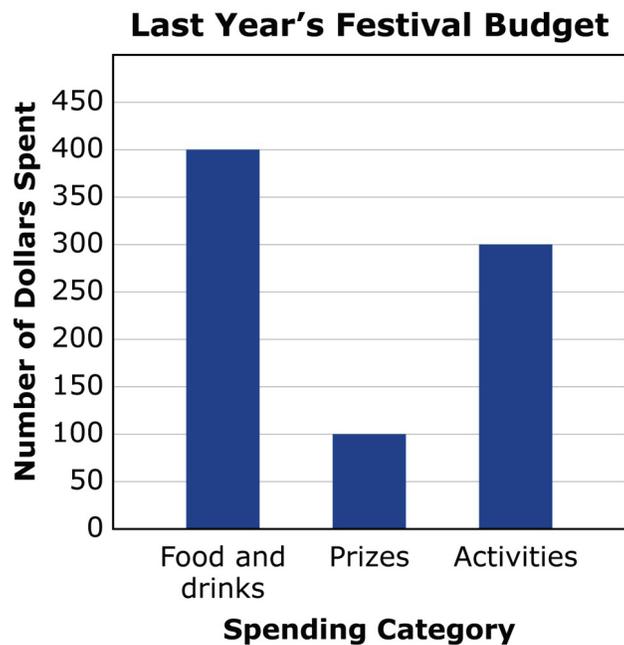
You serve on a committee that is in charge of planning a school festival. The following tasks need to be completed by committee members as part of the planning for the school festival.

- Determine the budget for the festival.
- Choose the food and drinks for the festival.
- Determine amounts of supplies for making a dessert.
- Make a schedule of the different activities.
- Make some decisions on the games and prizes used during the festival.

### **Part A**

Your first task is to determine how much money to spend on food and drinks, prizes, and activities.

This graph shows how last year's budget of \$800 was spent.



This year's budget has been increased to \$1600. The fraction of the money used for each spending category should be the same as the fraction of the money used for each category last year.

Write a summary of the changes to the budget. The summary must include—

- a bar graph showing the dollar amounts that will be spent in each category (be sure to include a title and labels)
- a description of the steps used to find each dollar amount shown in the bar graph

**Part B****Food and Drinks**

Your next task is to make decisions about the food and drinks that will be available at the festival. You need to determine the amount of food, drinks, plates, cups, and utensils that will be available for the people who attend the festival. You must also decide which types of food and drinks you will provide.

There are 75 students who will attend the festival. Each student will bring 1 guest to the festival. A total of 50 teacher and community members will also attend the festival.

The table that follows shows the amounts charged for different foods and drinks by two different restaurants.

	<b>Restaurant A</b>	<b>Restaurant B</b>
<b>Taco Meals</b>	\$4 per person	\$4 per person
<b>Hamburger Meals</b>	\$5 per person	\$3 per person
<b>Lemonade</b>	Free	\$75 for every 100 people
<b>Water</b>	Free	\$50 for every 100 people
<b>Plates, Cups, and Utensils</b>	Free	Free

Guidelines:

- You must choose 1 restaurant to provide the food and drinks for the festival. You must also choose 1 meal type.
- You may choose 1 or 2 drinks.
- You must make sure you have enough money in your budget for the choices you make.

The principal of the school needs to approve all committee decisions. Write a note to the principal that identifies the restaurant you have chosen and clearly explains why the restaurant is the better value. Your note should include—

- the total number of people attending the festival
- the calculated price for using that restaurant and how that price was calculated
- how you determined that the restaurant you chose was the better value

### ***Part C***

#### **Make the Dessert**

Parents have volunteered to provide cookies for the festival. One parent will buy the ingredients and then bake the cookies. The parent wants to be sure she has enough of each ingredient available to make cookies for all participants. The parent asks you to determine the amount needed for each item in the recipe shown below.

**Chocolate Chip  
Cookies  
(serves 40 people)**

$2\frac{1}{4}$  cups flour

1 teaspoon baking soda

1 teaspoon salt

1 cup butter

$\frac{3}{4}$  cup white sugar

$\frac{3}{4}$  cup brown sugar

2 eggs

2 cups chocolate chips

Fill in the list below with the amount needed for each item.  
Remember to think about the total number of people who will  
attend the festival.

### Item Amounts

- \_\_\_\_\_ cups flour
- \_\_\_\_\_ teaspoons baking soda
- \_\_\_\_\_ teaspoons salt
- \_\_\_\_\_ cups butter
- \_\_\_\_\_ cups white sugar
- \_\_\_\_\_ cups brown sugar
- \_\_\_\_\_ eggs
- \_\_\_\_\_ cups chocolate chips

Use the space below to show or explain in words how you calculated the amount of flour needed.

Use the space below to show or explain in words how you calculated the amount of brown sugar needed.

**Part D****Schedule of Activities**

The school festival will start at 11:00 A.M. on Saturday. The list below shows the amounts of time each activity should last.

- Presentation by principal: 30 minutes
- Lunch:  $1\frac{1}{2}$  hours
- Student and teacher basketball game: 1 hour
- Band performance: 30 minutes
- Games for prizes: 2 hours
- Break: 15 minutes

Finish filling out the schedule below so there are no gaps in time. Also, none of the activities can happen at the same time.

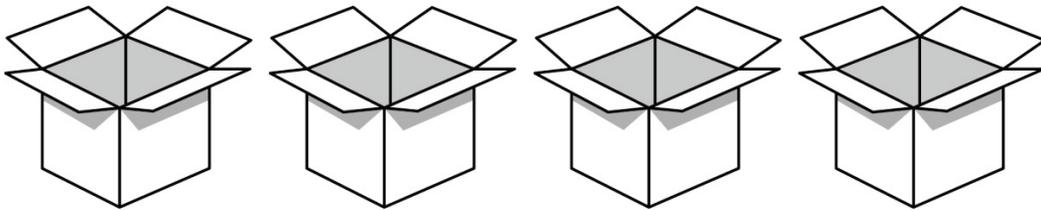
<b>Activity</b>	<b>Start Time</b>	<b>End Time</b>
Presentation by principal	11:00 A.M.	
Lunch		
Student and teacher basketball game		
Break		
Band performance		
Break		
Games for prizes		

## Games and Prizes

### Part E

Each time a student wins a game, he or she will get a prize. You will use the money in your budget to buy 4 boxes of prizes. You will spend the same amount of money on each box of prizes.

Attach a price tag to each box below to show the amount of money you will spend to buy the prizes in it.



Show the steps used or explain how you found the price for each box of prizes in the space below.

Each box contains 90 prizes. The prizes will be split evenly among the 3 games. The names of the three games students will be able to play for prizes are shown below.

1. Fishing for Sharks
2. Pie the Teacher
3. Frog Jumping

Draw a model below to show both the number of boxes and the number of prizes that will be used for each game. Be sure to label what each part represents.

*Sample Top-Score Response:*

**Part A**

**School Festival Budget Summary**

The equation representing the spending for both years is:

Food and Drinks + Prizes + Activities = Total

The number sentences below show how the spending categories make up the fractions of last year's budget.

$$\frac{400}{800} + \frac{100}{800} + \frac{300}{800} = \frac{800}{800} = 1 \text{ total amount}$$

$$\frac{4}{8} + \frac{1}{8} + \frac{3}{8} = 1 \text{ total amount}$$

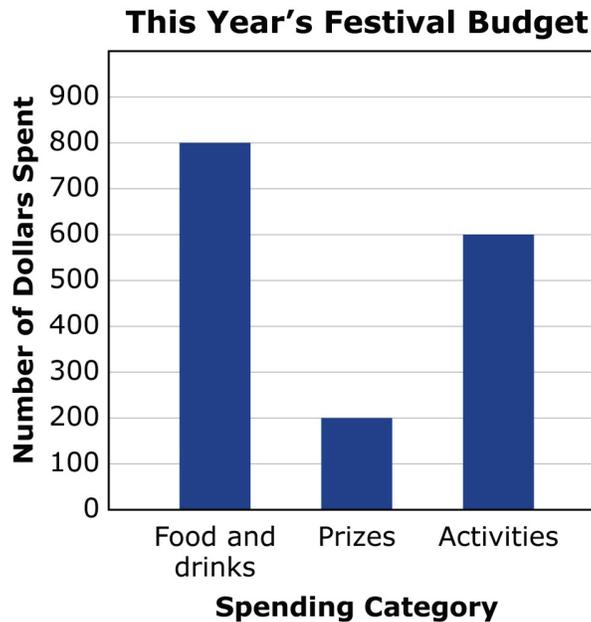
I calculated the amounts in the spending categories for this year by taking the same number sentence from last year and multiplying each fraction by the new budget total. The number sentences below show this.

$$\frac{4}{8}(1600) + \frac{1}{8}(1600) + \frac{3}{8}(1600) = 1600$$

$$800 + 200 + 600 = 1600$$

I used these values to make the bar graph below.

Sample Top-Score Response:



This year's festival budget has increased to \$1600. This amount is 2 times what it was last year. If the fractions spent on each spending category need to stay the same, the amount in each category will also be 2 times what it was last year.

I checked myself to make sure that the amount in each spending category was 2 times the amount from last year in the same spending category. The number sentence below shows this.

$$2(400) + 2(100) + 2(300) = 800 + 200 + 600 = 1600$$

**Part B**

*Note to Principal:*

*For this year's festival, I have planned for 200 people. Our budget for food and drinks this year is \$800. I have to buy food, drinks, plates, cups, and utensils. Plates, cups, and utensils are free to customers.*

*Although the hamburger plate for Restaurant B is less than the plate for Restaurant A, the total cost of using Restaurant B is more. For 200 people, it would cost \$600. If I got lemonade, it would cost \$75 for every 100 people. That would be \$150 for 200 people. I added \$600 and \$150 to get \$750. If I add the cost for a second drink choice, it would add another \$150, which would take me over my food and drink budgeted amount.*

**Sample Top-Score Response:**

*I chose Restaurant A to prepare the taco meals. They charge \$4 per person for this meal and provide lemonade. This would make the total charge \$800, which is the budgeted amount. With this restaurant, I will get 2 drink choices for free. This is a better deal than Restaurant B.*

**Part C****Item Amounts**

$11\frac{1}{4}$  cups flour  
 5 teaspoons baking soda  
 5 teaspoons salt  
 5 cups butter  
 $3\frac{3}{4}$  cups white sugar  
 $3\frac{3}{4}$  cups brown sugar  
 10 eggs  
 10 cups chocolate chips

I know that there are 200 people coming to the festival. Each batch of cookies serves 40 people. I divided 200 by 40 to see how many batches of cookies needed to be made. Then I multiplied the amount of flour needed for one batch of cookies by 5.

$$200 \div 40 = 5$$

$$5 \times 2\frac{1}{4} =$$

$$5 \times \frac{9}{4} = \frac{45}{4}$$

$$45 \div 4 = 11\frac{1}{4}$$

I know that there are 200 people coming to the festival. Each batch of cookies serves 40 people. I divided 200 by 40 to see how many batches of cookies needed to be made. Then I multiplied the amount of brown sugar in one serving by 5. The amount of white sugar is the same as the amount of brown sugar, so I just added the amount of brown sugar to itself. The total amount of sugar needed is  $3\frac{3}{4}$  cups.

**Sample Top-Score Response:**

$$200 \div 40 = 5$$

$$5 \times \frac{3}{4} = \frac{15}{4}$$

$$15 \div 4 = 3\frac{3}{4}$$

**Part D**

Activity	Start Time	End Time
Presentation by principal	11:00 A.M.	11:30 A.M.
Lunch	11:30 A.M.	1:00 P.M.
Student and teacher basketball game	1:00 P.M.	2:00 P.M.
Break	2:00 P.M.	2:15 P.M.
Band performance	2:15 P.M.	2:45 P.M.
Break	2:45 P.M.	3:00 P.M.
Games for prizes	3:00 P.M.	5:00 P.M.

I started with 11:00 A.M. and then added the amounts of time until I got to the end of the last activity. My number sentences are below:

$$11:00 + 30 \text{ minutes} = 11:30$$

$$11:30 + 90 \text{ minutes} = 1:00$$

$$1:00 + 1 \text{ hour} = 2:00$$

$$2:00 + 15 \text{ minutes} = 2:15$$

$$2:15 + 30 \text{ minutes} = 2:45$$

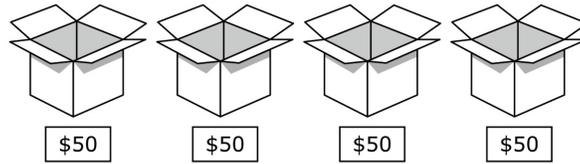
$$2:45 + 15 \text{ minutes} = 3:00$$

$$3:00 + 2 \text{ hours} = 5:00$$

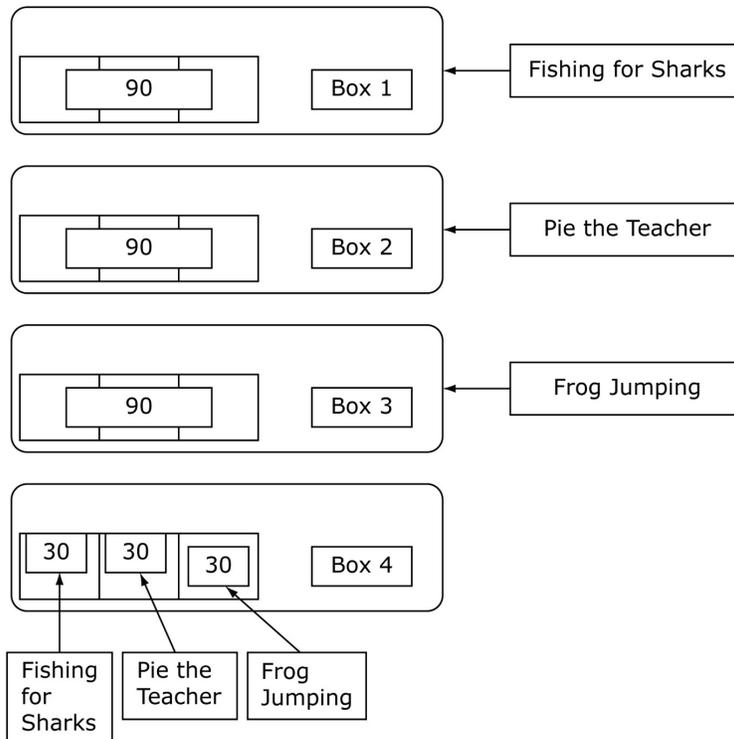
I checked myself by subtracting my start time from my end time. The difference was 6 hours. This number is the same as all the durations added together.

*Sample Top-Score Response:*

**Part E**



\$200 divided by 4 boxes is \$50 for each box.  
 $200 \div 4 = 50$



Each game will get 1 full box of 90 prizes. The last box will be divided by 3, with 30 prizes going to each game. That means each game will get a total of 120 prizes or  $1\frac{1}{3}$  boxes of prizes.

*Scoring Rubric:***Part A**

**4 points:** The student provides a properly labeled bar graph showing correct amounts for each spending category. The student describes how she/he calculated the values shown in the graph and how each amount changed from the previous year.

**3 points:** The student provides a bar graph showing correct amounts for each spending category, but did not label it correctly. The student describes how she/he calculated the values shown in the graph or how each amount changed from the previous year.

**2 points:** The student provides a bar graph showing some incorrect amounts for each spending category. The student describes how she/he calculated the values shown in the graph or how each amount changed from the previous year.

**1 point:** The student provides a bar graph showing incorrect amounts for each spending category. The student describes how she/he calculated the values shown in the graph or how each amount changed from the previous year.

**0 points:** The student provides a bar graph showing incorrect amounts for each spending category. The student does not describe how she/he calculated the values shown in the graph or how each amount changed from the previous year. **OR** The student left *Part A* blank.

**Part B**

**4 points:** The student provides a letter that identifies his/her choice of restaurant, states that 200 people will attend the festival, clearly explains the calculations of a correct price for using the given restaurant, and clearly explains a logical determination of value for the selected restaurant.

**3 points:** The student provides a letter that identifies his/her choice of restaurant, states that 200 people will attend the festival, explains the calculations of a correct price for using the given restaurant, and explains a determination of value for the selected restaurant.

**2 points:** The student provides a letter that identifies his/her choice of restaurant, states that 200 people will attend the festival, explains the calculations of a correct price for using the given restaurant, but does not explain or makes no determination of value for the selected restaurant.

**1 point:** The student provides a letter that identifies his/her choice of restaurant, does not state that 200 people will attend the festival, explains the calculations of a price for using the given restaurant, and does not explain or makes no determination of value for the selected restaurant.

**0 points:** The student provides a letter that does not identify his/her choice of restaurant, does not state that 200 people will attend the festival, gives little or no explanation of the calculations of a price for using a restaurant, and makes a no determination of value for either restaurant. **OR** The student left *Part B* blank.

**Part C**

**4 points:** The student correctly provides the correct amounts for each ingredient in the shopping list. The student provides a clear explanation of how she/he got the correct amount of flour. The student provides a clear explanation of how she/he got the correct amount of brown sugar.

**3 points:** The student correctly provides the correct amounts for each ingredient in the shopping list. The student provides an explanation of how she/he got the correct amount of flour. The student provides an explanation of how she/he got the correct amount of brown sugar.

**2 points:** The student correctly provides the correct amounts for some ingredients in the shopping list. The student provides an explanation of how she/he got the correct amount of flour. The student provides an explanation of how she/he got the correct amount of brown sugar.

**1 point:** The student inconsistently applies a correct method of determining amounts of each ingredient. The student provides little or no explanation of how she/he got the correct amount of flour. The student gives little or no explanation of how she/he got the correct amount of brown sugar.

**0 points:** The student inconsistently applies a method to determine the amounts used for each ingredient in the shopping list. The student does not provide an explanation for the solution in the first response. The student does not provide an explanation of how she/he got the amount of brown sugar. **OR** The student left *Part C* blank.

**Part D**

**2 points:** The student correctly provides start and end times for each activity.

**1 point:** The student incorrectly provides start and end times for each activity, but the correct amount of elapsed time was used to determine the given times.

**0 points:** The student provides incorrect start and end times for most or all activities with inconsistent application of elapsed time. **OR** The student left *Part D* blank.

**Part E**

**4 points:** The student identifies a \$50 price for each box of prizes. The student clearly explains a division problem to show how \$50 is the quotient. The student draws a model that clearly shows how each box represents prizes that will be evenly distributed among the 3 games.

**3 points:** The student identifies a \$50 price for each box of prizes. The student uses a division problem to show how \$50 is the quotient. The student draws a model that shows how each box represents prizes that will be evenly distributed among the 3 games.

**2 points:** The student identifies a \$50 price for each box of prizes. The student uses a division problem to show how \$50 is the quotient or draws a model that shows how each box represents prizes that will be evenly distributed among the 3 games.

**1 point:** The student identifies a \$50 price for each box of prizes. The student uses a division problem in an explanation of an incorrect quotient or draws a model that inaccurately or ineffectively shows how each box represents prizes for 3 games.

**0 points:** The student does not identify a \$50 price for each box of prizes. The student uses a division problem incorrectly in an explanation. The student draws a model that inaccurately or ineffectively shows how each box represents prizes for 3 games.

**OR** The student left *Part E* blank.