LEADING FOOD PRODUCTION AND SALES

Performance Standard 10A.H

Examine sales data from each sales team to determine which one is the leading team accordingly:

- *Mathematical knowledge*: calculate the mean, median and mode for a data set; know how to manipulate data to represent different points of view.
- *Strategic knowledge*: present a case for one team being the best choice for sales leader based on analysis of the data.
- *Explanation*: explain completely and clearly what was done and why it was done.

Procedures

1. ***In order to organize, describe and make predictions from existing data (10A),*** students should experience sufficient learning opportunities to develop the following:
   - Determine the best measure of central tendency from mean, median and mode.
   - Discuss how data can be manipulated to represent different points of view based on the use of different measures of central tendency and based on different graphical displays.

   Family and Consumer Science classes in commercial food production include information about profit margin, successful sales strategies and production of items for sale. Students must be able to more clearly see the relationship between all of these factors as they analyze sales data to determine the best measure of central tendency from mean, median and mode. Also evident is the various ways in which data can be manipulated to represent different points of view. This standard aligns with the National Standards for Family and Consumer Sciences Education – Standard 8.0 (Integrate knowledge, skills and practices required for careers in the food production and services.)
2. Provide each student a copy of the "Leading Food Production and Sales" task sheets and the rubric. Have students review and discuss the task to be completed and how the rubric will be used to evaluate it. Non-graphing calculators are allowed. Use additional paper as needed.
3. Have the students work individually to solve the problem. (Do not help the students or guide their thinking as they solve the following problem.) All work should be completed in class.

   During this year each team (kitchen) produced an item for sale to the student body. Sales were conducted over a period of one week. Each team developed the item and organized its production and sales utilizing the members of the class. Each team submitted a sales record sheet with the daily sales information from the sale of their product along with the cost to produce the item and the cost to purchase the item. The winning team will be awarded bonus points that will be added to their semester grade.
4. Evaluate each student's work using the rubric and its guide to determine the performance level. Give each student a score in each of the three categories, scoring each part of the problem separately. Students receiving a 4 should be able to look at the situation in several ways. For example, they will consider different statistical representations of central tendency, as well as total sales and distribution of the sales. A score of 3 will generally focus on fewer measures of central tendency such as mean or median and will probably not consider all the relevant data such as total sales or number of sales made. A score of 2 will focus on only one measure of central tendency and few other details, generally having trouble viewing the data from multiple perspectives. A score of 1 reflects an inability for students to look past one measure of central tendency and an inability to view complex information from more than one point of view. Minor errors in computation include making errors in the actual addition or multiplication, rounding incorrectly. Major errors include using the wrong operation or formulas. Evaluate each part as follows:
   - Part A: The students should describe how each team could be viewed as the leading team. Consider the information given on the data sheet and find the mean, median and mode for the sales generated by each team. In your description, be sure to note how the difficulty of production and profit for each item varies. The following table provides the data analysis that students should discuss.

Statistic	Team 1	Team 2	Team 3	Team 4	Team 5	Team 6
Mean	45	66.4	37	38	45	55.6
Median	45	42	35	40	59	49
Mode	36 & 54	42	35	51	22	43
Total sales	225	332	185	190	225	278

Profit per item sold	$0.45	$0.36	$0.77	$0.69	$0.57	$0.62
Total profit	$101.25	$119.52	$142.45	$115.90	$128.25	$172.36
Total sales	$225	$166.00	$185.00	$190.00	$225.00	$208.50

- Part B: The students should present a case for one of the teams and justify it in terms of the sales figures. Students may choose to make a case in terms of quartile range, total dollar sales, highest average selling price, etc. There is not a single correct answer for this part. The key is to be able to produce a convincing argument for the position the student takes. For instance, Team 2 had the highest mean number of sales per day and the highest total number of items sold, while team 5 had the highest dollar value of total sales and the highest median sales, while Team 6 made the most profit on their total sales. Team 3 had the highest profit per item. In addition to these, the complexity of the production could be considered.

Examples of Student Work

- **Meets**
- **Exceeds**

Time Requirements

- Two class periods

Resources

- Copies of the "Leading Food Production and Sales" task sheets
- Calculators
- Mathematics Rubric

NAME _____ DATE _____

LEADING FOOD PRODUCTION AND SALES

Student Task Sheet

During this year each team (kitchen) has produced an item for sale to the student body. Sales were conducted over a period of one week. Each team developed the item and organized its production and sales utilizing the members of the class. Each team submitted a sales record sheet with the daily sales information from the sale of their product along with the cost to produce the item and the cost to purchase the item. The winning team will be awarded bonus points that will be added to their semester grade.

A. Discuss how each team might make a case for being the leading team, based on the data provided. Be sure to include a comparison of measures of central tendency for each team as part of your analysis.

B. Which team do you think should be declared the leading team and why?

LEADING FOOD PRODUCTION AND SALES
Data Sheet

	Number of items sold					
Sales Day	**Team #1**	**Team #2**	**Team #3**	**Team #4**	**Team #5**	**Team #6**
Monday	36	42	35	13	22	43
Tuesday	54	25	26	35	59	43
Wednesday	36	42	48	40	60	49
Thursday	45	80	35	51	22	62
Friday	54	143	41	51	62	81
Item Sold	Strawberry Pie 1/6 9 in. pie	6 in. Chocolate Chip Cookie	7 inch Decorated Cookie (Christmas Tree)	Vegetable Pizza 1/6 9 in. pie	Chicken Taco Pie - 1/6 9 in. pie	Cinnamon Roll 6 in.
Cost to produce each item	.55	.14	.23	.31	.43	.13
Selling price of each item	1.00	.50	1.00	1.00	1.00	.75

MATHEMATICS RUBRIC

NAME _____ **DATE** _____

- ☐ Exceeds standard (must receive a 4 in each area)
- ☐ Meets standard (must receive all 3's or a combination of 3's and 4's)
- ☐ Approaches standard (must receive all 2's or any combination which may include a 3 or a 4)
- ☐ Begins standard (has no 3's or 4's but not all 1's)
- ☐ Absent (has all 1's and 0's)

	Mathematical Knowledge	**Strategic Knowledge**	**Explanation**
4	• Wrote the right answer. • Used math words correctly to show understanding of how math works. • Worked it out with no mistakes. • Used the right math words and labeled the answers.	• Identified all the important parts of the problem, and knew how they went together. • Showed all the steps used to solve the problem.	• Wrote what was done and why it was done. • If a drawing was used, all of it was explained in writing.
3	• Knew how to do the problem, but made small mistakes.	• Identified most of the important parts of the problem. • Showed most of the steps used to solve the problem.	• Wrote mostly about what was done. • Wrote a little about why it was done. • If a drawing was used most of it was explained in writing.
2	• Understood a little, but made a lot of big mistakes.	• Identified some of the important parts of the problem. • Showed some of the steps used to solve the problem.	• Wrote some about what was done or why it was done but not both. • If a drawing was used, some of it was explained in writing.
1	• Tried to do the problem, but didn't understand it.	• Identified almost no important parts of the problem. • Showed almost none of the steps used to solve the problem.	• Wrote or drew something that didn't go with the answer. • Wrote an answer that was not clear.
0	• No answer attempted.	• No strategy shown.	• No written explanation.
Score			