

## Illustrative Mathematics

### 3.OA, MD, NBT Classroom Supplies

Alignment 1: 3.NBT.A.2, 3.MD.B.3, 3.OA.A.3

Not yet tagged

Your teacher was just awarded \$1,000 to spend on materials for your classroom. She asked all 20 of her students in the class to help her decide how to spend the money. Think about which supplies will benefit the class the most.

| Supplies   | Cost  |
|--|-------|
| A box of 20 markers  | \$5   |
| A box of 100 crayons   | \$8   |
| A box of 60 pencils  | \$5   |
| A box of 5,000 pieces of printer paper   | \$40  |
| A package of 10 pads of lined paper  | \$15  |
| A box of 50 pieces of construction paper   | \$32  |
| <b>Books and maps</b>  |       |
| A set of 20 books about science  | \$250 |
| A set of books about the 50 states   | \$400 |
| A story book (there are 80 to choose from)   | \$8   |
| A map: there is one of your city, one for every state, one of the country, and one of the world to choose from | \$45  |
| <b>Puzzles and games</b>   |       |
| Puzzles (there are 30 to choose from)  | \$12  |
| Board games (there are 40 to choose from)  | \$15  |
| Interactive computer games (math and reading)  | \$75  |
| <b>Special Items</b>   |       |
| A bean bag chair for the reading corner  | \$65  |
| A class pet  | \$150 |
| Three month's supply of food for a class pet   | \$55  |
| A field trip to the zoo  | \$350 |

- Write down the different items and how many of each you would choose. Find the total for each category.
  - Supplies
  - Books and maps
  - Puzzles and games
  - Special items
- Create a bar graph to represent how you would spend the money. Scale the vertical axis by \$100. Write all of the labels.
- What was the total cost of all your choices? Did you have any money left over? If so, how much?
- Compare your choices with a partner. How much more or less did you choose to spend on each category than your partner? How much more or less did you choose to spend in total than your partner?

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## Commentary

The purpose of this task is for students to "Solve problems involving the four operations" (3.OA.A) and "Draw a scaled picture graph and a scaled bar graph to represent a data set with several categories" (3.MD.3). Additionally, students will engage in MP3, Model with mathematics. In this task students are asked to decide how to spend \$1,000 on supplies and materials for their classroom; students will have to make choices and be careful not to exceed the budget. Students are asked to decide which supplies will benefit the class the most and will compare their choices with other students' choices. Because the budget does not allow students to buy one of everything, this task provides an opportunity for teachers to discuss costs and benefits. A benefit is something that satisfies your wants. A cost is what you give up when you decide to do something.

In third grade students are asked to fluently add and subtract within 1,000 (3.NBT.3) which is why the total budget is \$1,000. Students are also multiplying and dividing within 100 (3.OA.7), so they might choose, for example, to buy 20 boxes of markers at \$5 each so that there is a box of markers for every student in the class. It is possible that students will choose to purchase a number of one of the items where the total is greater than \$100; while students are not expected to be fluent in multiplication above 100, they should be able to use their multiplication strategies to find such products. This task provides students with a natural opportunity to use addition, subtraction, and multiplication, and they might also use division depending on how they approach the task; thus it is well aligned to 3.OA.8.

Bar graphs make it easy for students to compare their allocations. If all of the students in the class include all categories on their graphs (whether they allotted any spending to them or not), list the categories in the same order that they are listed in the data table, and use the same colors for each category on a final draft, the teacher can put all of the final graphs up for display and the class can see whether there is a general consensus for how to spend the \$1000 or not.

As an extension, the teacher might consider asking students to represent their total purchases with an equation; for example, if a student chooses 15 boxes of markers, 3 boxes of crayons, and 2 beanbag chairs, she could write:

$$15 \times 5 + 3 \times 8 + 2 \times 65 = 75 + 24 + 65 + 65 = 229$$

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Solution: 1

- a. Solutions will vary. Here is one possible set of choices.

| Supplies                                      | Cost per item | Number of items | Total cost |
|---|---------------|-----------------|------------|
| A box of 20 markers                           | \$5           | 8               | \$40       |
| A box of 100 crayons                          | \$8           | 4               | \$32       |
| A box of 60 pencils                           | \$5           | 2               | \$10       |
| A box of 5,000 pieces of printer paper        | \$40          | 1               | \$40       |
| A package of 10 pads of lined paper           | \$15          | 2               | \$30       |
| A box of 50 pieces of construction paper      | \$32          | 3               | \$96       |
| <b>Books and maps</b>                         |               |                 |            |
| A set of 20 books about science               | \$250         | 1               | \$250      |
| A set of books about the 50 states            | \$400         |                 |            |
| A story book (there are 80 to choose from)    | \$8           | 12              | \$96       |
| A map   | \$45          | 1               | \$45       |
| <b>Puzzles and games</b>                      |               |                 |            |
| Puzzles (there are 30 to choose from)         | \$12          | 10              | \$120      |
| Board games (there are 40 to choose from)     | \$15          | 6               | \$90       |
| Interactive computer games (math and reading) | \$75          |                 |            |
| <b>Special Items</b>                          |               |                 |            |
| A bean bag chair for the reading corner       | \$65          | 2               | \$130      |
| A class pet                                   | \$150         |                 |            |
| Three month's supply of food for a class pet  | \$55          |                 |            |
| A field trip to the zoo                       | \$350         |                 |            |

- 8 boxes of markers will cost  $8 \times 5 = 4 \times 2 \times 5 = 4 \times 10 = 40$  dollars.

4 boxes of crayons will cost  $4 \times 8 = 4 \times 4 \times 2 = 16 \times 2 = 10 \times 2 + 6 \times 2 = 20 + 12 = 32$  dollars.

2 boxes of pencils will cost  $2 \times 5 = 10$  dollars.

1 box of printer paper costs 40 dollars.

2 packages of lined paper cost  $2 \times 15 = 2 \times 10 + 2 \times 5 = 20 + 10 = 30$  dollars.

3 boxes of construction paper cost  $3 \times 32 = 3 \times 30 + 3 \times 2 = 90 + 6 = 96$  dollars.

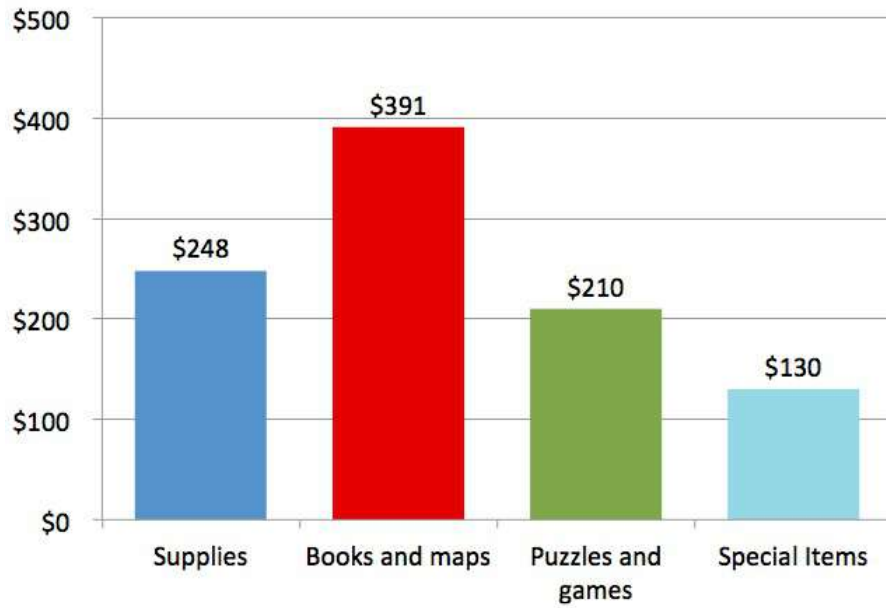
The total for the supplies is  $40 + 32 + 10 + 40 + 30 + 96 = 248$  dollars.

- 12 books cost  $12 \times 8 = 10 \times 8 + 2 \times 8 = 80 + 16 = 96$  dollars.

The total cost for the books and maps is  $250 + 96 + 45 = 391$  dollars.

- The total cost for the puzzles and games is  $10 \times 12 + 6 \times 15 = 120 + 3 \times 30 = 120 + 90 = 210$  dollars.
- The total for the special items is 130 dollars.

b. Here is a bar graph showing these totals:



- c. The total from all the purchases would be  $248 + 391 + 210 + 130 = 979$  So these purchases would total \$979 and \$21 would be left over.
- d. Comparisons will vary.



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