Subject/Course: 7th Grade Mathematics

Author Notes:
Tim Murphy is a special education teacher in Fairfax County Public Schools in Virginia. His lesson is targeted to teaching students how to use proportional and algebraic reasoning to make cost-effective purchasing decisions.

DLD member teachers created this lesson plan, using evidence-based practices in their own classrooms. They have shared them with TeachingLD.org so that other teachers may benefit from their experience. If you try the plan out in your classroom, please send us an email with your reflections.

©2013 Division for Learning Disabilities. The copyright holders grant permission to copy for personal and educational purposes, provided that any and all copies provide the entire document without modification.
Background Information

Subject/Course 7th Grade Mathematics _____________________________

Grade Level and Classroom Setting 7th grade/25 students in classroom _____________

Length of Session(s) 90 minutes (includes trip to grocery store)____________________

This lesson is part of a unit on Ratios and Proportions__________________________

The Big Ideas of the unit are

• Ratios and proportions, especially in the form of unit rates, are valuable tools for everyday living.

Goal(s)

• Students will use proportional and algebraic reasoning to make cost-effective decisions regarding purchases at a grocery store.

• Students will successfully solve practical problems related to grocery shopping.

Specific Objectives

Virginia Standards of Learning

7.4 The student will solve single-step and multistep practical problems using proportional reasoning.

7.14 b) The student will solve practical problems requiring the solution of one- and two-step linear equations.

Prerequisite Skills

• Knowledge of the mathematical terms ratio, proportion, and unit rate

• The ability to use cross-multiplication to solve proportion equations with unknown values

• The ability to discriminate and successfully order decimals

• The ability to round long decimal expressions to the hundredths place
Warm-up Ideas/Differentiation
This lesson includes a trip to the grocery store. However, it can be adapted for use in the classroom by bringing in grocery items, using the web to find several brands of a particular grocery item, or using local newspaper advertisements.

The Lesson

Phase I (time for the phase) **20 minutes**

A. Introduction
   1. Distribute calculators.
   2. Gain students’ attention at the projector.

B. Review of prior knowledge
   1. Use volunteers and selected teacher questions to review the key terms/key images for Ratios, Proportions, and Unit Rates.
   2. Ask for volunteers and judiciously call upon students to ensure group participation while reviewing the following calculations:
      a. Simplifying a given rate to create a Unit Rate
      b. Determining the missing value from the three other values given in a proportion.
   3. Go over the behavioral expectations for the trip to the Grocery Store.
   4. Distribute Grocery Store Data Tables, have students get their coats, and transition to the grocery store.
Phase II  (time for the phase)  50 minutes

A. Teacher Demonstration

1. Bring group of students to the spaghetti sauce aisle. Model for the students how each brand of spaghetti sauce has its own price, but the amounts contained in the jars can be very different. Explain that this can make determining the best price difficult because there isn't a basis for comparison.

2. Draw students’ attention to the unit price displayed on the shelf price tag for each of the spaghetti sauce items. Model for the students how to determine the lowest unit price for spaghetti sauce by amount, and also how to find the highest unit price by amount. Have the students record this information in their data tables.

B. Guided Practice

1. While supervising the students closely, allow them to find the next items called for by their data tables (root beer soda, peanut butter, and potato chips).

2. Observe the students as they record the prices, amounts, and unit prices for the least expensive and most expensive items they find, offering corrective guidance if necessary.

C. Independent Practice

Once the students’ data tables are all filled in, form a group and return to school.
Phase III (time for the phase) 20 minutes

A. Summary

1. Using the information the students recorded for spaghetti sauce, model for the students how to check the store’s quoted unit prices for accuracy, and how to use proportional reasoning to solve the practical problems on the back side of the Grocery Store Data Table.

2. Using the information the students recorded on their data tables, have them check the store’s quoted unit prices by writing their own rates and simplifying.

B. Conclusion

Have the students work in cooperative learning groups or independently to use proportions in order to solve the problems listed on the back of their Grocery Store Data tables, using the information they recorded on the front side.

Assessment Strategies

Use the completed problems from the back side of the Grocery Store Data Table to gauge students’ ability to employ correct computational strategies in order to solve problems involving proportional and algebraic reasoning.
<table>
<thead>
<tr>
<th>Item</th>
<th>Unit Price</th>
<th>Amount</th>
<th>Price</th>
<th>Unit Price</th>
<th>Amount</th>
<th>Price</th>
<th>Unit Price</th>
<th>Amount</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Potato Chips</td>
<td>least expensive</td>
<td>most expensive</td>
<td>least expensive</td>
<td>most expensive</td>
<td>least expensive</td>
<td>most expensive</td>
<td>least expensive</td>
<td>most expensive</td>
<td>least expensive</td>
</tr>
<tr>
<td>Butter</td>
<td>least expensive</td>
<td>most expensive</td>
<td>least expensive</td>
<td>most expensive</td>
<td>least expensive</td>
<td>most expensive</td>
<td>least expensive</td>
<td>most expensive</td>
<td>least expensive</td>
</tr>
<tr>
<td>Open Beef</td>
<td>least expensive</td>
<td>most expensive</td>
<td>least expensive</td>
<td>most expensive</td>
<td>least expensive</td>
<td>most expensive</td>
<td>least expensive</td>
<td>most expensive</td>
<td>least expensive</td>
</tr>
<tr>
<td>Spaghetti</td>
<td>least expensive</td>
<td>most expensive</td>
<td>least expensive</td>
<td>most expensive</td>
<td>least expensive</td>
<td>most expensive</td>
<td>least expensive</td>
<td>most expensive</td>
<td>least expensive</td>
</tr>
</tbody>
</table>

Grocery Store Data Table
<table>
<thead>
<tr>
<th></th>
<th>With $5.50</th>
<th>With $5.00</th>
<th>Unit price for potato chips:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Least expensive potato chips you could buy</td>
<td>Make a proportion to find out how much of the</td>
<td>Least expensive potato chips you could buy</td>
<td>Make a proportion to find out how much of the</td>
</tr>
<tr>
<td>Make a proportion to find out how much of the</td>
<td>amount.</td>
<td>amount.</td>
<td>amount.</td>
</tr>
<tr>
<td>Least expensive peanut butter you could buy</td>
<td>Make a proportion to find out how much of the</td>
<td>Least expensive peanut butter you could buy</td>
<td>Make a proportion to find out how much of the</td>
</tr>
<tr>
<td>Make a proportion to find out how much of the</td>
<td>amount.</td>
<td>amount.</td>
<td>amount.</td>
</tr>
<tr>
<td>Least expensive root beer you could buy with</td>
<td>Make a proportion to find out how much of the</td>
<td>Least expensive root beer you could buy with</td>
<td>Make a proportion to find out how much of the</td>
</tr>
<tr>
<td>Make a proportion to find out how much of the</td>
<td>amount.</td>
<td>amount.</td>
<td>amount.</td>
</tr>
<tr>
<td>Least expensive spaghetti sauce you could buy</td>
<td>Make a proportion to find out how much of the</td>
<td>Least expensive spaghetti sauce you could buy</td>
<td>Make a proportion to find out how much of the</td>
</tr>
<tr>
<td></td>
<td>amount.</td>
<td>amount.</td>
<td>amount.</td>
</tr>
<tr>
<td>Unit price for spaghetti sauce:</td>
<td>Make a unit rate to check the grocery store's</td>
<td>Make a unit rate to check the grocery store's</td>
<td>Make a unit rate to check the grocery store's</td>
</tr>
<tr>
<td>Make a proportion to find out how much of the</td>
<td>amount.</td>
<td>amount.</td>
<td>amount.</td>
</tr>
</tbody>
</table>