

Grocery Shopping - Unit Rates

Overview

Lesson Overview: In small groups, students find the unit rate for a produce item. They then calculate the cost of various bunches of produce. The groups are then jigsawed and each student explains the strategies they used to solve the problems to their new group.

- The lesson is designed for there to be cycling between small group work and whole class discussions. The teacher will need to circulate the room, listen to student discussions, and support learning as needed.

Prerequisite Knowledge:

- Familiarity with number lines
- Experience using either rate tables or double number lines

Learning Goals:

- Use proportional reasoning and determine a strategy for calculating unit rate.
- Apply unit rate strategies for solving problems.
- Explain to classmates how to calculate and apply unit rates.

CCSSM:

- 6.RP.A.2. Understand the concept of a unit rate a/b associated with a ratio $a:b$ with $b \neq 0$, and use rate language in the context of a ratio relationship. *For example, "This recipe has a ratio of 3 cups of flour to 4 cups of sugar, so there is $3/4$ cup of flour for each cup of sugar." "We paid \$75 for 15 hamburgers, which is a rate of \$5 per hamburger."*¹
- 6.RP.A.3. Use ratio and rate reasoning to solve real-world and mathematical problems, e.g., by reasoning about tables of equivalent ratios, tape diagrams, double number line diagrams, or equations.

Math Practices

- 1. Make sense of problems and persevere in solving them
- 2. Reason abstractly and quantitatively
- 3. Construct viable arguments and critique the reasoning of others
- 5. Use appropriate tools strategically
- 7. Look for and make use of structure

Materials:

- PhET *Unit Rate* simulation. Use this link to limit the *Shopping* and *Racing Labs*
 - https://phet.colorado.edu/sims/html/unit-rates/latest/unit-rates_en.html?screens=1,3
- 1 device per student
- "Grocery Shopping" Activity Sheet

Lesson Prep for Differentiation

Groups: This lesson is a jigsaw and is designed to be differentiated by group. Assign tomatoes or carrots to groups of students who need an more basic entry point. Assign cucumbers or potatoes to a group of students who can handle a more challenging entry point.

Activity Sheet Notes: The Activity Sheet is broken up into sections denoted by a horizontal line. These lines show the transitions between individual, small group, and whole class discussions.

Estimated Time: 1 Block period (90 mins)

Lesson - 1 Block Period (90 mins)

- 1) **(20 mins)** Draw students' attention to the learning goals. One strategy is to ask students to name all of the verbs they see in the goals. These verbs are the *actions* students will take during the lesson.

- a) Prompt students to explore the sim. **Optional:** Students write down the 2-3 things they think a classmate should know.
 - b) As a whole group, discuss what students notice about the sim. Important noticings:
 - i) That there are four types of each fruit, vegetable, and candy
 - ii) There is a 'reset' button that changes the questions
 - iii) The fruit can be weighed individually. The vegetables and candy can only be weighed in bunches/groups.
 - c) Be sure the whole class discussion mentions that we can see the cost of one fruit by weighing only one item. Define this as a *Unit Rate* and discuss what it means. Ask for real world examples of unit rates students might see regularly.
- 2) **(5 mins)** Students write their own definition of unit rate. You can scaffold this by providing language for students to use if they struggle to write their own definition.
- 3) **(20 mins)** Prompt students to work in their small groups. Circulate the room and listen for key understandings and misconceptions as students collaborate.
- a) Ask students how they are solving the problems and be sure they can verbalize a strategy.
 - b) When students disagree with each other's solutions, prompt them to 'convince your classmate that your own solution is correct.'
 - c) If time, prompt students to show on their double number lines how they jumped from one cost/fruit to another. For example, an arrow with a x2 shows they doubled.
 - d) Pause for whole class discussion and select 1-2 students to display and explain their work for the class to see.
 - i) Ask students to explain if they agree or disagree with their classmates strategy. Ask students to share something they notice about their classmates strategy.
- 4) **(20 mins)** Assign a vegetable to each group. See above for differentiation possibilities. These are the expert groups and every student in each group should be working with the same vegetable.
- a) There are 3 sets of questions per vegetable. (refresh button in the question box changes the numbers)
 - b) A key component is for students to be able to explain their strategies for solving. Prompt groups to collaborate and make sure everyone in the group is prepared to switch to another group and explain independently.
 - i) To do this, you may want to prompt each student to practice what they plan to say to their expert group first before being assigned a jigsaw group.
 - ii) Listen to as many explanations as you can and support students' ability to explain their reasoning.
- 5) **(20 mins)** Once an entire group is prepared to explain, if time permits and other groups are still working, students group can work on the challenge and/or explore the Racing Lab.
- a) Jigsaw: Create new groups so that there is one vegetable represented in each new group.
 - i) Some overlap may be necessary depending upon class size. If there is overlap, every student should still be prompted to explain their strategy, even if it has been described by someone else.
 - ii) Listen in on groups to hear how students explain
 - iii) Ask clarifying questions and prompt students to do the same. Ask classmates to disagree with the reasoning of each other if they do not think the strategy is viable or is completely correct.
- 6) **(5 mins)** Exit Ticket. Students complete the exit ticket working independently and turn in the activity sheet.