An Apple a Day

The Task

Have you ever heard someone say, "An apple a day keeps the doctor away"? At a local grocery store, you can buy a bag of 8 apples for $5.00. If everyone in your family ate one apple every day, how much money would your family spend in one year on apples?

Big Ideas

- Multiplicative/Proportional reasoning involved with scaling up quantities
- Estimating results of multiplication with large numbers
- Recording and representing relations with tables, charts, graphs, equations, and words

Standards of Learning for Grades 3-4-5	Standards of Learning for Grades 6-7-8
4.4 b,d multiply and divide whole numbers; solve multistep multiplication problems	6.1 describe/compare data using ratios
5.4 single-step and multistep practical problems involving whole numbers.	7.4 single and multistep practical problems with proportional reasoning
	7.12 The student will represent relationships with tables, graphs, rules, and words.
	8.3a solve practical problems involving rational numbers, percent, ratios and proportion
	8.14 The student will make connections between any two representations (tables, graphs, words, and rules) of a given relationship.

Process Goals

- Problem Solving and Reasoning – Students will apply their sense of number to consider the reasonableness of results of the year-long problem. Students will also have to find ways to approach a problem where they do not have a prescribed solution pathway. Then, students will justify their methods to other classmates who may have approached the problem differently.
- Connections and Representations – Students may make use of a variety of representations to keep track of the coordinated quantities in order to reach a solution. 7th and 8th graders may make connections between proportions and real world problems.
- Communication – Students may use words, pictures, tables, or equations to communicate their thinking and solution pathways to others.

Related Task – World's Largest Cookie

The world's largest chocolate chip cookie was created using 40,000 pounds of cookie dough! (The recipe is listed below.) A school wants to make a smaller version of this cookie to feed all 800 students in their school. They decide that each pound of dough will feed 4 students. How many pounds of chocolate chips will they need? (recipe included on blackline master)

Related Task – Solar Powered City

Solar panels collect energy from the sun so people can use that energy to power things in their homes. Is it possible to power an entire city by using only solar energy? New York City uses about 164,380 kilowatt hours of electricity each day. Usually, it takes 25 solar panels to produce about 5 kilowatt hours of electricity. How many solar panels would it take to power all of New York City for one day?

An Apple a Day
Lesson Plan
Adapted from the Lesson Study by: Cindy Cooper
George Mason University, COMPLETE Math
Fall 2015

The Task

Have you ever heard someone say, "An apple a day keeps the doctor away"? At a local grocery store, you can buy a bag of 8 apples for $5.00. If everyone in your family ate one apple every day, how much money would your family spend in one year on apples?

Materials	Facilitating Task
• Extra paper for students to sketch out ideas • Manipulatives, such as cubes or chips	• Although the task is written for individual students to consider their own respective families, you could allow students could work with a partner. • Students will need to consider their own family size, and the number of days in a year in order to answer the question. • As students work, circulate around the class, listening for places students may be stuck, and for strategies you may want to be shared with the class • Whole class discussion: Select a few students to share their approaches. Because student family sizes vary, call attention to the strategies used to generalize methods regardless of family size.

Misconceptions	Suggested Prompts or Questions
• Students may need to discuss that different family sizes will result in different answers, since many problems they have experienced have only one answer. • Students may have trouble coordinating quantities and keeping track of what each number represents in the context of the problem (apples, bags, money, days) • Students may have different approaches (focusing on apples, bags, or money) and may struggle to understand someone else's approach when sharing with the whole group.	Supporting thinking: • How many people are in your family? How will you use that information? • What have you done so far? What will you need to figure out next? • How will you know if your answer makes sense? Extending thinking: • What if there were__people in your family? How could you use what you've already figured out to solve that problem quickly? • What can we say about the cost per person to eat "an apple a day"?

An Apple a Day

Name _____

Date _____

Have you ever heard someone say, "An apple a day keeps the doctor away"? At a local grocery store, you can buy a bag of 8 apples for $5.00. If everyone in your family ate one apple every day, how much money would your family spend in one year on apples?

Answer the question using pictures, words, tables, graphs, and/or symbols.