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Introduction

No matter the grade level, no matter the lesson, math teachers are often confronted with the question, “When will I ever use this?” Of course, to varying extents, adults use a variety of skills acquired throughout their schooling. For whatever reason, however, the connection between learned mathematics skills and their usefulness in everyday living is not as obvious as it is in English, history, or science.

Mathematics textbooks have begun to address this problem by including more “situational” problems. Each problem set now usually contains an application problem or two relating the current lesson to a real-life situation. Entire books have been written to detail links between topics in mathematics and a variety of careers.

“But what if I don’t want to be a civil engineer?” a student may comment. “What if I don’t ever need to model the flight path of a honeybee?” For teachers, these questions are difficult to address. Often these real-life problems are pulled and stretched so tightly to conform to the given topic that they become cumbersome to students. Teachers find themselves breaking these problems down for students so far that the real-life is gone and only the skill work remains. In the end, many problems are omitted from assignments, having been judged as “more trouble than they’re worth.”

As teachers lose interest in these situational problems, students surmise that maybe the application level of mathematics isn’t that important after all. Students begin to see mathematics as a long pursuit of a series of skills, one after the other, with no connection to the bigger picture. This is a misleading perception about math and its relevance to the curriculum and today’s world. Most teachers chose this career path because someone or something along their academic journey sparked an interest, that led to a realization that mathematics is powerful . . . that mathematics is useful. Teaching allows us to share those ideas with our students. And even if all your students don’t delve into math-related careers, they can experience and learn to respect the beauty, power, and functionality of mathematics as it applies to their own lives.

The goal, then, becomes finding real-life problems or projects that can capture the interest of students and break down the myth that mathematics is for mathematicians and has no place in our daily lives.

Popcorn Economics

Investigation 6

Concepts & Skills

- number sense
- limits
- logical thinking
- communication
- problem solving

Materials

- calculators

Investigation Overview

Popcorn Economics is an investigation in number sense presented in the context of buying popcorn at a movie theatre. The investigation really involves very little set-up, as the question is clear: What size tub of popcorn is best to purchase at a movie theatre?

Initial Reactions

Students may initially have some very strong ideas on the answer to this question. You may hear things like, “If you get the large, it’s the best deal,” or, “Never get anything bigger than a small; it’s just too huge, and you’ll end up wasting most of it.” A quick discussion should be enough to convince students that finding the “best size” to purchase depends on the answers to a lot of questions. Have students brainstorm a list of pertinent questions like the following:

- How much popcorn do I get from each size tub?
- How much does each size tub cost?
- Who is paying for the popcorn? (Is it my money or Mom’s?)
- How much popcorn could I eat?
- How much popcorn should I eat?

The answers to the questions that your students brainstorm will be our guide for all of the work on the project.

Definitions

In order to make any decisions, we will need some data on prices and volumes of popcorn tubs. This investigation might be most authentic for your students if you use prices and volumes from your local theatre.

You can get them with a phone call, or you could incorporate this data collection into the students’ responsibilities. For the rest of the discussion, we will be using data from an actual theatre.

Tub Size	Price	Volume
small	\$3.00	46 ounces
medium	\$3.75	85 ounces
large	\$4.50	130 ounces

Popcorn Economics *(cont.)*

Extension 2: How much does a 25-cent refill cost? *(cont.)*

The Mathematics

Once students have agreed on whatever hidden cost you have steered them to agree on, we are ready to reconstruct our table from the last extension. As a result of our sample discussion of hidden costs, the table below appears to be constructed using a 50-cent refill; this 50 cents includes external costs paid to the concession stand and internal costs for the consumer.

	\$3.00	\$3.25	\$3.50	\$3.75	\$4.00	\$4.25	\$4.50	\$4.75	\$5.00	\$5.25	\$5.50	\$5.75	\$6.00
small	46		92		138		184		230		276		322
medium				85		170		255		340		425	
large							130		260		390		520

In the previous extension, popcorn costs matched up at some point for all three tubs; that is, there was an amount available in each tub for every 25-cent increment. That is not the case here; there are several gaps in the table for which tubs cannot be purchased. This will make the Fixed Intake consumer's guide a bit more complicated to construct. (If we had chosen the hidden cost amount to be 50 cents, however, the table would have matched up for us nicely.)

With a little work, students should be able to construct the consumer's guide. The gaps in our table will cause them to need to audition several more sample values. Their results should fall into a consumer's guide similar to the following:

Intake Amount	Optimal Route
0 oz	none
1 oz. – 138 oz.	small
139 oz. – 170 oz.	medium
171 oz. – 184 oz.	small
185 oz. – 255 oz.	medium
256 oz. – 260 oz.	large
261 oz. – 340 oz.	medium
341 oz. – 390 oz.	large
391 oz. – 425 oz.	medium
426 oz. – up	large

Discussion Opportunity

Suppose a Fixed Intake consumer goes to the theatre early enough that he is able to finish his first tub of popcorn and get a refill before the movie begins. Would this change his buying strategy?