Should We Burst Their Bubble?

Each of you has been given 2 packages of bubble gum made by the same company. You will notice the bubble gum comes in 2 different forms. One type is the Ouch® bubble gum whose 21 sticks of gum come in a box that looks like Band Aids®. The other type, Bubble Tape® comes in a container that looks like a roll of scotch tape. Although the 2 products seem different, they both cost 99 cents each. Could the company have made a mistake when they were deciding the price they should charge for each of their products?

What you have to do:

Investigate the 2 products to determine whether or not both products should cost 99 cents. If you decide they should cost different amounts, make a mathematical recommendation for the cost of each. Write the gum-making company a letter describing your investigation, along with your mathematical conclusions.

Their address is:

Amurol Confections Company
Consumer Relations
2800 North Route 47
Yorkville, IL 60560

When writing your letter, be sure to...

- Tell clearly what you did and why you did it.
- Tell how you know you have reached a mathematically correct recommendation.
- Use accurate mathematical language.
- Represent your solution in a graph, chart, table, diagram, model or plot.
- Make sure your work and your letter is well labeled, organized and clear.
- Try to impress the company with your mathematical knowledge and observations.

GOOD LUCK!!!!

Grade Levels 3 - 5

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Context

Many task ideas I come up with occur while I am waiting in the check-out line at the grocery store. This time I spotted a bubble gum display that had many different types of bubble gum in many different containers. The thing that perplexed me about the gum was that although they all seemed so different, they all cost 99 cents.

The students in this fourth grade classroom had been given this task the first month of school after completing a unit on measurement. It was their first problem-solving task of the year. Students had also been learning how to write business letters, so the format requirements for their "write-ups" also assessed the degree to which students have mastered writing this type of letter.

What This Task Accomplishes

This task assesses student's measurement skills. It was also used as a pre-assessment of student problem-solving ability. It also allowed us to determine the degree to which students understand the concepts of equality, ratios and unit pricing.

What the Student Will Do

Since this task was the first presented to students this year, we felt it necessary to break it down into two parts. The first day, students were to determine whether or not the two types of gum should be sold at the same price. Many students reached the conclusion that they should not cost the same and that bubble tape should cost more. They made their determinations in several different ways. Some students took linear measurements of both types of gum. Others lined up the two gum types next to each other to compare sizes. Others used scales and weighed the gums with and without their wrappers to make their determinations.

On the second day, students experimented with finding fair values of each of the gums. Many students were unsuccessful, but had a fun time exploring and practiced a lot of critical thinking and meaningful mathematics skills. Many students knew if one gum was half the size of the other, it should cost half as much.

On the third day, before students were given their materials to work with, I did a mini-problem with them involving pizza. The problem was, in the gum task, the numbers did not work out so neatly. The similar problem I gave did not work out neatly either and we did the task as a class.

The task was:

Here are 2 pizzas. This pizza made of 1 large piece costs $4 and the pizza, made up of 6 small pieces cost $4 also. Is that a fair price for both? What would be a more fair price?

This seemed to assist students with getting on track in solving the gum task, as all students were fairly successful with the gum task after we solved this pizza task as a class.

Time Required for Task

90 minutes

Three, 45-minute periods to solve the problem.

At least one, 45-minute period to write the business letter.

Interdisciplinary Links

This task could be linked to a unit on writing business letters or consumerism.

Teaching Tips

When presenting the task to students, we also brainstormed mathematical language they might use when writing their solutions. We also brainstormed strategies and tools that might come in handy when solving the task.

Students were also given the following recording sheet so they could document their ideas as they worked.

What You Did	Why You Did It	Results	Were You Successful?

Suggested Materials

- Two types of bubble gum per pair of students (we used Ouch® and Bubble Tape®)
- Tape measures, rulers, yard sticks, scales, etc.
- Calculators
- Change and dollar bills

Possible Solutions

Answers will vary depending on how students approach the task. In looking at correctness, look for ratios of cost proportionate to the amount of gum. One must consider reasonableness of solutions as well (for instance, it is probably not appropriate to charge significantly more or less for the gum than the company is currently charging).

Benchmark Descriptors

Novice
A Novice will determine which gum has more or less without using any mathematical tools and will have no strategy for making a mathematically sound recommendation for the price. The solution will exhibit little or no mathematical language or representations and little mathematical

reasoning.

Apprentice
An Apprentice will determine which gum has more or less using mathematical tools and will reach a recommendation that considers the proportion between size/weight and price. This recommendation may, however, not be considered reasonable and the student may only demonstrate minimal reasoning skills.

Practitioner
A Practitioner will determine which gum has more or less using mathematical tools and will reach a recommendation that considers the ratio between size/weight and price. This recommendation would be considered reasonable and the student would demonstrate sound mathematical reasoning skills. The Practitioner would use appropriate mathematical language and representation to communicate.

Expert
An Expert will determine which gum has more or less using mathematical tools and will reach a recommendation that considers the ratio between sizes/weights and prices. The student's recommendation is reasonable and the student demonstrates higher level mathematical reasoning skills. The Expert demonstrates a command of mathematical language and representation to communicate. The Expert also makes mathematically relevant comments and observations, such as a statement about the unit price, the ratio between gum and cost, the difference among the two gum sizes and may also comment on the profit to be made on charging the same price for both size gums.

Note: There is no Expert student work for this problem.

Novice

This solution lacks mathematical documentation.

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White Street
So. Burlinton, Vt

Amurol Confections
Consumer Relations
North Route
Yorkville, IL

Although the student knows the two gum prices should be different, s/he does not make the cost determination using mathematical skills and reasoning. The student does not use any mathematical representation to communicate.

Dear Reader

Our class has been studying your bubble gum. I do not think they should be the sameprices. they both are 99 cents and I think that the Ouch bubblegum sould be 75 cents and Bubble tape should be 99 cents because

The student's use of math language is basic, and is mostly the language of money.

I think Ouch sould be 75 cents because it's weight is less and bubble tape weight is more.

Apprentice

The student's work lacks a mathematical representation.

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White St.
So. Burlington, Vt

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Consumer Relations
North Route
Yorkville, I

Although documentation of the student's solution is minimal, here is evidence of what the student did to obtain a solution, and his/her work supports this solution.

Dear sir or madam,

My clas sis trying to find out New prises of the Bubble tape gum and the ouch gum.

I (Heather) and my partner Danny found out that you need to make new prices and I think that you should make the tape $16.00 and the ouch $5.25 each stick of ouch should cost 25¢ each for 21 stick I took the ouch sticks and put them next to the tape- There were 23 sticks and more left that was half a stick and the half of stick cost 13¢

Sincerely

The student reaches a solution using mathematical reasoning and maintaining costs proportionate to the amount of gum.

Practitioner

This solution lacks a mathematical representation.

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White Street
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The student uses correct mathematical reasoning to find a solution.

The student makes no mathematical observations or connections.

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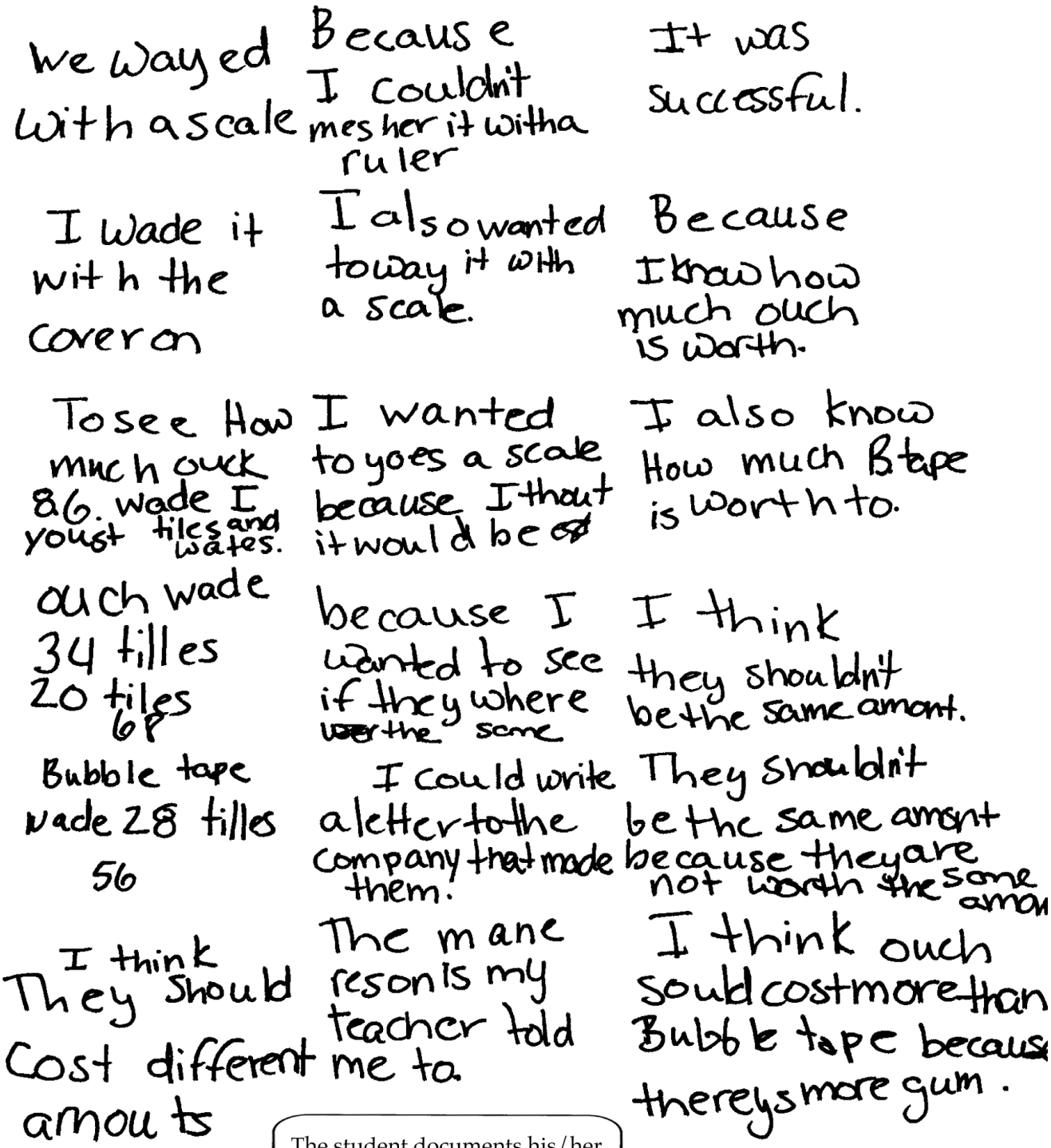
The student explains how s/he solved the problem.

The student uses some sophisticated math language. For instance, "1¢ per tile".

Dear Sir or Madam,

Our class did a project on each gum and Bubble tape. My class is wondering why two different kinds of gum have the same prices is one has more gum than the other. This is what I did, I weighed them on a scale. I put tiles in one bucket and gum in the other one. I kept puting tiles in the bucket until the gum and the tiles where the same weight. Then I took the tiles out and conted them (I weighed each Bubble tape) Each weighed 34 tiles and Bubble tape weighed 28 tiles. I thought it wasn't enough so to change 1¢ per tile. I put 2¢ for every one tile so I got 68 for each and 50 for Bubble tape. I thought you could change your price to that if you want. Thank you. good by.

Practitioner



We Wayed With a scale

Because I couldnt mesher it witha ruler

It was successful.

I Wade it with the cover on

I also wanted toway it with a scale.

Because I know how much ouch is worth.

To see How much ouck 86. wade I youst tiles and wates.

I wanted to yoes a scale because I thaut it would be

I also know How much B tape is worth to.

ouch wade 34 tilles 20 tiles 6P

because I wanted to see if they where wer the same

I think they shouldnt be the same amont.

Bubble tape wade 28 tilles 56

I could write a letter to the company that made them.

They shouldnt be the same amont because they are not worth the same amon

I think They Should Cost different amou ts

The mane reson is my teacher told me to.

I think ouch sould cost more than Bubble tape becaus there eys more gum.

The student documents his/her process for solving the problem.