TEACHERS GUIDE TO GOLDFISH

I love Goldfish…
The cheese kind.

So with the school year underway I am looking to get my favorite cheesy treat back in my school lunch … Goldfish. I know they are not the best thing for me, but I don't think they are worst either. I feel that they are a sensible and tasty snack. Good with any sandwich. While at the store I noticed three different Goldfish products. I have listed the product, prices and amount of Goldfish in ounces in the table below:

Product	**Price**	**Total Ounces**
Bag of Goldfish	$2	about 6 oz
Box of nine min-packs of Goldfish, each 1 oz	$5	9 oz
Big box of Goldfish	$7	30 oz

1. I am planning on consistently buying Goldfish for my school lunch and snacks around the house for a while. I don't want my parents to think that the Goldfish is too costly, so I need to get a good deal. I also don't know if I will be able to eat a big box of Goldfish before they go bad, so I am a little worried that I could be wasting by getting the big box. Create **ratio tables** for each Goldfish product to help me determine which product to buy.

In case you haven't heard of a ratio table here is an example. Say Jelly Belly's are $5 for 12 ounces. I can find the cost of various weights of Jelly Belly's by doing some multiplying and dividing:

cost	5	10	1	15	20	25	4.25	.425
ounces	12	24	2.4	36	48	60	10	1

Make ratio tables comparing cost and ounces for each of the three Goldfish products. In each ratio table find various cost/ounce relationships. Try to compare the three products based on the same amount of ounces or the same price.

These are possible examples of ratio tables. Students basically double or halve or multiply or divide to get other equivalent ratios. There is no necessary order. What ever you multiply the cost by, you should multiple the ounces by the same multiple.

Cost $	2	4	8	10	70	60	1	.33
ounces	6	12	24	30	210	180	3	1

Cost $	5	10	1	70	100	.56	25	150
ounces	9	18	1.8	131	180	1	45	270

Cost $	7	14	21	42	70	10	1	.23
ounces	30	60	90	180	300	42.86	4.29	1

2. Which product gives you the best deal on Goldfish? Use your findings in your ratio tables to show how you know.

The big box gives the best deal. You can tell from cost per 1 oz, or any multiple of 90 oz. You can also tell from comparing ounces for the same price. All three deals can easily be compared at $70 (see ratio tables). Unless it something that you are specifically working on, don't focus too much on finding a unit rate. Let students use their intuitive reasoning to find common multiples of either cost or ounces to make comparisons. Consider highlighting a few different strategies at the board or let the kids share their strategies at the board, doc camera or overhead.

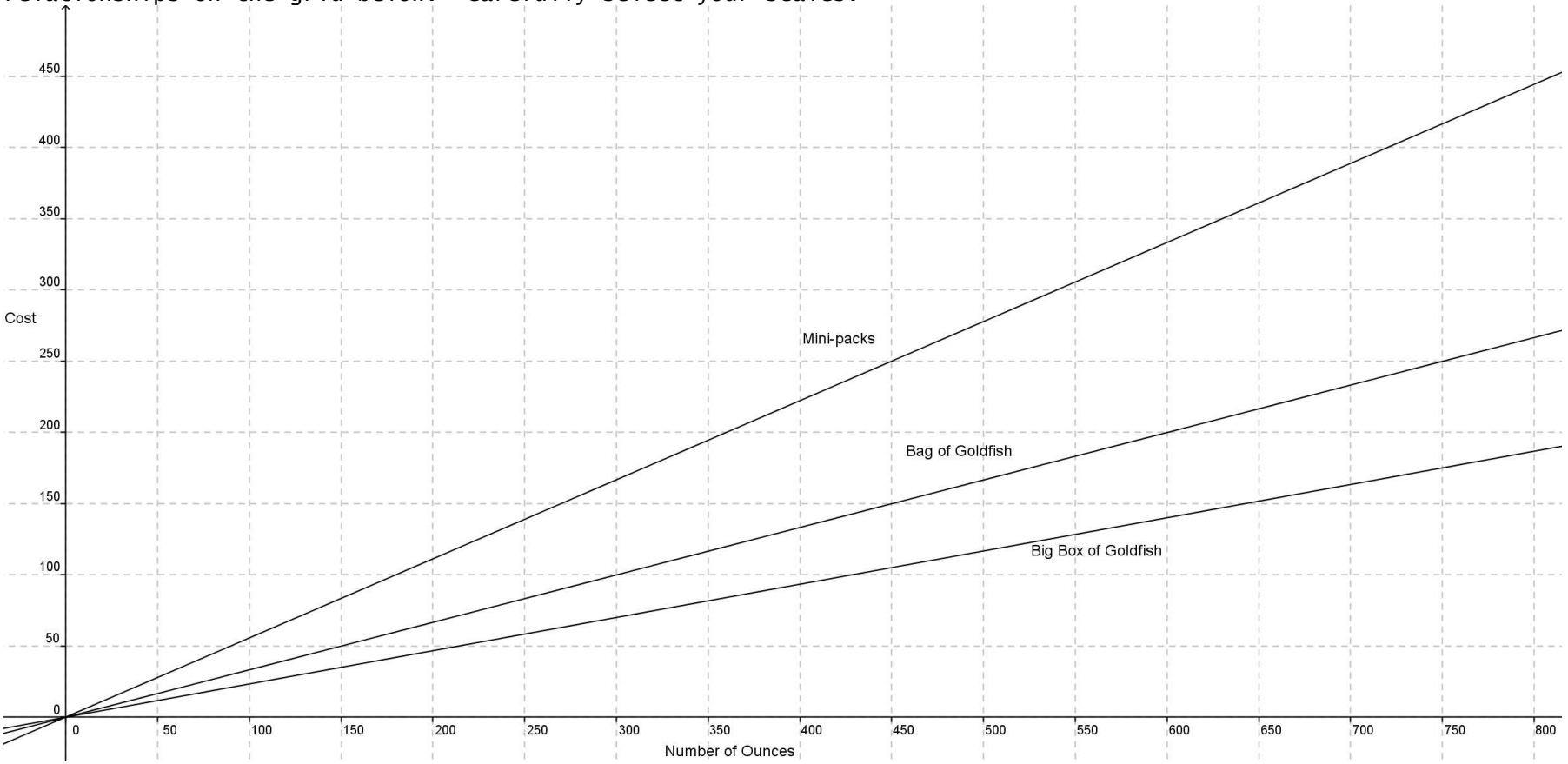
3. My siblings also love Goldfish. Mom says that she thinks we go through about 700 to 900 ounces a year in Goldfish. Assume that this is a correct estimate and pick a number of ounces in that range that my family might go through. How much will we save per year on Goldfish by always buying the big box versus the other two products? Show your reasoning below.

This problem is intentionally left open. Many students will compare at either 720 or 810 or 900 ounces. If students pick 900 ounces a year then we should see a savings of $290 per year.

4. Under what condition might it make sense to buy either of other two products that have a higher cost per ounce?

You might buy the other products if you are hardly ever going to eat the Goldfish and you are worried that they might go bad. You might buy the mini-packs for convenience, so that you can easily take them places.

5. We can visually represent the cost per ounce of the three products on a graph. Graph all three cost per ounce relationships on the grid below. Carefully select your scales.



Note: All three graphs have a y-intercept of zero and are directly proportional, also called a direct variation. Technically the graphs could go into the third quadrant, but the context of this problem demands only positives values. Students do not have to use this scale, but do make sure kids have some time to process on what their scales might look like. It would also seem perfectly reasonable to only go up to 300 ounces on the x-axis. You might discuss which variable goes on which axis. The ounces would most likely go on the x-axis, because the number of ounces determines the cost.

6. How do the graphs help you compare costs? How does the steepness of the graphs more expensive product compare to the steepness of the less expensive products?
The greater the cost per ounce the steeper the line, the greater the rate of change, the steeper the slope. Consider asking kids what the graph of a bag of Goldfish being sold at an airport or sporting event would look like.

7. Sam's Club may sell a giant box of Goldfish at an ever cheaper cost per ounce then the big box of Goldfish. Determine a box size in ounces and a cost that has a lower price per ounce then the big box of Goldfish. Give the total ounces of Goldfish in the box, the cost of the box, the price per ounce of the box and finally describe how the cost per ounce graph of this product would look compared to the other three graphs.

This is an open question. There are many possible examples. Students need to come up with a cost per ounce that is less than the big box. Anything will work that is less than 23 cents per ounce and the box should also be hold more than 30 oz of Goldfish. I don't shop at a warehouse club, but I would guess that something like 50 oz for $9 or $10 would make sense. This can be a great opportunity to share out student thinking. The graph should be less steep. The cost is not increasing as rapidly per ounce as the other three products.

8. What are some different methods for determining what product is the best deal? For example, what methods could you use to determine which is a better value, a 2-liter (2000 ml) bottle of Coke for $1.50 or a 355 ml of Coke for $0.70?
We could use a ratio table, a graph, find a common multiple of milliliters, find a common multiple of dollars, find a cost per milliliter, or find a number of ounces per one dollar or one cent.