



Crunching Numbers – Food Science Style!

Middle School Food and Agricultural Literacy Curriculum

Precepts

- H. Social Growth
- H2. Present Self Appropriately in Various Settings.

National Standards

- CS.09.01. – Apply economic principles to AFNR systems (e.g., supply, demand, and profit).
- NL-ENG.K-12.12 – Applying Language Skills
- NM-Conn.PK-12.3 – Recognize and Apply Mathematics in Contexts Outside of Mathematics

Student Learning Objectives

- As a result of this **unit**, the student will be able to...
- Recognize the importance of food marketing and economics on the local, state, national, and global scope of the agriculture industry.
- As a result of this **lesson**, the student will be able to...
- Apply math concepts related to food marketing and economics.

Content Outline

Objective 1. Apply math concepts related to food marketing and economics.

- A. High Quality or Service
 - 1. People buy quality food.
 - 2. People will pay extra for quality or name brand.
- B. Low Cost
 - 1. People buy low cost food
 - 2. People will pay the lower cost if there is no difference between quality
- C. **Demonstrated Value.** A **Demonstrated Value** is something you can taste, smell, feel, hear, or see. Something that is useful or time saving.
 - 1. For example: No pulp orange juice because of the taste or flavor.

Time

Instruction time for this lesson: 45 minutes.

Resources

National FFA Organization. (2009). LifeKnowledge Online. Retrieved September 1, 2009 from <http://agedlearning.org>
Hayes, K. Introduction to Food Science, Purdue University CopyMat, 2005.

Tools, Equipment, and Supplies

- Overhead projector/transparencies
- Writing surface
- Writing utensil
- Six index cards
- Six common food items around the house such as, but not limited to:
 - 24-pack of soda pop
 - 5-pound bag of apples
 - Box of snack cakes
 - Flour (name brand, one pound)
 - Loaf of bread (name brand)
 - Gallon of milk (name brand and Vitamin D)
 - Peanut butter (name brand, 18 ounces)
- MS.FS.3.4.TM.A – one per teacher
- MS.FS.3.4.ASSESS.A – one per student

Key Terms

The following terms are presented in this lesson and appear in **bold italics**:

Demonstrated Value

Perceived Value

- D. **Perceived Value.** A **Perceived Value** is something we think is good or better than the rest.
 - 1. For example: Brand names, organic, home-made
- E. Price. Price is the determining factor on food sales.
 - 1. If there is a **demonstrated value** and a **perceived value**, the price can be higher.
 - 2. If not, we buy the cheaper product.
- F. **Demonstrated value** plus **Perceived value** divided by Price is greater than or equal to 1; or, $DV + PV / \$ = \geq 1$.



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Interest Approach

The interest approach draws from students' perceptions about food prices by using a game from the show, "The Price is Right." Have six common food items sitting on a table in front of the room and have six index cards with the price of each item written on them to serve as the price tag. Six contestants are needed (one at a time) to match the price tag to its correct product.

Who has been to their grandparents' house and watched "The Price is Right"? Anyone watch it on their own when Grandma and Grandpa are not around? There's a game on that show where a contestant must assign prices to items found at most grocery stores. Who knows which game we're talking about? How would you explain it?

Allow time for students to explain.

Yeah. That's pretty much it. Grocery items sit on a table and the prices for the items are displayed below. The contestant then tries to match the price to the correct product with the help of the audience. Well, we have a similar set up today. Who wants to play the Price is Right?

Students should raise their hands.

Our first contestant is _____. Come on down!

Student comes forward.

There are six items sitting on the table. I'll give you a price tag and your job is to match it to the correct item. Audience, feel free to help him out. You will have 15 seconds to make your choice. Questions? Go!

Allow time for student to choose.

And the correct answer is _____! Thank you!
You may have a seat.

Next contestant!

Repeat above directions for all other contestants.

Price of Item:

24-pack of soda pop: \$6.98

5 lbs of Gala apples: \$4.99

Decorated birthday cake: \$12.67

Name brand flour (one pound): \$2.75

Name brand loaf of bread: \$2.60

Name brand gallon of milk: \$2.69

Name brand peanut butter (18 ounces): \$2.89

Some of us never pay attention to the numbers behind our favorite foods. However, the math behind figuring the price a single food item is vital. From the farm to the store to your plate, the economics of food markets is wide. Get ready to discover how math can be used to determine why you purchase the food you eat!

Today, we will be learning how mathematical concepts can be used to determine the food we eat. Think about the foods we love and get ready to assign a value to them! Be prepared to take notes and work diligently throughout today's lesson. Let's get ready to crunch some numbers, food science style!

Summary of Content and Teaching Strategies

Objective 1. Apply math concepts related to food marketing and economics

Students will use the *Einstein e-Moment®* to draw connections from the value of a food item to setting up a mathematical equation. Student will present an idea, concept, or process by using symbols and signs that would reflect a mathematical equation. That allows the student to create a visual that would represent the relationship between the content. The final equation that students will create will appear as $DV + PV/\$ = >1$.

For a moment, imagine we are in a grocery store. It is time to select food for dinner. Think about this: What characteristics make the food appealing? Why would we buy a product? Who will be the first to share their answers?

Solicit student answers. Capture them on the writing surface. Common ideas may be name brand, attractive packaging, quality food, ease of preparation, lower cost.

Great contributions! Each of these reasons can be broken up into two basic reasons people will purchase one food item over another.



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Use **MS.FS.3.4.TM.A** to allow for ease of providing materials to students.

So, how do people determine how to buy food?
Let's discover this through a simple equation!

The Einstein e-Moment challenges students to create a mathematical formula for the content. The formula is not required to be true mathematically, but it should possess some sort of logic created by the student or teacher that aids in memory and recall of a concept. Assist students in developing a concise reference for the information.

Albert Einstein was a well-known genius in his time. Quite often he created equations that helped others understand complex situations. Who can tell us what equation Albert Einstein was famous for?

Solicit student answers.

That's correct! $E=MC^2$. Today, we are going to create an equation that represents the information that we will soon discover. Find a sheet of paper and a writing utensil and let's prepare to become geniuses too in the food science field!

The first step to determining how people buy food is the **demonstrated value**. Let's capture this information down in our notes today.

Display **demonstrated value** section of outline.

Take the next 30 seconds and write down all of the food items that can be purchased because of a **demonstrated value**.

Pencils down! Turn to the left and say, "That's quite a list!" Who will be the first to share an item that's on their neighbor's list?

Solicit student answers. Other examples such as low-fat ice cream, microwave popcorn, porterhouse steak, sugar-free jam, macaroni and cheese, etc. may be added if needed.

Great work so far! Now that we have determined what a **demonstrated value** is, let's start the equation! An abbreviation that we could use for this is **DV**. Let's capture this down in our notes.

The next component we have in our equation is **Perceived value**.

Display this section of outline.

Take the next 30 seconds to write down all of the food items that can be purchased because of a **perceived value**.

Pencils down! Turn to the right and say, "Great perception!" Who will be the first to share an item on their neighbor's list?

Solicit student answers. Other examples may be: low fat, no sugar added, gourmet food products, Idaho potatoes, microwaveable, Godiva chocolate, etc.

Great ideas! We must add **perceived value** to **demonstrated value**. How will this look in the equation?

Solicit student response.

I think we've got some Einsteins in this class! Our equation should look like this so far: **DV+PV**.

Our next step in the equation is price.

Display this section in outline.

To explain this concept better, picture a huge, juicy steak. Approximately how much does a steak cost at a high-end restaurant?

Solicit student answers.

A good steak dinner at Texas Roadhouse could cost approximately \$20 with all of the fixings. A steak at a fancy restaurant is usually sold a la cart and the steak by itself could cost \$35. If we don't perceive a steak to be worth that much, we could head on down to Ponderosa to purchase a steak for \$10, or we could fix one on the grill at home for \$5. The same goes for many other products.

Since price affects many of the purchases we make, it is the determining factor for our purchase. Let's use a dollar sign to represent price. We must use it to divide the sum of **demonstrated value** and **perceived value**. What will our equation look like now?

Solicit student answers. $DV+PV \div \$$.

Exactly! $(DV+PV) \div \$$. Now, the left side is complete. What comes next? We are now at $(DV+PV) \div \$=$



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If the **demonstrated value** added to the **perceived value** is higher or equal to the price, then it will equal to or be greater than 1 if we are to purchase the food at hand. Therefore, our answer must be greater than one. Let's finish the equation.

$DV + PV / \$ = > 1$. Let's review this by reading our equation out loud together. "**Demonstrated value** plus **Perceived value** divided by Price is greater than or equal to 1." Great mathematical work today, students! I am sure that Einstein would use this equation to purchase his food if he were alive today.

As we think about the reasons that we purchase food, many of the same ways that first impressions are made in the grocery store by the package on the shelf are ways that can be used on first impressions when we meet others for the first time.

Put students into groups of four for the following activity. Groups may be divided by height, color of hair, or by random numbering. They will brainstorm the factors that lead to making a good and bad impression.

When we hear GO, move to a corner of the room to work in. Choose one person to be the scribe. Scribes, draw a vertical line down the center of the paper. Write the word "Bad" on the left side and "Good" on the right side. Brainstorm factors that lead to a bad first impression and factors that lead to a good first impression. You will have three minutes to complete this task, and then we will share our answers with the class. What can I clarify? GO!

Time the event for three minutes. Walk to each group and assist them if they need help in the brainstorming process.

Okay, let's hear what each group has to say. Please come to the front of the room and, as a group, present your ideas to the other groups. Listen carefully to what each group shares.

Call on each group to present to the class. Capture their answers on the writing surface. Some possible answers are clothing, handshake, eye contact, environment, association with the person, conversations.

Thank you for sharing your wonderful thoughts!

Why are these particular traits important when making a first impression?

Possible answers include because these are the first things you may notice about a person.

Which one do you think would create the best first impression? Which one would create the worst? Write all these ideas in your notebooks.

Allow students to copy the information into their notebooks.

Review/Summary

Using our newfound knowledge of the equation used to price an item, create equations for two food items that have left a good impression on you and two food items that have left a bad impression. You should know the relative price of each item. You need to write the name of the product and its equation on the same piece of paper, totaling four separate pieces of paper. Hang these around the room when finished so we may all learn what you discovered.

Write the following example on the writing surface to model the expected outcome:

For example: a **demonstrated value** of no-pulp orange juice is \$3.50. If the orange juice is name brand that **perceived value** adds \$1.50. The actual price of orange juice is \$4.12.

So our equation is $\$3.50 + \$1.50 \div \$4.12 \geq 1$.

You may work with a partner of your choice to complete this exercise and you will have 10 minutes to complete this. What questions are there? Go!

While monitoring the class, observe and select a few good examples and have those students explain their work to the class after their 10-minute work session.

We've created quite a number of mathematical equations today! Our calculating skills are definitely great enough for each of us to be Einsteins! Throughout this class period we have determined that **demonstrated value + perceived value** divided by price must be greater than or equal to one for us to purchase the food we eat. We also discovered that the first impressions we make can have demonstrable value in our lives. Tomorrow we will begin discussing the presence of a marketing infrastructure within the food science industry! We have done an awesome job creating concepts in food science. To celebrate our success, give your neighbor a high-five.



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Application

Extended classroom Activity:

Have students “market” something to apply the concepts in the latter part of the lesson (**demonstrated value** or **perceived value**). Show the products around the room and discuss how values for food products can be different for each person by having each student assign values to each of the food products brought in.

FFA Activity:

Students can create their own packaging for a finished food product. This is a portion of the Food Science CDE and will allow students to explore and discover this CDE as a potential opportunity to be competitive in during high school.

SAE Activity:

SAE products can also have **demonstrated values** and **perceived values** depending on the products or results produced in their SAE. Have students choose an SAE area and list the demonstrated and **perceived values** that may result based upon the successful completion of the SAE.

Evaluation

MS.FA.3.4.ASSESS.A

Answers to Evaluation

1. D
2. A
3. C
4. B
5. $DV + PV/\$ = >1$



Name _____

Directions: Choose the correct answer and write the letter in the blank.

1. _____ **A demonstrated value is something you can _____.**
 - A. Taste
 - B. Feel
 - C. See
 - D. All of the above
2. _____ **Price is the determining factor on food sales.**
 - A. True
 - B. False
3. _____ **Which of the following is a perceived value?**
 - A. Pulp-free orange juice
 - B. Easy Mac & Cheese
 - C. Brand Name Products
 - D. All of the above
4. _____ **When determining to purchase food, the value of the equation must be greater than or equal to 2.**
 - A. True
 - B. False
5. **Write the equation for determining the price of a food item below:**



Apply math concepts related to food marketing and economics.

- **High Quality or Service**
 1. People buy quality food.
 2. People will pay extra for quality or name brand.
- **Low Cost**
 1. People buy low cost food
 2. People will pay the lower cost if there is no difference between quality
- **Demonstrated Value** — A Demonstrated Value is something you can taste, smell, feel, hear, or see. Something that is useful or time saving.
 1. For example: No pulp orange juice because of the taste or flavor.
- **Perceived Value** — A Perceived Value is something we think is good or better than the rest.
 1. For example: Brand names, organic, home-made
- **Price** — Price is the determining factor on food sales.
 1. If there is a demonstrated value and a perceived value, the price can be higher.
 2. If not, we buy the cheaper product.
- **Demonstrated Value plus Perceived Value divided by Price is:**
greater than or equal to 1.
Or:
$$DV + PV / \$ = > 1.$$