**Grade Level**
4-8

**Length of Lesson**
45 minutes

**Objective**
By the end of this lesson, students will have a better understanding of the challenges farmers face and be able to demonstrate simple math functions.

**Materials Needed**
- 1.4 oz bags of M&M's (per student)
- Calculator
- Copies of student worksheets

**Standards**
Common Core
CCSS.ELA-Literacy.RI.4.2; RI.4.6; W.5.1; SL.4.1

CCSS.Math.Content.4.OA.A.3; 7.SP.A.1

## Lesson Summary
This lesson is a hands-on activity is designed to help students have a better understanding of marketing farm commodities by selling them (represented by M&M's candy) for a profit! Students will use basic math functions and critically think through challenges that farers face when marketing commodities.

## Suggested Sequence of Events:
1. Read through the Corn, Soybean, and Wheat Ag Mags to learn about common Illinois commodities. Interactive online versions can be found on our website.
2. Complete the activity following the procedures:
   - Pass out the student worksheets and read through the introduction and definitions.
   - Pass out the bags of M&M's. Make sure to tell them to **NOT** open the bags!
   - Have them fill out the "M&M estimator" section on their worksheet.
   - Explain to them that each color represents a different commodity they are 'growing.'
   - Revisit the term "future" and read the "Farmer's Dilemma" prompt as a class. Give students a minute to think and answer individually, then have them share their responses with a partner, and then share as a whole class. (Answer on "Teacher Resources" page)
   - Have students finish the rest of the student worksheets. They can eat their candy (with your permission, of course!) when they complete their worksheet and found how much profit they earned from their 'crop.'
3. Whole class discussion and reflection of activity. Here are some possible discussion questions:
   - How many of you realized that a farmer only makes money at certain times of the year?
   - How is the method of payment different than when some of your parents receive their paychecks?
   - What are some school subjects a farmer must be familiar with or understand well?
   - How would budgeting funds come into play in a farmer's family life?

**Extension Ideas:**

- As a class, discuss your students' answers at the end of the worksheet. Figure out who made the most profit and who owed the most. Explain why these students made the most or lost the most. Compare and contrast each student's outcome. Focus on the details and describe the differences and similarities.
- Put students into groups and have them calculate the averages of their: total M&M's, M&M's of each color, $ made from their pre-sold, $ made not pre-sold, and overall $ made.
    - Have them discuss these questions in their groups
        - What trends do you notice in your group?
        - In general, did the group take more risks, or were they less risky?
        - Why is it important to calculate averages? Would this help in determining the risk?
- Have students create a bar graph to show a side-by-side comparison of each color in their bag. Have them create a second bar graph to show how many colors were pre-sold and sold.
- Have students create a pie chart to show the percentage of the overall total for each color.
- Have a local farmer come in to talk to the class about how they sell their crop in relation to the activity.
- Have students write two to three paragraphs explaining the main idea of this activity. They should use details from the text and lesson to help support their explanation.
- Have students use the information from the unit to chart statistics from their population of M&M's. Explain the odds of drawing each color from the bag at random. Use this data to draw inferences. What are the odds of randomly selecting each color? Which is most likely?
- Go to agintheclassroom.org to contact your County Literacy Coordinator for free classroom sets of our Ag Mags!

**The Farmer's Dilemma Answer:**
There might be a drought, flood, or wind damage that could hurt the farmer's yield. He or she might not harvest 150 bushels of corn. In order to make money, that farmer must have the number of bushels he or she sold ahead of time, otherwise he or she loses money. It is like borrowing money: someday you have to pay it back. Remember, the farmer is taking a risk like the students are doing with their candy. Imagine taking a risk with thousands of dollars, not just candy.

## Introduction

A lot of planning goes into the sale of a farmer's crop. In order to make the most money, a farmer must predict when he will receive the best price for his or her crop, even before the crop is harvested. This is called "futures" because the prediction the farmer makes is based on the future. The futures market can be both complicated and risky. In this activity, you will see if you are a good predictor with your "crop" in hopes of making the most money!

| | |
|---|---|
| Acre | Portion of land about the size of a football field. |
| Bushel | How the crop is measured; can be measured by weight or amount. |
| Commodity | A commercial article, especially an agriculture or mining product, that can be transported. |
| Crop | The total yield of agricultural produced in a given season or place. |
| Expenses/Inputs | Items the farmer must pay for in order to stay in business; examples: electricity, gasoline, taxes, chemicals. |
| Futures | Commodities or stocks bought or sold upon agreement of delivery at a later time. A farmer only gets paid when he or she sells a crop. That he or she sells the crop before it is harvested - "future." |
| Profit | Amount of money made after expenses are paid. |

## M&M Estimator

Do **NOT** open your bag of M&M's yet! Your bag will have approximately 55-60 M&M's inside. Predict how many of each color of M&M's candy you have in your bag and record those numbers in the circles below.

Blue

Brown

Green

Yellow

Red

Orange

### The Farmer's Dilemma

A farmer has the opportunity to sell his or her crop before they harvest. For example, if the farmer thinks he might have 150 bushels of corn to sell in the fall, he might sell 100 bushels ahead of time at a higher price. Why wouldn't the farmer want to sell all 150 bushels ahead of time at the higher price?

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### Pre-Harvest Phase

It's time to decide if you would like to sell your crop (the M&M's) before you harvest it. By selling before harvest, you can get a premium price for your commodity! Remember, you already estimated the amount of "crop" you will have when you harvest (or open your bag). Use those estimated numbers to help you fill out the information below!

### Prices

The grain elevator will pay $4.50 now or only $4.00 after you open your bag.

For the green M&M's, your teacher will also pay $4.75 now or only $4.25 after you open your bag.

Blue _____ x $4.50 = _____

Brown _____ x $4.50 = _____

Red _____ x $4.50 = _____

Orange _____ x $4.50 = _____

Yellow _____ x $4.50 = _____

Green _____ x $4.75 = _____

Total Sold: _____  Total Made: $_____

**Harvest Phase**

It's time to harvest your crop! Open your bag of M&M's, but don't eat them yet. Count how many actual M&M's you have of each color. Then, set aside your pre-sold M&M's and record the remaining number of M&M's below.
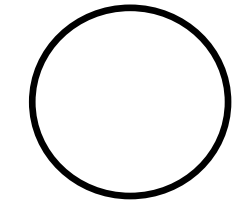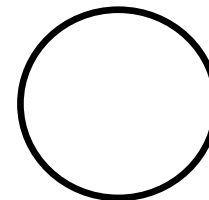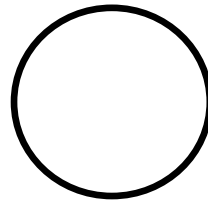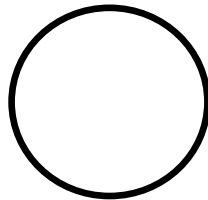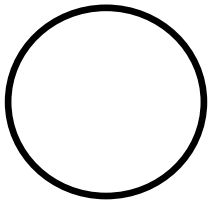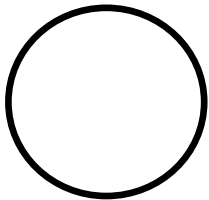
| Blue | Brown | Red | Orange | Yellow | Green |
|------|-------|-----|--------|--------|-------|
| ◯ | ◯ | ◯ | ◯ | ◯ | ◯ |

Blue   _____   x $4.00 =   _____

Now, take the information obtained above and use it in the chart on the right to find out how much money your made on the M&M's that were not pre-sold!

Brown   _____   x $4.00 =   _____

Red   _____   x $4.00 =   _____

Orange   _____   x $4.00 =   _____

Yellow   _____   x $4.00 =   _____

If you oversold any color, place a zero in the space.

Green   _____   x $4.25 =   _____

Total Made:  $_____

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Add together the totals you made from pre-harvest and harvest.   Overall total: $_____

Did you oversell any of your crops?          Yes          No

If yes (any color other than green), how many?   _____   x $4.50 =   _____

If yes (green only), how many?   _____   x $4.75 =   _____

Total Oversold:   $_____

Overall Total: $_____   -   Total Oversold $_____   =   $_____

**Final Questions**

1.  How many of each color did you oversell?

2.  Did you make good choices when it came to the predictions?

3.  Which commodity, or color, had the highest amount sold?

4.  What can you do differently if you were to do it again?

5.  What did you learn about farming while doing this lesson?

6.  What was one thing that surprised you about farming?

7.  What is one thing that surprised you about your predictions and actual calculations?

8.  What did you learn about risk-taking? In your opinion, is it always better to take a risk? Was your opinion the same before the activity?