NEBRASKA AGRICULTURE IN THE CLASSROOM
NEBRASKA FARM BUREAU FOUNDATION

Activity: Futures Farming

***Activity Level*: Advanced**

Source: Adapted from Innovations in Agriculture: Resource Guide for Teachers, Illinois Farm Bureau, IIA Foundation

Purpose

Understand the basic concept of selling commodities on the futures market.

Example Topics It Supplements

Basic economics; application of math in agriculture

Activity Snapshot

1. Organize and Prepare Supplies
2. Read Background Information
3. Interest Approach
4. Conduct Activity
   Have students define and learn words/terms. Distribute materials and complete "Futures Farming Worksheet" and M&M® Graph. Work with students through each step, having students complete all math and tasks.
5. Ask follow up questions and make the connection to agriculture.
   - What surprised you the most about selling "corn" on the futures market?
   - Raise your hand if you realized that a farmer only makes money (receives a check) at certain times of the year? How is this different than when some of your parents/guardians receive their paychecks?
   - What are some school subjects and skills a farmer must be familiar with or understand well?
   - How would a graph, similar to your M&Ms® graph be of value to a farmer?
   - What can we share with others about what we learned today?

State Standards It Supports

LA 6.3.3.d—Listen, ask probing questions, summarize, and explain information being communicated and consider its contribution to a topic, text, or issue under study.
MA 5.4.1—Students will create displays that represent data.
MA 5.4.2.b—Formulate questions that can be addressed with data and make predictions about the data.

Materials

- "Futures Farming" worksheet—1 per student
- Handout "M&M Graph"—1 per student
- M&Ms®--1 per student (1.6 oz. or a bag with 55-60 M&Ms®)
- Red, orange, yellow, green, blue and brown crayons, markers, or colored pencils—1 per student or enough that partners may share
- Calculator (optional)—1 per student

What's the Connection to Agriculture?

Farmers must plan and study the markets for their commodities in order to guarantee the best price for their crops. They gather information about futures market prices and use math skills and calculations to determine how to market and sell their product even before the crop is harvested.

PROCEDURES:

1. Organize and Prepare Supplies
   See "Materials" on cover page.

2. Background Information
   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 or she will receive the best price for the crop, sometimes even before the crop is planted or 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, students will see what it is like to predict the futures with their "crop" in hopes of making the most money.

3. Interest Approach
   Place the word "Future" on a writing surface. Pose question: What do you think of when you see/hear the word future? *Expected responses: something that happens later on, what we see in our life in years ahead, etc.*

   Explain that the future is often uncertain because we don't know for sure what will happen. Have students think about that in terms of farmers and what they do. In what ways does an uncertain "future" directly apply to farmers? *Expected responses: don't know if crops will grow, if animals will be safe, if weather will be good, etc.*

   Share that farmers don't have a guarantee on how much crop they will harvest or what the price will be for the corn, soybeans, etc. when they harvest it out of the field. They have to do a lot of planning to get the most money for their crop. Today, students will explore the "futures" market in agriculture and practice predicting how much "crop" to market to get the best price.

4. Conduct Activity
   a) Put the following words on a writing surface: futures, acre, bushel, expenses, profit. Divide the class into five groups. Assign each group one of the terms. Each group's task is to come up with the best definition of the term and include an explanation/example of how it connects to agriculture. Provide two minutes to complete.
   b) Discuss the group's definitions and provide the additional information for the class:
      - **Futures**: Commodities or stocks bought or sold upon agreement of delivery at a later date. Ex: farmers pre-sell their crops at a set price for actual delivery of them later.
      - **Acre**: Portion of land about the size of a football field. Ex: Acres are the measurement or amount of land a farmer uses to produce crops. The farmer uses the number of acres planted to help plan the total amount of crops produced.
      - **Bushel**: How a crop is measured; can be measured by weight or volume. Ex: The amount of corn a farmer produces is measured in bushels produced per acre.
      - **Expenses**: Items the farmer must pay for in order to stay in business. Ex: fuel, cost of seed, cost of fertilizers, taxes, etc.
      - **Profit**: Amount of money made after expenses are paid. Ex: farmers seek to earn a profit by selling their crop at the best price so there will be money left after expenses.
   c) Pass out the bags of M&Ms® and one copy of each handout to the students. Tell the students they should leave their bag of M&Ms® unopened.

d) Using the Futures Farming Worksheet, students complete Step 1: The Gamble—estimating how many M&Ms® of each color they think might be in their single bag before opening it.
e) Next, have students use red, orange, yellow, green, blue, and brown crayons, markers, or colored pencils and transfer their estimated numbers to the M&M® Graph Worksheet. Students should color the squares under each "E" (estimate) column up to the number that matches their guess in Step 1.
f) Move onto Step 2: Pre-Selling on the worksheet and have students decide how many per color they wish to presell.
    - Once the students have their totals, they now have the bushels of corn they can sell.
    - This is a good opportunity to talk about how many bushels of corn a farmer produces in one acre. (In Nebraska, the average yield of corn per one acre is 185 bushels. Nationally it is approximately 168 bushels per acre. *Source: Nebraska Corn Board, 2015 statistics)*
g) Revisit and discuss the term "futures" that the students defined earlier. A farmer has the opportunity to sell his/her crop before he harvests it. For example, if the farmer thinks he/she may have 175 bushels of corn to sell in the fall, he/she may sell 125 bushels ahead of time at a higher price. Pose question: Why wouldn't the farmer want to sell all 175 bushels at the better price? *Answer: There might be a drought, flood, or wind damage that could hurt the farmer's yield OR he/she might not harvest 175 bushels of corn. In order to make money, that farmer must have the number of bushels he/she sold ahead of time, otherwise he/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!*
h) Complete Step 2.
i) Have students open their bag of M&Ms®—keep all M&Ms® on the desk/table until completely counted!! Complete the first part of Step 3: The Harvest—count the colors and record under Actual Harvest.
j) Have students transfer the actual numbers to the M&M® Graph by coloring up to the number in the "A" column. Have students share their graphs with each other or the entire class. Lead discussion on how many of the student predictions were close; how many were way off in their estimates? How challenging is estimating for farmers using real commodities and crops?
k) Have students complete Steps 4, 5, 6, 7, and 8 on the Futures Farming Worksheet. Students may eat their candy at the end of the activity.
l) *NOTE: The price of corn on the worksheet is $3.50 in futures market and $3.20 cash price. These are not reflective of current market prices, but rather a fixed number to use for calculations. One option for the lesson is to replace the given numbers with actual market prices.*

5. Ask Follow Up Questions and Make the Connection to Agriculture
    - What surprised you the most about selling "corn" on the futures market?
      Answers will vary

    - Raise your hand if you realized that a farmer only makes money (receives a check) at certain times of the year? How is this different than when some of your parents/guardians receive their paychecks?

Most people receive a paycheck one-two times per month, which cover their earnings. Many farmers only receive checks a few times a year, depending upon when and how much they have to sell. That means farmers must be skilled at budgeting and planning to meet monthly expenses throughout the year.

- What are some school subjects and skills a farmer must be familiar with or understand well?
  Math, economics, marketing, English (communications), social studies (geography), science (weather) etc.

- How would a graph, similar to your M&Ms® Graph be of value to a farmer?
  Graphs and charts are visual representations that can help a farmer plan. By keeping track of the estimated amount and actual amount of corn produced on specific acres, a farmer can use that information to better plan for the next year. Data is collected in an Actual Production History (APH) that shows the history of the previous five years yields.

- What can we share with others about what we learned today?
  Farmers must plan and study the markets for their commodities in order to guarantee the best price for their crops. They gather information about futures market prices and use math skills and calculations to determine how to market and sell their product even before the crop is harvested.

Related Activity and Resource:

- *Introduce the term "grain elevator" to students. The grain elevator is where the farmer sells his corn. If possible, have an elevator manager come and speak to the class or arrange a visit to a grain elevator.*
- *Contact the Nebraska Corn Board for additional information on corn production, renewable resources, types of corn, corn processing, corn uses, and career information.*
  http://www.nebraskacorn.org

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Futures Farming Worksheet

Name _____ **Date** _____

Step 1: The Gamble
Leave your bag of M&Ms® unopened. Predict how many of each color of M&Ms® candy you will get in your bag. You will have approximately 55-60 M&Ms® in the bag.

Blue_____ **Brown**_____ **Red**_____ **Orange**_____ **Yellow**_____ **Green**_____

Step 2: Pre-Selling
Would you like to sell your corn (M&Ms®) before you harvest (open your bag) and get a premium price for your commodity? You can pre-sell now for $3.50, or for $3.20 once you open your bag.

Pre-sold corn:
Place the number you wish to sell in the first blank. Multiply to see what you could make.

Blue:	_____	X	$3.50	=	_____
Brown:	_____	X	$3.50	=	_____
Red:	_____	X	$3.50	=	_____
Orange:	_____	X	$3.50	=	_____
Yellow:	_____	X	$3.50	=	_____
Green:	_____	X	$3.50	=	_____

Step 3: The Harvest
Open your bag and place all the M&Ms® on the surface in front of you. Count how many actual M&Ms® you have of each color and enter the totals below.

Blue_____ **Brown**_____ **Red**_____ **Orange**_____ **Yellow**_____ **Green**_____

Now subtract what you have pre-sold from your actual harvest and write the new number below. If you have over-sold all or part of your harvest in Step 2, you will have a negative number in the blank.

	Actual Harvest		**Pre-Sold Amount**		
Blue:	_____	—	_____	=	_____
Brown:	_____	—	_____	=	_____
Red:	_____	—	_____	=	_____
Orange:	_____	—	_____	=	_____
Yellow:	_____	—	_____	=	_____
Green:	_____	—	_____	=	_____

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Step 4: Selling
Take the information you obtained in Step 3 and use it below to find out how much money you made on your corn (M&Ms®) that was not pre-sold. Only write down the positive numbers; skip the negative numbers until Step 7.

Blue:	_____	X	$3.20	=	_____
Brown:	_____	X	$3.20	=	_____
Red:	_____	X	$3.20	=	_____
Orange:	_____	X	$3.20	=	_____
Yellow:	_____	X	$3.20	=	_____
Green:	_____	X	$3.20	=	_____

Step 5: Before and After Harvest Totals
Add together the totals you made either from pre-selling your corn (M&Ms®) at $3.50 or selling your corn (M&Ms®) after harvest at $3.20.

Total from Step 2: $ _____
Total from Step 4: $ _____
Total Made: $ _____

Step 6: Grand Total
Did you oversell any corn (M&Ms®)? (circle one) **YES** **NO**
If no, write how much you made below from step 5.

Grand Total (from Step 5) **$**_____

Step 7: The Cost of Overselling
If you oversold your corn (M&Ms®), you will have to buy more corn to make up the difference. The grain elevator will also charge handling fees on top of the base price of the corn you buy. Write all the negative numbers (from Step 3) for each color of M&Ms® you oversold in the blanks below. Write the sum of these numbers in the Total Oversold blank, then find out how much you have to pay to buy more corn.

Blue_____ **Brown**_____ **Red**_____ **Orange**_____ **Yellow**_____ **Green**_____

Total Oversold: _____ X $3.70 = _____

Step 8: Grand Total
Now, subtract the total amount you oversold in Step 7 from the total in Step 5 to find out your grand total.

Total made (from Step 5): _____
Total oversold (from Step 7): – _____

Grand Total: $ _____

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M&M® GRAPH

Name_____

E = Estimate **A = Actual**