NILE Fourth Grade Agriculture Education

Crop Section Teacher's Guide

The following is a teacher's guide designed to be used with MSU Extension Video_NILE_Ag_2020_1.mp4. Please reference the guide to help facilitate discussion during the video and for additional resources.

INTRODUCTION

Time 1:28 – Discussion 1

Q: What is a crop?

A: A crop is a plant that is grown for food.

Discussion: Encourage students to think about why farmers grow crops. Do they use them for themselves? Do they sell their crops? How do we use crops? Do we eat them? Urge them to think outside the box regarding how farmers make money. Farmer's paychecks are not the same each year, as it varies on current market prices and how well the crop does during the growing season.

Time 2:57 – Discussion 2

Q: What are the five main crops grown in Yellowstone County?

A: Sugar beets, barley, wheat, corn, and alfalfa

Discussion ideas: Encourage students to think about what they see when driving down the road. Challenge students to think about other crops grown in Montana.

Additional Resources:

- 2019 Montana Agricultural Statistics: https://www.nass.usda.gov/Statistics_by_State/Montana/Publications/Annual_Statistical_Bulletin/2019/Montana-Annual-Bulletin-2019.pdf
- 2017 Yellowstone County Profile: https://www.nass.usda.gov/Publications/AgCensus/2017/Online_Resources/County_Profiles/Montana/cp30111.pdf

SUGAR BEETS

Time 4:27 – Discussion 3

Q: Why do you farmers prefer 3 to 4 pound sugar beets instead of especially large sugar beets?

A: Smaller sugar beets are more efficient than abnormally large beets. That means they use less water, fertilizer, and soil nutrients while producing about the same amount of sugar as a large beet. Furthermore, smaller beets take up less space in the truck when getting hauled to the factory. This allows for more efficient transportation.

Time 6:33 – Discussion 4

Q: How much sugar is in a 4 pound sugar beet with 15% sugar content?

A: 4 lb x 0.15 = 0.6 pounds; if 1 pound of sugar = approximately 2 cups then you would get approximately 1.2 cups per sugar beet.

Discussion: Since sugar content ranges from beet to beet, think about how much sugar a 4 pound beet with only 12% sugar content would produce. If farmers are paid based off sugar content, why would it be important for them to raise a crop with a higher sugar content? What are some things we eat that include sugar?

Additional Resources:

- Video of sugar beet harvest at Hein Farms, Ballantine: https://www.youtube.com/watch?v=XYHtX9Dpc-g&t=3s
- KTVQ interview with Hein family: https://www.youtube.com/watch?v=oGVYIhYurco

BARLEY

Time 8:27 – Discussion 5

Q: What type of crop is Nikki holding?

A: Barley

Discussion: If students answer wheat, explain what an awn is and the difference in length. Wheat's awns are much shorter than barley awns.

Time 9:12 – Discussion 6

Q: What type of products do we get from harvesting and processing barley?

A: Malted milk balls, malted milk shakes, cattle feed, beer, barley soup, straw, etc.

Discussion: Barley grain and barley straw are harvested differently. Encourage students to think about this difference. Farmers use combines to separate the grain from the plant. They use balers to gather the straw. Bales can be round or square!

Additional Resources:

- Barley Harvest in Billings Montana video: https://www.youtube.com/watch?v=UhjfggLhaCY&t=32s
- Montana Barley Production Guide: https://store.msuextension.org/publications/AgandNaturalResources/EB0186.pdf

WHEAT

Time 10:52 – Discussion 7

Q: What type of crop is Nikki holding?

A: Wheat

Discussion: Question students about wheat coloring. Why is wheat green at first and then golden colored? Does it have to do with the plant's maturity?

Time 11:10 – Discussion 8

Q: What types of wheat do we mainly grow in Montana?

A: Hard red winter wheat, hard red spring wheat, and durum

Discussion: Discuss the different uses of wheat types. Wheat is divided into 6 major classes that vary by variety of wheat and their protein and gluten contents. For example, hard wheats usually have higher protein then soft wheat. Because of that, they are best for making bread, whereas soft wheats are better for making cookies, pastries, cakes, and crackers. Durum wheat is a high protein wheat but does not make good bread because it is not high in gluten. The most common application for Durum wheat is pasta.

Time 12:06 – Discussion 9

Q: What food product do we get out of grinding wheat?

A: Flour

Discussion: How do we as consumers use flour? What are some products we make or consume that use flour?

Time 13:09 – Discussion 10

Q: How is wheat transported from the grain elevator to the coast or processing facility?

A: Train

Discussion: Why is a train the best mode of transportation compared to a semi or airplane?

Additional Resources:

- Wheat Fun Fact Sheet: https://www.kfb.org/page/file?path=Files%2Fpage-161%2Fwheat%2FWheatFunFactGuide.pdf
- Montana Wheat Production Guide: https://carbon.msuextension.org/documents/ag%20wheat%20prod.pdf
- Montana Kids Wheat Information: https://montanakids.com/agriculture_and_business/crops/Wheat.htm

CORN

Time 16:24 – Discussion 11

Q: How tall do you think the field corn is?

A: Approximately 8 feet

Discussion: Why do you think field corn is taller than sweet corn? Do you think it has something to do with their uses? With field corn, farmers want to grow corn that gets tall so that it will create a lot of tonnage to feed their cattle. Sweet corn needs to focus its energy on producing a yummy ear of corn for people to eat, rather than growing tall.

Time 18:30 – Discussion 12

Q: Aside from feeding corn to livestock, what are some other uses?

A: Corn starch, corn meal, corn bread, Corn Chex, Corn Flakes, ethanol, etc.

Discussion: Ask students what corn products they have consumed.

Additional Resources:

- Corn Harvest in Montana, Pompey's Pillar (combine) video: https://www.youtube.com/watch?v=MGcGcsrkAaQ
- Corn Facts just for Kids: https://www.factsjustforkids.com/food-facts/corn-facts-for-kids.html
- Montana Kids Corn Information: https://montanakids.com/agriculture_and_business/crops/Corn.htm

ALFALFA

Time 26:34 – Discussion 13

Q: Aside from small squares and large round bales, what is the other shape of bales we commonly see?

A: Large squares or rectangles

Discussion: Encourage your class to think of the reasons for different sizes. Why would farmers and ranchers want different sized bales?

Time 28:07 – Discussion 14

Q: Alfalfa is different from the other crops as it's a perennial plant. What is the difference between annual plants and perennial plants?

A: Annual plants live for one growing season and then die, while perennials regrow every spring.

Discussion: Ask your students to brainstorm other examples of annual and perennials plants.

Time 30:08 – Discussion 15

Q: Assuming a cow weighs 1400 pounds, eats 2.5% of her body weight per day, a round bale weighs 1300 pounds and a small square bale weighs 50 pounds, how many cows can a rancher feed from each type of bale?

A: 1400 lb cow x 0.025 = 35 lbs of alfalfa hay

1300 pound bale / 35 pounds of hay per cow = 37.14 cows → approximately 37 cows

50 pound bale / 35 pounds of hay per cow = 1.43 cows → approximately 1 cow

Discussion: Alfalfa hay is an excellent source of protein for cattle. Brainstorm food items we eat that are good sources of protein. Examples may be eggs, almonds, meat, and beans.

Additional Resources:

- Alfalfa Swathing and Baling: https://www.youtube.com/watch?v=7l4rsqrRrWo
- Alfalfa Facts: https://www.softschools.com/facts/plants/alfalfa_facts/1147/
- Establishing a Successful Alfalfa Crop: http://animalrange.montana.edu/documents/extension/alfalfaest.pdf