Program Excellence Award Application

Kids, Compost, Crops & Consumption

Applicant Information:
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Narrative:
The Kids, Compost, Crops & Consumption program is partially grant funded and led by area and county staff. During the January 2015 event called Ag and YOUth held in Stutsman County, the common response from 95 students when asked about livestock manure was “eww, gross” or “it smells bad”. The response was similar among 2,266 fourth graders from Cass County schools who participated in the Living Ag Classroom during the spring of 2015.

The average American consumer is three to four generations removed from agriculture and according to the Centers for Disease Control and Prevention, 92% of children in North Dakota do not eat enough vegetables to maintain a healthy diet.

A multidisciplinary team was created during the summer of 2015 to build a program that would include not just kids and compost, but the entire food cycle! The team includes area specialists and county agents with discipline focuses in livestock, compost, soil, horticulture, and nutrition. The objectives are that students will learn about agriculture and where their food comes from, will grow their own garden, and will increase vegetable consumption. The first Kids, Compost, Crops & Consumption was piloted to 80 third- and fourth-graders at a low-income school in the Fargo School District from January through May of 2016. Each month, one team member went into the classrooms and taught a section of the food cycle. The lessons consisted of:

- Livestock production
- How compost recycles plant and livestock manure into a valuable resource for crop production
- How soil supports livestock and crop production
- Root development, required nutrients for plant growth and photosynthesis
- Health benefits of vegetables and how to incorporate vegetables into their diet

Each lesson incorporated presentational aids that the students could not only see but could smell, touch, taste, or feel as well. The livestock production lesson included animal feeds that the students
could smell and touch. The composting lesson included a mystery bucket that the students were able to shake and fresh manure (in a baggie!) that they could squeeze. During the soils lesson, the students pretended to be soil particles and learned about soil structure. The root development lesson incorporated hand drawings of root systems and the nutrition lesson included tasting foods that had been talked about during the program. Each lesson also incorporated structured exercise where we spent at least five minutes teaching the students how to stay active. The last lesson was a review of each previous lesson. With grant funds from the North Dakota Nutrition Council and the North Dakota FFA Foundation and the help of Northern Cass FFA, we were able to purchase supplies and assemble square-foot garden boxes for each student to take home for the summer. The boxes were filled with all the necessary supplies to plant spinach as well as recipes to follow so the students would have ideas for healthy snacks and meals. Students were also sent home with a formatted paper where they could record the progress of their growing plants during the summer.

Each month, a newsletter was created as a review of the current lesson with the idea that the student’s family could learn as well. For the final class, a review newsletter containing all the information shared was created.

Knowledge improvement was measured with pre and post program evaluations. Some of the impacts include:

- 97 percent know livestock use plants as food.
- Before the program, only 41% of students correctly answered that paper is a material that can be composted in comparison to 78% after the program, which is a 37% increase.
- 68% of the students were able to correctly identify photosynthesis as the life cycle that uses sunlight energy as well as carbon dioxide to make sugar and oxygen in the post evaluation.
- Only 20% of the students correctly answered sand as the largest soil particle in the pre evaluation in comparison to 75% in the post evaluation, which is a 55% increase in knowledge.
- 91% of students correctly answered that fruits and vegetables contain vitamins and minerals that help our brain, eyes, heart, skin and teeth.
- 85% of students indicated that they are more willing to try new fruits and vegetables since the program started.

Behavior change and success of the at-home gardening project will be measured at the beginning of the 2016 school year. The program is going to be piloted in three counties during the 2016-2017 school year in various scenarios such as a single agent office, multiple agent office, and an after-school program to ensure successful implementation can be replicated in a variety of settings. After that, the program will be made available to any Extension agent who wishes to share this program in their county.

Supporting Materials for this Program of Excellence Award application:

- Review of each lesson with objectives and photos.
- Example newsletters for each lesson.
- Example Leaders Guide that will be included in the final packaged program. Lesson 1 is included for this application.
- The evaluations that were used for the program. You will find included a pre-evaluation (given prior to starting the first lesson), a post-evaluation (given immediately following the last lesson), and a follow-up evaluation (given during the first 2 weeks of school following summer break).
Kids, Compost, Crops and Consumption

The Situation
According to the Centers for Disease Control and Prevention, 92 percent of children in North Dakota do not eat enough vegetables. Also, the average American consumer is three to four generations removed from agriculture.

Extension Response
Youth participating in the Kids, Compost, Crops and Consumption program learned about nutrition, agricultural production and where their food comes from. This program was piloted to 80 third- and fourth-graders at a low-income school in the Fargo School District.

The program consisted of six lessons taught once a month throughout the school year. Each lesson focused on a different part of the food cycle:

- Livestock production
- How compost recycles plant and livestock manure into a valuable resource for crop production
- How soil supports livestock and crop production
- Root development, required nutrients for plant growth and photosynthesis
- Health benefits of vegetables and how to incorporate vegetables into their diet

The final lesson was a review of the previous lessons. Each student was provided with a square foot garden and all of the necessary supplies and information to grow spinach during the summer. Students also received two recipes for using spinach and tasted those recipes before the lesson ended. Every lesson also promoted daily physical activity.

Success of the at-home gardening project will be measured at the beginning of the 2016 school year.

Impacts
Students improved their knowledge of nutrition, composting and agriculture. For example:

- 97 percent know livestock use plants as food.
- 78 percent know paper can be composted, compared with 41 percent before the program.
- 68 percent correctly defined photosynthesis as the life cycle that uses sunlight energy and carbon dioxide to make sugar and oxygen.
- 75 percent correctly answered that sand is the largest soil particle, compared with 20 before the program.
- 85 percent indicated they are more willing to try new fruits and vegetables.
- 91 percent know fruits and vegetables contain vitamins and minerals that help our brain, eyes, heart, skin and teeth.

Educating students about the nutritional requirements of a healthy diet and about agriculture production teaches them where their food comes from and may begin to provide food security.

Feedback From Teachers

- “We appreciate all of your work and patience with our students. You made it hands-on, interesting and something they will remember. Thank you for all of your work and effort!”
- “The most valuable part of the program was exposing the students to agriculture in ways they have not experienced. Very hands-on and having something to take home to try was excellent. As one student said, ‘Showing us real life.’”

Team Members
Mary Berg – Area Livestock Environmental Management Specialist
Alicia Harstad – Extension Agent, Stutsman County
Kelcey Hoffmann – Extension Agent, Cass County
Nikki Johnson – Area Community Health and Nutrition Specialist
Todd Weinmann – Extension Agent, Cass County
Kids, Compost, Crops and Consumption
Lesson 1 – Livestock

Lesson Objectives – Students will learn:
• What livestock eat and where they are raised
• What products come from livestock

Showing students what different livestock feed looks and smells like.

Explaining the basics of livestock production and what products come from livestock.
Lesson 2 – Compost

Lesson Objectives – Students will learn:

- What materials can be composted
- Livestock manure can be recycled through composting
- The same nutrients found in livestock manure are needed by plants

Explaining how livestock manure and food scraps can be recycled into compost which is a valuable resource for plants.

Staying active! Students participate in physical activity during the compost lesson.
Lesson 3 – Soils

Lesson Objectives – Students will learn:

- Difference between sand, silt and clay soil particles and how they influence water and nutrients in the soil
- Plants take up nutrients and water from the soil which they need to live

Students feeling soil before water infiltration demonstration.

Students acting as soil particles to illustrate the difference in pore space between sand, silt and clay particles.
Lesson 4 – Plants

Lesson Objectives—Students will learn:

- How plants grow and about the photosynthesis process
- The difference between a taproot and fibrous root

Learning about different vegetable roots.

Students learning about photosynthesis.
Lesson 5 – Nutrition

Lesson Objectives—Students will:

- Identify different examples of fruits and vegetables
- Recognize how fruits and vegetables play an important role in their health
- Learn the key vitamins and minerals found in fruits and vegetables
- Taste new fruits and vegetables with an open mind

Students learning color groups of fruits and vegetables and what part of the body they help.
Learning how to make spinach and pepper quesadillas.

Student trying a sample of spinach and pepper quesadilla.
Lesson 6 – Review and Planting the Spinach Garden

Lesson Objectives– Students will:
• Review learning objectives from each previous lesson
• Learn how to set up and plant a spinach square foot garden
• Sample two different spinach recipes
• Exercise with Thundar, NDSU athletic mascot

Review of previous lesson plans. Students learned how each lesson connects with each other in food cycle.

Each student went home with a spinach square foot garden kit which included all the material needed to grow spinach and two spinach recipes.
Students learning how to assemble their spinach square foot gardens.

Thundar leading the Cha Cha Slide dance.
Thumbs up, thumbs down! Students vote if they like the two spinach recipes after eating a sample.

Students who participated in the Kids, Compost, Crops and Consumption program.
Agricultural animals have an important role in our world by providing us with food, fuel, fertilizer, and other products. These animals eat plants that humans may not be able to consume and graze on land that may not be suitable for growing crops. Today, we discussed different agricultural animals, what they consume, and what they provide to our food cycle.

**Cows Facts:**
- Cows are able to see color.
- Cows can smell something up to 5 miles away.
- Cows have 4 stomachs.
- Cows eat corn, hay, grass, oats, and barley!
- Cows provide us with meat and leather.

**Sheep Facts:**
- One pound of sheep wool can potentially make up to 10 miles of yarn.
- Sheep have 32 permanent teeth.
- A group of sheep are called a “flock.”
- Sheep eat hay, grass, and oats!
- Sheep provide us with meat, leather, clothing, and soap.

**Dairy Facts:**
- Dairy cows are milked 2 to 3 times a day.
- A single dairy cow will produce 6 to 8 gallons of milk per day. That is about 90 glasses of milk a day!
- A dairy cow will eat about 100 pounds of nutritious feed and drink between 30 and 50 gallons of water each day.
- Dairy cows provide us with milk, meat, and leather.

Sources:
- https://www.midwestdairy.com/schools-and-communities/farm-to-school/
- http://oklahoma4h.okstate.edu/aitc/lessons/extras/facts/cattle.html

Photo credits: NDSU.

This issue’s author: Kelsey Hoffmann, Extension Agent, Agriculture and Natural Resources, Cass County. Other contributors and KCCC committee: Mary Berg, Area Extension Specialist, Livestock Environmental Management, Carrington Research Extension Center. Alicia Harstad, Extension Agent, Agriculture and Natural Resources, Stutsman County. Todd Weinmann, Extension Agent, Agriculture and Natural Resources - Horticulture, Cass County. Nikki Johnson, Extension Agent, Youth Nutrition Programs - EFNEP and Family Nutrition Program, Cass County.
Recipe: ONE-DISH BEEF STROGANOFF
Total Recipe Time: 30 to 35 minutes
Makes 4 servings

INGREDIENTS
1 pound Ground Beef (93% lean or leaner)
1/2 pound sliced button or cremini mushrooms
3 cloves garlic, minced
1 tablespoon chopped fresh thyme or 1 teaspoon dried thyme leaves
2 cups uncooked whole grain wide noodle-style pasta
1 can (14-1/2 ounces) reduced-sodium beef broth
1 cup frozen peas
1/4 cup regular or reduced-fat dairy sour cream plus additional for topping
1 tablespoon regular or coarse-grain Dijon-style mustard
Salt and pepper

INSTRUCTIONS
1. Heat large nonstick skillet over medium heat until hot. Add Ground Beef, mushrooms, garlic and thyme; cook 8 to 10 minutes, breaking Ground Beef into 3/4-inch crumbles and stirring occasionally.
2. Stir noodles and broth into beef mixture. Bring to a boil. Cover and cook 9 to 10 minutes or until noodles are tender, stirring twice. Stir in peas; continue cooking, uncovered, 3 to 5 minutes or until peas are heated through, stirring occasionally.
3. Remove from heat; stir in 1/4 cup sour cream and mustard. Season with salt and pepper, as desired. Garnish with additional sour cream, if desired.

TEST KITCHEN TIPS
• Cooking times are for fresh or thoroughly thawed Ground Beef. Ground Beef should be cooked to an internal temperature of 160°F. Color is not a reliable indicator of Ground Beef doneness.
• One pound beef Top Sirloin Steak Boneless, cut 1-inch thick may be substituted for Ground Beef. Cut beef steak lengthwise in half, then crosswise into 1/8-inch thick strips. Heat 1 teaspoon oil in large nonstick skillet over medium-high until hot. Add half of beef; stir-fry 1 to 2 minutes or until outside surface of beef is no longer pink. Remove from skillet. Repeat with 1 teaspoon oil and remaining beef. Keep warm. Heat 2 teaspoons oil in same skillet. Add mushrooms; cook and stir 3 to 5 minutes or until mushrooms are tender and begin to brown. Add noodles, broth, garlic and thyme; bring to a boil. Cover and cook as directed in Step 2, returning beef to skillet and stirring in peas as directed. Remove from heat and continue as directed in Step 3.

NUTRITIONAL FACTS
Nutrition information per serving, using 93% lean Ground Beef: 444 calories; 12 g fat (5 g saturated fat; 4 g monounsaturated fat); 86 mg cholesterol; 616 mg sodium; 48 g carbohydrate; 6.6 g fiber; 38 g protein; 14.4 mg niacin; 0.6 mg vitamin B6; 2.4 mcg vitamin B12; 5.7 mg iron; 25.0 mcg selenium; 7.8 mg zinc; 101.2 mg choline.
This recipe is an excellent source of fiber, protein, niacin, vitamin B6, vitamin B12, iron, selenium and zinc; and a good source of choline.
Nutrition information per serving, using Top Sirloin Steak: 457 calories; 13 g fat (4 g saturated fat; 4 g monounsaturated fat); 82 mg cholesterol; 322 mg sodium; 48 g carbohydrate; 6.6 g fiber; 39 g protein; 17.8 mg niacin; 0.8 mg vitamin B6; 1.5 mcg vitamin B12; 4.5 mg iron; 36.7 mcg selenium; 6.7 mg zinc; 118.3 mg choline.
This recipe is an excellent source of fiber, protein, niacin, vitamin B6, vitamin B12, iron, selenium, zinc and choline.

http://www.beefitswhatsfordinner.com/recipe.aspx?id=5698#InstructionsTab
Compost is a mixture of organic residues that has been piled, mixed, moistened and undergone thermophilic decomposition. The results of this process is a crumbly, low odor, stable nutrient-rich soil amendment that lacks viable weed seeds and pathogens. The final product has also decreased 50% in volume.

**Site Selection:** Select a site with good drainage to eliminate pooling which can cause pest issues or unwanted odors. Be aware of surface water and make sure that runoff cannot contaminate it.

**Piling:** A cone-shaped pile is preferred, to promote proper air movement for aerobic (with oxygen) decomposition.

**Moisture:** Compost piles work best with 50% moisture and 50% dry matter. The microbes (“good bugs”) present in the compost pile need both oxygen and water to function correctly. To test the moisture level, grab a handful of compost and squeeze it. If water runs out of your hand while squeezing, the compost is too wet. If nothing runs out and the compost is very crumbly, it is too dry. If there is a little moisture on your glove when you squeeze and the compost is not crumbly, the moisture level will be very close to 50%!

**Temperature:** In order to kill pathogens (“bad bugs”) and weed seeds, the temperature of the compost pile must reach 131 degrees Fahrenheit for 15 days. Temperature increases when the C:N ratio and moisture levels are correct. A compost thermometer can help determine the current temperature of the compost pile.

**Mixing:** Mixing and turning the compost pile will keep oxygen in the pore spaces and redistributes moisture. Maintaining correct oxygen and moisture levels in the compost pile keeps the temperature where it needs to be!

**Finished Product:** When the compost has been turned 5-6 times and the temperature no longer increases, the compost is finished. Compost needs to cure (sit without being disturbed) for at least a month after it’s finished, then the cured compost can be used as a fertilizer in large fields (wheat, corn) or mixed with potting soil and used in gardens or flower pots!

**C:N Ratio:** Carbon (C) and nitrogen (N) content vary greatly among composting materials. Carbon is found in the “brown” ingredients in a compost pile while nitrogen is “green”. In a compost pile, the ideal C:N ratio range is 20:1 to 40:1.

**Worms:** Sometimes worms, Eisenia fetida (red wigglers), are added to compost piles to enhance the process as they break down large items. We will add worms to the classroom compost bin this Spring!


References:

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No, this recipe doesn’t USE compost — it’s just for fun. But it will remind you about what we learned. Compost is good stuff!

Recipe: DIRT CUPS
Total Recipe Time: 1 hour and 15 minutes
Makes 10 servings

INGREDIENTS
- 1 3.9 oz package chocolate flavor instant pudding
- 2 cups cold milk
- 2 cups whipped cream
- 15 chocolate sandwich cookies, finely crushed
- 10 worm-shaped chewy fruit snacks

INSTRUCTIONS
1. Beat pudding mix and milk in a large bowl with a whisk for 2 minutes. Let stand 5 minutes.
2. Stir in whipped cream and 1/2 cup cookie crumbs.
3. Spoon into 10 (6– to 7– oz.) paper or plastic cups. Top with remaining cooking crumbs.
4. Refrigerate 1 hour. Top with fruit snacks just before serving.

TEST KITCHEN TIPS
- For easy preparation, substitute 1 8oz tub of (thawed) whipped topping in place of the real whipped cream.
- Save 60 calories and 4 grams fat per serving by preparing with sugar-free pudding mix, fat-free milk, lite whipped topping, and reduced fat cookies.
- Dirt cups can be served frozen. Prepare as directed, except for the gummy worms; cover tightly with foil. Freeze 3 hours or until firm. Add the gummy worms just before serving.
- How to crush cookies: place cookies in a resealable plastic bag, roll with a rolling pin until finely crushed. Or, process in a food processor until finely crushed.

NUTRITIONAL FACTS
Nutrition information per serving: 240 calories; 9 g fat (6 g saturated fat); 5 mg cholesterol; 280 mg sodium; 36 g carbohydrate; 1 g fiber; 3 g protein.

http://www.kraftrecipes.com/
February 2016

Kids, Compost, Crops, & Consumption

Soils support plant life and plant life supports animal life.

All living things depend upon soil.

Plants receive nutrients and water through their roots from the soil.

What about Soil Testing?

In order to make sure our garden soil has enough nutrients to support plant growth, a soil test should be conducted to make sure the right about of fertilizer is added.

Over application of fertilizer can cause nutrients to leach into the water systems which can cause pollution.

Steps for soil sampling include:

A. Sample the soil from several areas in your garden
   1. Remove non-soil (grass, thatch, leaves, plastic, etc.) layer from the surface of sampling location and sample the soil to a depth of 6 inches.
   2. Soil samples can be collected with either a soil probe or a standard spade shovel.
   3. Place the soil from each area into a bucket and mix them all together. This becomes the composite sample for your garden.

B. Place some of this soil (about 1 pint) into a soil sample bag or any type of container/bag.

C. Label the bag with your name, phone number and sample ID. Fill out the lab information sheet obtained from the soil testing lab and include with sample. Send sample to a soil testing lab. NDSU soil testing lab can conduct soil samples for homeowners. To obtain a soil testing information sheet go to: www.ndsu.edu/soils/services/ or contact your local Extension agent.

Soil is made up of several layers which make up the soil profile.

There are three different soil particles: sand, silt and clay.

- Sand particles are large and allow water to filter through the soil.
- Silt are medium-sized particles.
- Clay are small sized particles that help hold the soil together.

References and sources:

http://assoc.garden.org/courseweb/course1/week1/page8.htm
www.agintheclassroom.org/TeacherResources/AgMags/Interactive_soil_agmag.pdf


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Recipe: Make Your Own Soil Profile Snack

Using breakfast cereal, you can make a mock soil profile showing the different layers you could see if you dug a deep hole in the earth. While soil texture varies from location to location, all soil types can be divided into layers.

1. In a clear plastic cup, first place in about 2-3 tablespoons of Kix cereal. These represent the rocks in the ground.

2. Next, add 1-2 tablespoons of Rice Krispies. This represents the subsoil, which is not as dark and rich as the top soil.

3. The topsoil comes next, so add an additional 1-2 tablespoons of Cocoa Krispies to represent topsoil.

4. Sprinkle a little Raisin Bran on top to represent leaves and debris on the soil surface.

Got milk? Pour about one-third of a cup of milk in the cup. Watch the milk as it flows through the cracks to the bottom of the cup. This is called percolation.

**Percolation occurs when water fills up the spaces between the soil particles.** If the space is all filled with water, the ground is soggy or even flooded. When the ground is frozen, like it is in late winter, the water cannot go all the way to the aquifer (groundwater) beneath and within the parent material layer. When the ground thaws, this water goes into the ground. Percolation is not just important because it allows water to reach the roots of plant. It is also very important because the soil filters the water as it percolates through.

But your profile isn’t made of soil; it’s cereal. So eat and enjoy.

(credit: Illinois Ag Mag Soil www.agintheclassroom.org/TeacherResources/AgMags/Interactive_soil_agmag.pdf)
March 2015

Kids, Compost, Crops, & Consumption

Roots are not all the same. Some plants, such as carrots, have tap roots. Other plants have fibrous roots, like grass or beans. Some plants have both types of roots: an example is an oak tree. And some vegetables, like potatoes, grow underground but are not a root at all.

Carrot Facts:
- Carsrots are usually orange in color, though purple, black, red, white, and yellow varieties exist.
- Carrots have a higher natural sugar content than all other vegetables with the exception of beets, making them a wonderful snack when eaten raw and a tasty addition to a variety of cooked dishes.
- A baby carrot isn’t exactly a baby. Baby carrots come from a large carrot that has been rolled over blades and thrown around in a metal cage to be rubbed down to a short, round-ended baby carrot.

Potato Facts:
- Potatoes are tubers, which, although they grow underground, are actually enlarged stems, rather than enlarged roots.
- Potato skins are edible and a good source of fiber.

Tomato Facts:
- When people think of tomatoes they think red, but they also grow in the colors of: green, yellow, orange, pink, black, brown, white, and purple.
- Because the tomato has seeds and grows from a flowering plant it is a fruit.
- The largest producer of tomatoes is China, then the United States and then India.

This issue’s author: Todd Weinmann, Extension Agent, Agriculture and Natural Resources - Horticulture, Cass County. Other contributors and KCCC committee: Mary Berg, Area Extension Specialist, Livestock Environmental Management, Carrington Research Extension Center. Alicia Harstad, Extension Agent, Agriculture and Natural Resources, Stutsman County. Kelsey Hoffmann, Extension Agent, Agriculture and Natural Resources, Cass County. Nikki Johnson, Area Extension Specialist, Community Health and Nutrition, NDSU and University of Minnesota.

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Recipe: Oven-Roasted Potatoes, Carrots, and Tomatoes

Minutes to Prepare: 20
Number of Servings: 4

INGREDIENTS
- 4 Large Potatoes
- 4 Large Carrots
- 12 Grape Tomatoes
- 2 Tablespoons Extra Virgin Olive Oil
- Salt and Pepper as desired

DIRECTIONS
1. Preheat the oven to 375 degrees and set the oven rack in the middle of the oven.
2. Chop the tomatoes and carrots into 1/2 inch pieces. Chop the grape tomatoes in half.
3. Place red potatoes, carrots, and tomatoes in a bowl; season with salt and pepper and toss with olive oil until evenly coated.
4. Place in a single layer in a 10x12 inch pan.
5. Cook in the preheated oven for 30-45 minutes or until vegetables are tender.

Serving Size: Makes approximately 4 - 1 cup servings
Tips: You can also try different seasonings to add additional flavor.

Try this recipe on the grill!

https://recipes.sparkpeople.com
Eat the **RAINBOW**

Fruits and vegetables come in a variety of colors. There are five different color groups of fruits and vegetables and each color provides us with a different nutrient.

**Red:** Lycopene, a phytonutrient that is important in protecting our heart. Vitamin C is also found in red fruits and vegetables and is important for keeping our skin healthy and our immune system strong.

**Orange and Yellow:** Vitamin A helps our eyes. It is needed to help our eyes adjust from light to dark.

**Green:** Lutein, another phytonutrient, also helps our eyes.

**Blue and Purple:** Phenolics are a phytonutrient that keeps our memory sharp.

**White and Tan:** Potassium aids in regulating blood pressure.

### How many fruits and vegetables should we eat each day?

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<td>9-13</td>
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<tr>
<td>14-18</td>
<td>2 ½ cups</td>
<td>3 cups</td>
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Did you know fruits and vegetables are full of fiber?

Fiber has many jobs in our body, like cleaning out our intestines, keeping us fuller longer, and lowering cholesterol levels.

References and sources:
- Quesadilla photo courtesy pexels.com and via CC0.
- Food-healthy vegetables-potatoes image courtesy pexels.com and stockpic.com via CC0.
Recipe: Colorful Quesadillas
Makes: 8 servings

INGREDIENTS
8 ounces fat-free cream cheese
1/4 teaspoon garlic powder
8 flour tortillas (small)
1 cup sweet red pepper (chopped)
1 cup low-fat cheese (shredded)
2 cups fresh spinach leaves
OR 9 oz. frozen spinach, thawed and squeezed dry

DIRECTIONS
1. In a small bowl, mix the cream cheese and garlic powder.
2. Spread about 2 tablespoons of the cheese mixture on each tortilla.
3. Sprinkle about 2 tablespoons bell pepper and 2 tablespoons cheese on one half of each tortilla.
4. Add spinach: 1/4 cup if using fresh leaves OR 2 Tablespoons if using frozen. Fold tortillas in half.
5. Heat a large skillet over medium heat until hot. Put 2 folded tortillas in skillet and heat for 1-2 minutes on each side or until golden brown.
6. Remove quesadillas from skillet, place on platter and cover with foil to keep warm while cooking the remainder.
7. Cut each quesadilla into 4 wedges. Serve warm.

Nutrition Information (For 4 wedges or 1 quesadilla)

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</table>

*Percent Daily Values are based on a 2,000 calorie diet.

Recipe from Iowa State University Extension at https://www.whatscooking.fns.usda.gov/recipes/supplemental-nutrition-assistance-program-snap/colorful-quesadillas
Compost is organic residue that has been piled, mixed, moistened and undergone thermophilic decomposition, resulting in a crumbly, low odor, stable nutrient-rich soil amendment that lacks viable weed seeds and pathogens and has decreased 50% in volume.

Soils support plant life and plant life supports animal life. All living things depend upon soil. Plants receive nutrients and water through their roots from the soil.

Agricultural animals provide food, fuel, fertilizer, and other products. These animals eat plants that humans may not be able to consume and graze on land that may not be suitable for growing crops.

Fruits & vegetables are full of nutrients that help us grow and be healthy. Fruits and vegetables come in a variety of colors that provides us with different nutrients.

Roots are not all the same. Plants like carrots have tap roots. Fibrous roots grow in grass or beans. Some plants have both types of roots: an example is an oak tree. And some vegetables, like potatoes, grow underground but are not a root at all.


Sources:
University of Minnesota Extension
Photo credits: NDSU Extension Service and Flickr.

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Recipe: SPINACH AND STRAWBERRY SALAD
Total Recipe Time: 30 minutes. Makes 6 servings.

**INGREDIENTS**
- 2 bunches spinach, rinsed and torn into bite-sized pieces
- 2 cups sliced strawberries
- 1/2 cup vegetable oil
- 1/4 cup white wine vinegar
- 1/4 cup white sugar
- 1 tablespoon poppy seeds

**DIRECTIONS**
1. In large bowl, toss spinach and strawberries together.
2. In medium bowl, whisk oil, vinegar, sugar, and poppy seeds together to make dressing.
3. Right before serving, pour desired amount of dressing over spinach mixture and toss to coat.

**Note:** Store extra dressing in the refrigerator.

**TIPS & VARIATIONS**
- STORE poppy seeds in the freezer to maintain freshness.
- CHILDREN CAN tear spinach into bite-sized pieces.
- OLDER CHILDREN CAN hull and slice strawberries; younger children can use a plastic knife.
- CHILDREN CAN measure and “dump” ingredients.
- FOR EXTRA NUTRITION, toss in some nuts, such as slivered almonds or coarsely chopped walnuts.

**NUTRITIONAL FACTS:** Serving Size: 1 portion; Calories: 269; Fat: 20g; Saturated Fat: 2g; Cholesterol: 0mg; Sodium: 91mg; Potassium: 815mg; Carbohydrates: 22g; Fiber: 5g; Sugar: 14g; Protein: 5g; Calcium: 17%; Iron: 22%; Vitamin A: 355%; Vitamin C: 102%

Recipe from University of Minnesota Extension

Recipe: Spinach Artichoke Dip (Slow Cooker)
Total Recipe Time: 4 hours. Makes 20 servings.

**INGREDIENTS**
- 2 (14-ounce) cans artichoke hearts, drained and coarsely chopped
- 1 (10-ounce) package frozen spinach, thawed, drained, squeezed dry
- 1 c. shredded part-skim mozzarella cheese
- 1/4 c. grated Parmesan cheese
- 1 c. fat-free Greek yogurt, plain
- 2 (8-ounce) blocks 1/3-less-fat cream cheese, softened and cut into 1/2-inch cubes
- 4 cloves garlic, minced
- 1/2 tsp. crushed red pepper flakes
- 1/2 tsp. ground black pepper

**DIRECTIONS**
1. If time allows, place spinach in the refrigerator overnight to thaw. Otherwise, run hot water over spinach until it has thawed.
2. Coat slow cooker with cooking spray.
3. Add all ingredients to slow cooker. Stir to combine, cover and cook until heated through, 1 1/2 to two hours on high or three to four hours on low.
4. Serve warm with raw fresh veggies such as baby carrots; red, orange, yellow or green bell pepper strips; broccoli; cauliflower; zucchini; and/or sugar snap peas.

**NUTRITIONAL FACTS:** Serving Size: 1/4 cup. Per Serving: 100 calories, 5 grams (g) fat, 7 g protein, 8 g carbohydrate, 4 g fiber and 300 milligrams sodium.

Recipe from North Dakota State University Extension
Add your picture here!

On ______ I planted _______ with _____________ 
(date) Kind of seed Did anyone help you?

On ______ I noticed that ___________________ 
(date) 
What did you see? What does it look like?

On ______ I harvested my garden and _____________ 
(date) 
What did you do? What recipe did you make?

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LESSON 1 - LIVESTOCK

Target Audience: 3rd and 4th Grade

Time: 60 minutes

Objectives:
Participants will be able to:
• Identify examples of livestock.
• Identify examples of products from specific livestock.

Equipment/Supplies:
• Presurvey copies
• Feed samples (labeled in zip-top bags)
  • Hay, corn, silage, oats, soybean meal
  • Water bucket
• Cattle by-products
• Football, soap, chalk, lipstick
• Dairy products
  • Milk, butter, cheese, yogurt
• Sheep by-products
  • Roll of yarn, crayons, glue, candle
• Pig by-products
  • Paint brush, soap, leather gloves
• Example photos
  • Hamburger, steak, roast
  • Beef cow
  • Dairy cow
  • Sheep
  • Lamb chops
  • Pig
  • Ham, bacon, pork chops

Equipment/Supplies continued:
• Chores on the Farm – Feed Relay
  • Buckets
  • Feed

Additional Resources:
www.midwestdairy.com/schools-and-communities/farm-to-school/

Introduction:
Introduce yourself and assistants/partners.

Provide an overview of the program:
How many of you know where your food comes from? Did you know food doesn’t just appear at the grocery store! Over the next few months we are going to learn about the food cycle. (Ask students to make a circle with their arms to imitate a circle.) Everything in the cycle is connected in some way.

Today we will start with livestock.

Presurvey:
Before we begin our lesson you will take a short presurvey to find out what you already know. Don’t worry these won’t be graded and you don’t need to write your names on them.
Livestock – First Stop on the Food Cycle
Utilize the example pictures and products when covering the following material.

Who can tell me what all of these items (hamburger picture, yarn, carton of milk) have in common? – All of these things come from animals we raise on farms and ranches. We call these animals livestock.

Today our lesson is all about livestock. We’ll talk about what these animals eat, where they live and how they fit into the food cycle.

Cattle
Can anyone tell me what this picture is of? – Cow
What sound do cows make? – Moo!
Cows come in all sorts of colors such as brown, white, black and red and many different types such as a dairy cow and a beef cow.
Does anyone know what a baby cow is called? – Calf
The calf’s mother is called a cow and the father is called a bull.
Does anyone have a guess as to how many years a cow can live? – 12 to 15 years old.

What do cows eat?
A cow’s diet (food) is made up of many things including hay, corn, silage, oats and water.
Pass around the feed bag samples and hold up the water bucket.
Cows can eat up to 50 pounds of food a day and drink 35 gallons of water! Wow that’s a lot.

Where do cows live?
During the summer, cows spend most of their time out in grassy pastures where they eat lots of grass and enjoy the sun.
In the winter, cows spend their time around the barn and some prepare to have a calf. They spend most of their days walking, eating and sleeping.

Cows and the food cycle
Remember I mentioned their were different types of cows. Does anyone remember the examples I gave? - Dairy cow and beef cow - (show picture)

These cows contribute different things to our food cycle.
A dairy cow provides us with milk. Dairy cows can be milked two to three times a day. Does anyone have a guess as to how much milk a dairy cow can produce in one day? – 6-7 gallons of milk a day! That’s almost 90 glasses of milk!
The milk can be made into many different dairy products such as cheese, butter, yogurt and ice cream (show pictures).
Dairy products are an important part of our diet. Dairy provides us with important nutrients for use to be healthy. Does anyone have a guess what the important nutrient is that helps us build strong bones? – Calcium! One serving of milk has about 300 milligrams of calcium.

Do you know how many servings of dairy you should be getting each day? – Boys and girls your ages should get 3 servings of dairy each day.
Beef cows contribute different things to our food cycle. Does anyone have a guess as to what they are? – Meat (hamburger, steaks and roasts).
The meat from these cows are good sources of protein.
What does our body use protein for? – To build strong muscles! Servings for protein are measured in ounce equivalents. Boys and girls your age need about 5 ounce equivalents each day to grow tall and strong.
Cows are used to make other things we use such as a football, soap, chalk and lipstick. How many of you knew cows were a part of making these things?
Does anyone have any questions about cows?
Sheep
Can anyone tell me what this picture is of? - Sheep
What sound do sheep make? – Baa!
Does anyone know what a baby sheep is called? – lamb
The lamb’s mother is called a ewe and the father is called a ram.
Does anyone have a guess as to how many years a sheep can live? – 6 to 11 years old

Here’s a fun fact! Sheep have a field of vision around 300 degrees. That means they can see behind themselves without turning their head.

What do sheep eat?
A sheep’s diet (food) is made up of hay, corn, and water.
Pass around the feed bag samples and hold up the water bucket.

Where do sheep live?
Sheep spend most of their time grazing in the pasture. In the winter they spend lots of time in the barn getting ready to have a lamb or two. Sheep usually have two or more babies at a time.

Sheep and the food cycle
Sheep provide us with many things we use such as food, yarn, crayons, glue and candles (show examples).

The meat from sheep, provide us with another source of protein. Who remembers why protein is important for our bodies? – Helps us grow strong muscles.

Does anyone have any questions about sheep?

Pigs
Can anyone tell me what this picture is of? - Pig
What sound do sheep make? – Oink!
Does anyone know what a baby pig is called? – piglet
The pig’s mother is called a sow and the father is called a boar.

What do pigs eat?
A pig’s diet (food) is made up of corn, soybean meal and water.
Pass around the feed bag samples and hold up the water bucket.

Where do pigs live?
Pigs spend their time outdoors in a pen or in a special barn that doesn’t get too hot or too cold. A momma pig (sow) can have lots of piglets each year. They usually have 2 ½ litters each year with as many as 9 piglets each time! That’s a lot of babies!

Pigs and the food cycle
Pigs provide us with food such as ham, bacon and pork chops.

The meat provide us with another source of protein to help us build strong muscles.
Pigs also provide us with things to make paint brushes, soap and leather gloves.

Does anyone have any questions about pigs?

Review
Today we talked about the first stop on our trip around the food cycle – Livestock
Can anyone tell me what specific livestock we talked about? - Cattle, sheep and pigs

Does anyone remember the two important nutrients we talked about that these animals provide us? – Calcium and protein.

Activity
Chores on the Farm – Feed Relay
Chores on the Farm – Feed Relay

Time: 10 minutes

On the farm there are always chores that need to be done! Sometimes the chores are tough and it’s best to do them as a team. Today’s chore is carrying feed out to livestock. You will need to work in teams to complete this activity.

Procedure:
• Divide students evenly into teams.
• Instruct half of the team to stand on one end of the room while the other half of the team stands on the opposite end.
• Give each team a bucket/feed bag.
• Begin the relay by having the first member carry their bucket of feed without spilling to their teammates on the other side of the room.
• This continues until all team members have carried the feed bucket.

After the relay:
How many of you thought that was tough? Some of you might be breathing hard and maybe even sweating. Can you feel your heart beating faster? You not only were doing farm chores but you were taking part in physical activity. Can anyone tell me how much physical activity we should get in a day? – 60 minutes. Does it all have to be a one time? – No! So today’s activity can count toward your 60 minutes of physical activity for today.
1. How old are you?
   a. 8 years old
   b. 9 years old
   c. 10 years old
   d. 11 years old
   e. Other ____

2. Are you:
   a. Male (boy)
   b. Female (girl)

3. What is your ethnic origin? (check all that are true)
   a. White
   b. American Indian/Native American
   c. Asian or Pacific Islander
   d. Hispanic
   e. African American
   f. Other________

4. If you have a garden, how often do you help with gardening activities?
   a. Never/Almost Never
   b. Some Days
   c. Most Days
   d. Every Day

5. What do livestock eat? (Circle all that apply.)
   a. Grass
   b. Corn
   c. Tree
   d. Carrot

6. Do livestock and plants rely on each other to survive?
   a. Yes
   b. No

7. Meat comes from:
   a. Paper
   b. Animals
   c. Plants
   d. Grocery store

8. Manure from a feedlot can be changed into compost and used as plant food in a garden?
   a. Yes
   b. No
9. What materials can be composted?
   a. Pop cans
   b. Leftover meat
   c. Paper

10. How does compost help the soil?
    a. Increases organic matter
    b. Adds nutrients
    c. Increases water movement
    d. All of the above

11. Do you know the difference between a tap root and a fibrous root is?
    a. Yes
    b. No

12. Do you know how a plant uses roots?
    a. Absorb water
    b. Food storage
    c. Anchor the plant in the soil
    d. All the above

13. Some roots are used as food by people:
    a. True
    b. False

14. Which soil particle is the largest in size?
    a. Sand
    b. Silt
    c. Clay

15. What do soil particles effect?
    a. Water movement in the soil
    b. Nutrient holding capacity
    c. Both A & B

16. Which nutrient do plants get from the soil?
    a. Hydrogen
    b. Carbon
    c. Oxygen
    d. Nitrogen

17. Are you willing to try fruits and vegetables you have never tasted before?
    a. Yes
    b. No

18. How many days of the week are you physically active for 60 minutes? (circle one)
    0  1  2  3  4  5  6  7

19. When given the choice, which do you choose:
    a. Junk food
    b. Fruits and vegetables
Please circle the best answer!

1. How old are you?
   a. 8 years old
   b. 9 years old
   c. 10 years old
   d. 11 years old
   e. Other ____

2. Are you:
   a. Male (boy)
   b. Female (girl)

3. What is your ethnic origin? (check all that are true)
   a. White
   b. American Indian/Native American
   c. Asian or Pacific Islander
   d. Hispanic
   e. African American
   f. Other________________

4. Which of the following do livestock eat?
   a. Grass
   b. Corn
   c. Hay
   d. All the Above

5. Livestock use plants as:
   a. Food
   b. Clothes
   c. Bedding
   d. None of the above

6. If you were to eat a hamburger at supper what animal would it come from?
   a. Cow
   b. Sheep
   c. Pig
   d. None of the above

7. Manure can be used as compost?
   a. Yes
   b. No

8. What materials can be composted?
   a. Pop cans
   b. Leftover meat
   c. Paper
9. Composting will reduce the volume (amount) of product at the end by:
   a. 50%
   b. 10%
   c. 80%

10. Which root is a tap root?

    a. 

    b. 

11. This life cycle uses sunlight energy as well as carbon dioxide to make sugar and oxygen:
    a. The sunrise
    b. Photosynthesis
    c. The water cycle

12. Nitrogen, phosphorus, and potassium (N-P-K) are also called:
    a. Micronutrients
    b. Macronutrients
    c. Grass

13. Which soil particle is the largest in size?
    a. Sand
    b. Silt
    c. Clay

14. How does compost help the soil?
    a. Increases organic matter
    b. Adds nutrients
    c. Increases water movement
    d. All of the above
15. What do soil particles effect?
   a. Water movement in the soil
   b. Nutrient holding capacity
   c. Both A & B

16. Are you more willing to try new fruits or vegetables since this class started?
   a. Yes
   b. No

17. How many fruits and vegetables do you eat a day?
   a. 3
   b. 5
   c. 7

18. Fruits and vegetables contain ___________ and ___________ that help our brain, eyes, heart, skin and teeth:
   a. Vitamins and minerals
   b. Sugar and salt
   c. Sticks and stones

19. How many days of the week are you physically active for 60 minutes? (circle one)
   0    1    2    3    4    5    6    7

20. List one thing you learned:

21. List one thing you will do this summer that you learned in the nutrition/garden project:

22. What did you like about the nutrition/garden project?

23. Did you take the family newsletter home?
   a. Yes
   b. No

24. Did anyone in the family read the newsletter?
   a. Yes
   b. No
1. Did you plant the garden we provided for you?
   a) Yes!
   b) No. Please explain what stopped you from planting your garden.

   __________________________________________________________
   __________________________________________________________
   __________________________________________________________

2. Did you harvest and eat the spinach from the garden that you planted?
   a) Yes! What did you make with the spinach?

   __________________________________________________________
   __________________________________________________________
   __________________________________________________________

   b) No.
   c) Did not plant the garden.

3. Who else participated in your garden activity?
   a) No one
   b) Parent
   c) Sibling
   d) Other _____________________________
   e) Did not plant the garden.

4. Did you grow a garden besides the one we provided you?
   a) Yes
   b) No

5. Did you start a compost pile this summer?
   a) Yes! What did you compost?

   __________________________________________________________
   __________________________________________________________
   __________________________________________________________

   b) No.
6. How many days of the week were you physically active for 60 minutes this summer? (circle one)

0  1  2  3  4  5  6  7

7. How many servings of vegetables did you eat a day this summer?

0  1  2  3  4  5

8. Is there anything else you would like us to know?

____________________________________________________________________________
____________________________________________________________________________
____________________________________________________________________________
____________________________________________________________________________
____________________________________________________________________________

Thank you! We enjoyed bringing Kids, Compost, Crops and Consumption to your classroom!