

GED

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Activities and Lessons to help prepare for the GED

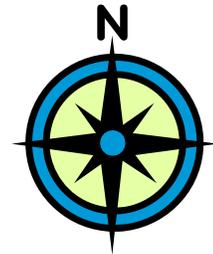


Table of Contents

Corn **3-7**

Tassel to Tank Activity with Extended Response
Question

Horticulture **8-11**

Exploring Cells
Water Cycle Bracelet
Conversations about Conservation

Nutrition **12-13**

DNA Bracelet
Digesting the World's Diet Activity with Extended
Response Question

Specialty Crops **14-15**

Navigating Illinois

Tassel to Tank



Grade Level: 4-12 Science, Social Studies & Reading

Objective: This activity is designed to help students become more familiar with the process of raising alternative materials for fuel.

Illinois Learning Standards: Reading: 1.B.2b; 1.C.2b; 1.C.2d; 2.A.2b; 12.A.2a; 15.A.2a; 15.D.2b

Assessment Framework: Standard 1B 1.4.09; 1.4.10; 1.4.13; 1.4.14; 12.4.03; 12.4.04; 12.4.05

Materials:

Tassel to Tank information slips

Illinois ATTC's Corn Ag Mag and Renewable Fuels Ag Mag

Corn by Gail Gibbons

Anna's Corn by Barbra Santucci

Important Vocabulary:

Barge: a flat bottom boat designed for transporting and storing grain through water systems.

Elevator: a structure used for drying, storing and loading grains.

Fermentation: the conversion of sugar to carbon dioxide.

Distillation: the process of heating a liquid until it boils, capturing and cooling the hot vapors, and collecting the condensed vapors.

Processing: changing a product like corn into a variety of products such as livestock feed, cosmetics, and fuel.

Directions:

1. Learn about corn by reading the Corn and Renewable Fuels Ag Mags. Explain the processes involved in taking corn from the field and producing ethanol for automobiles.
2. Divide students into groups or for smaller classes give each student their own Tassel to Tank information slip.
3. Have students brain storm about the process of making ethanol and answer the questions on each card.
4. After adequate time for brain storming have students place the cards in the order from the beginning of growing corn to the process of making ethanol. Explain to students they should be forming a timeline that involves all the processes of production, processing, packaging and distribution of corn to ethanol.

Extended Response

Transportation is vital for ensuring the United States' food source is delivered and distributed to everyone. Discuss how your diet might be affected without our elaborate transportation system. Use examples you learned from the Tassel to Tank activity.

Farmer



What decision making skills are needed for the farmer in the first step of planting a crop?
What types of decisions need to be made? Explain how these decisions might effect the crop?

Planter

What are the factors that could effect the farmer in this stage of his job? What types of impact could this have for the rest of the growing season?



Corn

What are some of the precautions a farmer needs to take with the crop as it is growing?

What are some of the hazards a farmer can avoid by preplanning?



Harvester

Farming equipment is expensive. Are there any ways for farmers to offset their equipment cost, if so what are they?



Transportation (All)

List all the types of transportation that is needed to make corn into ethanol. Explain how rising fuel cost could affect the cost of products, how can these be avoided?



Elevator

What services does a grain elevator supply to the farmer?
List all the services and determine why they are important.



Manufacturer (Ethanol Plant)

What type of corn is processed into ethanol? Why is this type of corn used verses other types of corn?



Grinder

Grinding corn exposes the starch from the corn. Do you think the ethanol process would work if we didn't grind the corn, why or why not?



Cooker

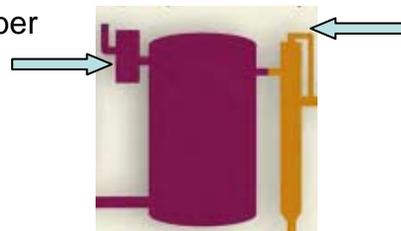
The ground corn is mixed with water, cooked briefly and then enzymes are added. The enzymes convert the starch to sugar. Why is heat used instead of cold water?



Fermentation

Yeast is added to the cooked mixture of corn. Yeast is the important ingredient to create fermentation. Define what fermentation is.

CO2 Scrubber

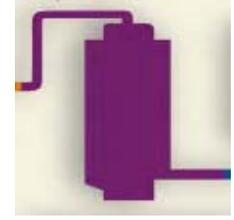


Distillation

Fermentation Tank

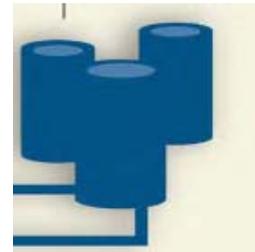
Molecular Sieve

Ethanol has been used by humans for thousands of years, in part because it is easy to make. Ethanol can be produced from any biological plant that contains sugar. What types of plants, other than corn, do you think ethanol could be made from?



Ethanol Storage

Over 4 billion gallons of ethanol are produced in the U.S. each year and many new plants are currently under construction. Name two positive impacts additional ethanol plants could have on Illinois.



Delivery

Illinois uses 470 million gallons of ethanol each year, this fuel is delivered in specialized fuel trucks. How could an equipment break down or drivers strike effect the delivery of fuel?



Retail

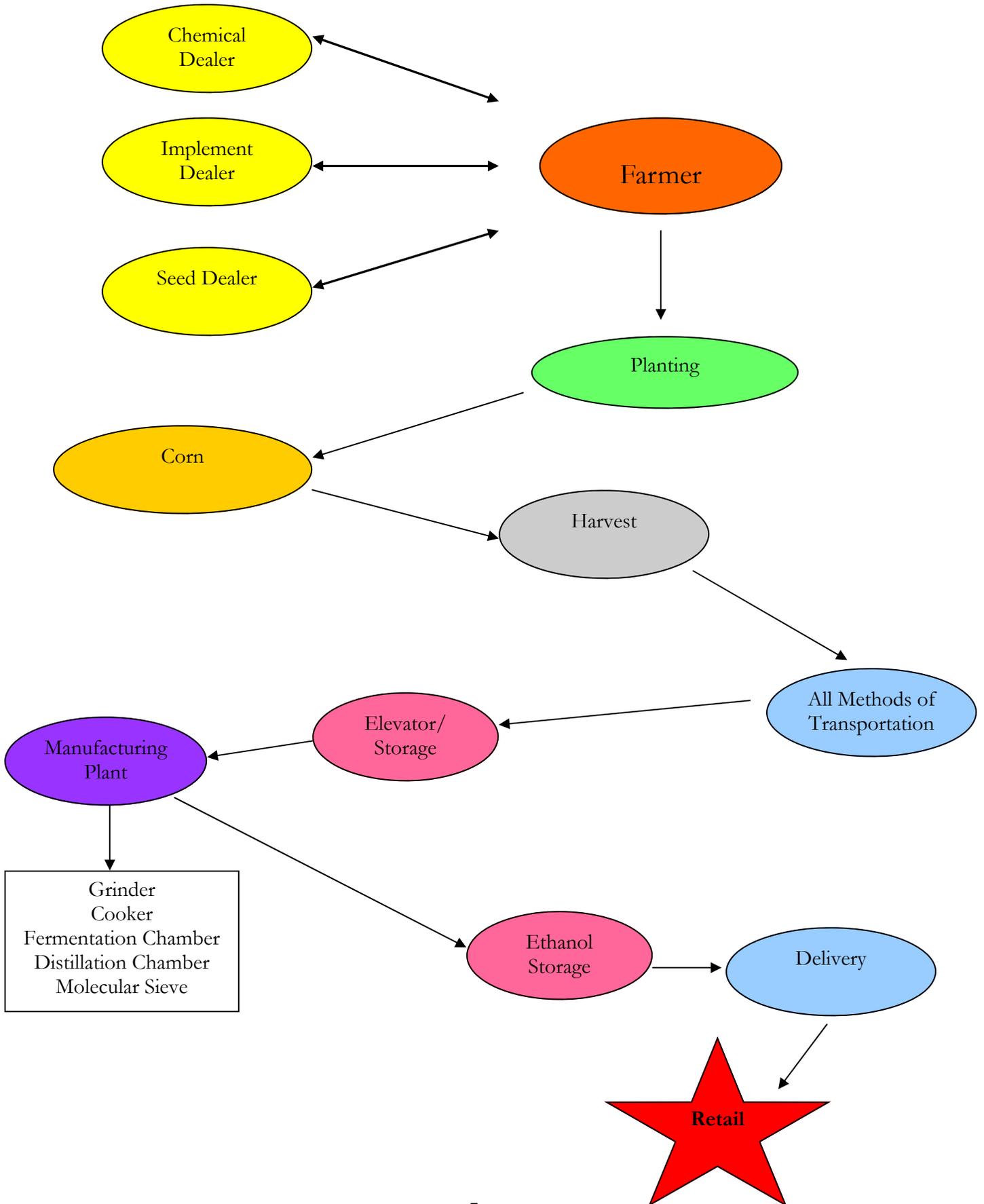
All cars sold in the U.S. are factory warranted for the use of gasoline containing up to 10 percent ethanol. Since most cars are already running on some ethanol, what advertising tactics need to be done to encourage people to use E85 fuel?



Illinois Ethanol Facts

- Illinois is one of the leading producers of ethanol in the U.S. and about 90 percent of the gasoline sold in Illinois contains 10 percent ethanol.
- Illinois uses about 470 million gallons of ethanol for fuel each year.
- There is currently no Illinois sales tax on E-85.
- Illinois turns out over 1 billion bushels of corn each year, of which 1/6 is used to produce ethanol.
- One bushel of corn yields 2.8 gallons of ethanol and 18 lbs. of Distillers Grains from dry mill ethanol plants.
- Over 30 percent of all gasoline sold in the U.S. contains ethanol.
- Ethanol reduces greenhouse gas emissions from vehicles.
- Ethanol fuel reduces our dependence on foreign oil.

Tassel to Tank Flowchart Answer Key



Exploring Cells



Grade Level: 4-12 Science

Objective: Upon completion of this activity, students will identify parts of the animal and plant cells.

Illinois Learning Standards: Science 12.A.2a; 12.A.2b; 12.A.3a; 12.A.3b; 12.A.3c

Assessment Framework: 12.4.05; 12.4.06; 12.7.02; 12.7.03,12.7.04; 12.7.05

Suggested Reading Materials:

IAITC Biotech Ag Mag

Gene Machines by Francis R. Balkwill

Enjoy Your Cells by Francis R. Balkwill

Introduction: This lesson was designed to help students learn the different organelles of the plant and animal cells. After students have been given the general introduction to the different organelles in each cell, have them explore the Biotech Ag Mag. Once they have read through the Biotech Ag Mag, have them complete the following activity.

Students are going to treat each individual cell as a theme park. Their goal is to create a theme park brochure with a map that will guide them through each cell organelle. The map should detail each of the organelles that you discussed in class and have an illustration and function of each. Students can choose between the animal or plant cell, or you could have them create a project for both.

The theme park maps can be placed on a brochure made from white paper plates. The instruction on how create the paper plate brochure are included in this lesson.

Vocabulary:

Cell wall: found only in plant cells and is for support and protection of the cell.

Cell membrane: found in both cells, controls material movement in and out of the cells.

Nucleus: found in both cells and controls cell activities.

Chloroplast: found only in plant cells and breaks down food into small parts.

Vacuole: found in both cells but is larger in the plant cell. Its purpose is to store food and waste.

Ribosome: found in both cells and produces proteins.

Mitochondrion: found in both cells and breaks down sugar into energy.

Exploring Cells Activity Sheet

Directions:

The goal of this exercise is to design a creative and colorful amusement park map. The animal cell or the plant cell will serve as your “amusement park.” This brochure will provide visitors with a tour of the cell. Maps at amusement parks always explain the location of each attraction and what it does. Be sure to include this on your map! Each attraction in the map should come from the organelles that make up either the animal or plant cell.

1. Select from the animal or plant cell.
2. Make a list of the organelles found in your selected cell. Each organelle should serve as a stop on your amusement park map. On a scrap piece of paper, create a rough draft on how you want your brochure to appear.
3. Once you have designed your amusement park tour acquire the paper plates needed to create your brochure.

Paper Plate Booklet

1. Fold the first paper plate in half and cut a narrow window out of the folded edge. Start the window after the ruffled edge and end before the other ruffled edge.
2. Any additional pages should be folded and then reopened. On the fold, cut one slit starting from the edge of the plate and ending at the ruffle (cuts should be no longer than an inch). Make a second slit directly opposite the first one.
3. To assemble the booklet. Fold, but do not crease, the paper plate with the slits in half so that the two slits meet. With the plate folded in half, push the plate through the slit. Open the plate, moving one slit to the top of the window and one slit to the bottom of the window.
4. Close the brochure so all the plates are folded in half. Design the front cover to match your cell.
5. Use the inside pages to serve as the maps to the amusement park attractions.

WATER CYCLE BRACELET



Grade Level: 4-12 Science

Objective: Students will be able to identify the parts of the water cycle and their importance.

Introduction: This activity uses 10 beads that represent the water cycle, or the hydrologic cycle. The beads are used to show the paths water takes through its various states – solid, liquid and vapor, as it moves throughout Earth’s systems – oceans, atmosphere, ground water, rain, streams, etc.

Directions:

Read the book Water Dance by Thomas Locker. This has a great explanation of the water cycle. Give each student a piece of yarn, leather, or rope.

Show the students that each colored bead represents a different stage of water in the Earth’s systems.

Ask the students to string one of each colored bead on their bracelet. Tell them to string the beads in any order they like.

After the bracelets are complete, ask the students to show you their personal water cycle. For example, if their beads are in the following order: clouds, puddles, plants, etc., the students explain that the water started in the clouds, then it rained and fell into puddles on the sidewalk, then the water evaporated and collected on the plants overnight. Each student will have a different water story to tell.

The beads and what they represent are as follows:

Sun (yellow) – the sun is the source of all energy on earth and powers the water cycle.

Water Vapor (clear) – the part of the water cycle where water is suspended in the air or is steam and humidity.

Clouds (gray) – when water vapor condenses but is still in the air.

Rain (sparkling clear) – moisture from clouds falls to the earth as a liquid.

Snow (white) – moisture falling as a liquid in the frozen state.

Erosion (brown) – rain causes erosion where soil is unprotected by vegetation. Soil particles are suspended in the water run off.

Oceans (dark blue) – the Earth’s weather factory. Moisture evaporates from the oceans by the sun’s heat and is carried around the Earth by winds.

Lakes (sparkling blue) – the way we like to see a lake. Collects water from streams, and also evaporates water into the atmosphere.

Puddles (sparkling brown) – rain water collects in low spots, streets, sidewalks, and also collects pollutants (dirt, trash, automotive fluids, etc.) Puddles evaporate or go into storm sewers.

Plants (green) – Plants take in water through roots and evaporate water into the atmosphere through leaves – a process called transpiration.

Conversation about Conservation Terms...



In our efforts to protect the environment we sometimes confuse the terms preserve and conserve. This activity is designed to help students understand the difference between conservation, preservation, and indiscriminate use.

Directions:

Divide the class into three groups. Give each student a Tootsie Roll. Instruct each group as follows:

Group 1:

These students are to eat the Tootsie Roll immediately.

Group 2:

These students may unwrap the Tootsie Roll but they may only lick the candy, they cannot eat it.

Group 3:

These students may not unwrap their Tootsie Roll during this activity. They may look at it, smell it, measure it, but NOT eat it.

Terms:

The students in group 1 are the indiscriminate users.

The students in group 2 are the conservationists.

The students in group 3 are the preservationists.

Discussion Questions:

1. Which group uses the candy slowly so that more candy can be made?
2. Would it make a difference if we determined the reason for having the candy?
3. What if the group had not eaten in three days? Would that make a difference?
4. Which group would be the wisest group?
5. What if the goal was to have the same number of Tootsie Rolls a year from now?
6. Which group would have met the goal?

Like any area of decision making, there are no right or wrong answers.

Students are encouraged to examine several aspects of the situation, make their decision and be able to defend that decision.

Applying to Areas of Conservation:

Preservationists might want to save all trees and all forests no matter what.

Indiscriminate users might cut down trees and forests no matter what.

Conservationists might want to use the forest by harvesting trees and managing the forest so that it can regenerate itself.

Adapted from Utah Agriculture in the Classroom

WHAT YOU'LL NEED

Beads

You'll need four different colors of beads. Large beads work best.

String

Dental floss or fishing line works great for big beads.

Scissors

Be careful with these.

Section of DNA Codes

Choose one from the list below.



A (green) pairs with T
 T (pink) pairs with A
 C (yellow) pairs with G
 G (purple) pairs with C

SECTIONS OF DNA* CODES

Match the beads on your bracelet to a section of DNA code from your favorite plant or animal below.



Monarch butterfly (*Danaus plexippus*)

gaggctacc aag tctccga tctgt agg ag abgca tbg aaaga tctgt t bog



Grizzly bear (*Ursus arctos*)

atgac caac atc og aaaa aacc ac cca tt agc ta aaa tc atc aa caa ctc



Sunflower (*Helianthus annuus*)

tg ag abg tctaga aggtg caaaa tc aat agggg cgggagc tgc ta caa tbg



Chimpanzee (*Pan troglodytes*)

tgac cccga cagc aaaa tcaacc cac taataaaaatt aa tbaatcac tca



Human (*Homo sapiens*)

tgac cccaa taccg caaaa tcaacc ccc taataaaaatt aa tbaatcac tca



African elephant (*Loxodonta africana*)

atgac cagac attc gaaa atctc atcct tca act caaaa tgb abgaa taa atc



Apple tree (*Malus domestica*)

gaat cgggc ag ag aag aa ag aag ag ag ag ag ag caaaa abggtt



Red flour beetle (*Tribolium castaneum*)

ca caacc cggggga tgc cc ttcgc cat cc tctgc ctggc ogaga atc cca



Brown trout (*Salmo trutta*)

ct ctggc tca ctctc taggc tbtgt tct agccacc caa at tct taccggac

GIVE SOMEONE THE SPECIAL KEY TO YOUR HEART

Make a bracelet from this pattern. It's DNA code from a gene*, for the human heart!



gt tgc tgggt caaatctc ataaaatggggtccagtgtt tagag aagga cag

Digesting the World's Diet



Objective: After completing this activity, students will have explored the nutritional habits of families all around the world. Students will be able to compare and contrast these countries with the United States and each other. They will also be able to investigate how weather, landscape and soil types affect agriculture all around the world.

Illinois Learning Standards: 3.A.2, 3.B.2b, 3.C.2a, 4.B.2a, 5.A.2b, 5.C.2b, 15.A.2a, 17.A.2a, 23.C.2a, 23.C.3 **Assessment Standards:** 3.5.03, 3.5.06, 3.5.19, 3.5.28

Suggested Reading Materials:

Hungry Planet: What The World Eats by Peter Menzel & Faith D'Aluisio

Nutrition Ag Mag available at www.agintheclassroom.org

Activity Instructions:

1. Discuss the book, Hungry Planet: What The World Eats.
2. Have the students pick one of the countries in the book (any country but the United States). Give the students a photocopy of the picture of their country from the book and the introductory page of each country which includes the cost of all their food purchased for one week.
3. Students should investigate the country using the internet, books, encyclopedias, etc.
4. Have the students write a report on their country including what items were purchased and how much money was spent. Have them include agricultural aspects such as weather/climate, topography/landscape, soil types, etc. Each student should use these findings in their discussion of why the people of their assigned country can grow specific foods and why they can't grow other types of food. Students should also discuss nutritional aspects. Does the food purchased fulfill all of the nutritional needs of the people in that country?
5. After writing their report, have the students prepare a short presentation about their country. This could be done with a PowerPoint presentation or just a general sharing session.
6. After all students have shared their findings, discuss how the United States differs from other countries. What kind of land and climate do we have? What types of food do we buy? How much money do American families spend on food?

Lesson Extender!

1. Have students compare and contrast different families from the book. They could compare types of food eaten, how much money was spent on food for the week, obesity rates, birth/death rates, etc.



Extended Response Question: Nutrition is important for everyone around the world. Discuss how your diet is different from those of other families around the world. Do other families receive the proper nutrition according to our standards?

Navigating Illinois



Grade Level: 3-5

Objective: After completing this exercise, students will have a better understanding of reading maps as well as the diversity of specialty crops in Illinois.

Illinois Learning Standards: 11.A.2b; 11.A.2c; 13.B.2f; 15.A.2a; 17.A.2b; 17.C.2b

Assessment Framework: 11.4.04; 13.4.11

Suggested Reading Materials:

Illinois AITC Specialty Crops Ag Mag

Materials:

Access to the Internet

Illinois Maps

Markers or crayons

Activity Instructions:

1. Using dark blue markers or crayons draw the Illinois and Mississippi Rivers on the map. These rivers are used to ship many agricultural products.
2. The Pumpkin Capital of the World is located in Morton, IL. Find the county that Morton is located in and draw a pumpkin inside of it.
3. Agri-tourism is a growing industry in Illinois. The Country Corner Farm Market is located in Alpha, IL in the west-central part of the state. Find the county that Alpha is located in and color it brown.
4. Apple orchards are very popular destinations in the fall because they offer u-pick apples, cider and other homemade treats. Almost Eden Orchard is located in Hancock County. Find Hancock County on the map and color it red.
5. The Horseradish Capital of the World is located in Collinsville, IL. Find the county that Collinsville is located in and color it gray.
6. Many of the peaches grown in Illinois are grown in the southern half of the state. Rendleman Orchards is located in Alto Pass, IL. Find its county and color it orange.
7. Bees are very helpful in the pollination of specialty crops. Sasse's Apiary is located in Chestnut, IL. Find Logan County and color it yellow.
8. Many of Mason County's specialty growers, like Ron Armbrust from Manito, use irrigation to help keep their crops watered. Find Mason County and color it light blue.
9. Many consumers flock to Christmas tree farms to cut their own tree for the holidays. Richardson's Christmas Trees is located in Spring Grove, IL. Find its county and color it green.
10. Olthoff Farms and Dutch Valley Growers, Inc. grow onion sets for stores like Wal-Mart and Farm & Fleet. They are located in Kankakee County. Find it on the map and color it pink.
11. Siemer Milling Company in Teutopolis, IL mills wheat into flour to be used in cookies, cakes, crackers and other goodies. Find the county it is located in and color it purple.

