Farmer George Plants a Nation

A Complementary Lesson Booklet for
Farmer George Plants a Nation

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Soil Sam

For use with pages 10-11 in <u>Farmer George Plants a Nation</u>

Objective: Students will have a better understanding of the growth and development of a seed and the factors that affect it.

Common Core: Mathematics: CCSS.Math.Content.4.MD.A.2

Next Generation Science Standards: Matter and Energy in Organisms and Ecosytems: 5-PS3-1; 5-LS1-1 | Structure Function and Information Processing: 4-LS1-1.A;

Materials Needed:
- Potting Soil
- Untreated Grass Seed
- Fabric
- Baby Food Jars
- Water
- Knee High Stockings
- Jiggle Eyes

Directions:
1. Using a knee-high stocking, place some grass seeds in the toe where you want the grass to grow. The toe of the stocking is the top of the head for Soil Sam. The grass will look like hair when it grows.
2. Pack a handful of soil (roughly 1-1.5 cups) in the end of the stocking on top of the grass seeds. Make sure that the ball of soil is slightly larger than the baby food jar or the water bottle.
3. Tie a knot in the stockings under the ball of soil.
4. Completely wet the head of the Soil Sam. Place the top of the stocking (the bottom of the Soil Sam) in the jar filled with water, making sure the head is above the mouth of the jar. The end of the stocking will absorb the water to feed the grass seeds, which will germinate through the stocking. (You may have to poke a few small holes in the top of the Soil Sam to help the grass get through.)
5. Now decorate! Suggestions are a round piece of fabric to fit over the mouth of the jar for a shirt. You can add buttons to the shirt, jiggle eyes on the face, and cut out felt for a mouth. Water as needed and be sure to cut the grass (hair) and style as desired. Will the grass grow better or faster with fertilizers? Try it out. Add different fertilizers to the soil and water and see which grows best.

Lesson Extender:
Try adding some of the following to your Soil Sam's water and make predictions on what the outcome will be. Make more than one Soil Sam and have students chart the differences in the grass.
- **Add to the Water:** Store-bought liquid fertilizer, soda pop, apple juice, lemon scented liquid soap
- **Add to the Soil:** Store-bought fertilizer stick, coffee grounds, baking soda, Epsom salts

Farmers have to be careful to not add too much fertilizer. They go to special classes and use math problems to figure out the right amount. You shouldn't use too much fertilizer either, but you can experiment with different amounts.

Other possible resources:
IAITC Soil Ag Mag
<u>Diary of a Worm</u> by Doreen Cronin; ISBN-13: 978-0060001506
<u>A Handful of Dirt</u> by Raymond Bial; ISBN-13: 978-0802786982

Growing Letters!

For use with pages 10-11 in <u>Farmer George Plants a Nation</u>

Objective: This activity is designed to allow students to observe the germination process and what factors encourage growth and what factors can discourage growth.

Common Core: CCSS.ELA-Literacy.RI.2.1; W.2.2; W.2.8; SL.2.1

Next Generation Science Standards: Structure & Properties of Matter: 2-PS1.A; 2-PS1-2

Materials Needed:
- Seeds
- Construction paper
- Glue
- Water bottle
- Crayons
- Waxed paper or cookie sheets

Directions:
1. Cut large sheets of construction paper in half (hot-dog style). One 1/2 piece of paper for each student.
2. Next, write each students' name on the construction paper strip using the crayons. Older students can write their own name.
3. Now have each student trace over their name with glue. Elmer's white school glue will work or a glue stick.
4. Once the student has traced his or her name in glue have them shake the seeds over the glue. If you use small seeds like radishes, carrots or even grass seeds you can put them in shakers to help students place the seeds easier. Old rinsed out plastic spice jars work really well.
5. Sit to the side to let glue dry.
6. Once the glue is dried place the projects on wax paper or on cookie sheets so the seeds can be spritzed with water. Do not saturate the paper but do get the seeds damp. The seeds should be kept damp to ensure growth.

Lesson Extender:
Each student should submit a writing prompt identifying characteristics that impacted the growth of their seeds. Discuss the factors identified. Why is construction paper best suited for this experiment? Each student should participate in a class discussion about matter and its interactions.

Other Possible Resources:
IAITC Specialty Crops Ag Mag
<u>Planting a Rainbow</u> by Lois Ehlert; ISBN-13: 978-0152626105
<u>The Tiny Seed</u> by Eric Carle; ISBN-13: 9780140557138
<u>Tops and Bottoms</u> by Janet Stevens; ISBN-13: 978-0152928513
<u>Pick, Pull, Snap</u> by Lola M. Schaefer; ISBN-13: 978-0688178345

Tree Rings

For use with pages 20-21 in <u>Farmer George Plants a Nation</u>

Objective: Students will learn about the parts of a tree and note significant life events.

Common Core: CCSS.ELA-Literacy.RF.3.3; RF.3.4; W.3.2

Next Generation Science Standards: Structure and Properties of Matter: 2-PS1-1; Interdependent Relationships in Ecosystems: LS2-A

Materials Needed:
- White paper plates
- Crayons
- Blank Sticky Labels
- Pens/Pencils

Directions:
1. Discuss these parts of a tree with the students: outer bark (protects tree), inner bark/phloem (pipeline for the food to be passed to the rest of the tree), cambium (the growing part of the tree that produces new bark and wood), xylem (pipeline for moving water up to the leaves), and heartwood (supports tree on the inside).
2. Give each student a paper plate. Ask them to use crayons and draw the outer bark, inner bark, cambium, xylem, and heartwood on the plate so it looks like a cross-section. Each section should be a different color and the sections should be labeled.
3. Ask the students to draw rings on the tree to show the age of the tree.
4. Ask the students to pretend their life is on the tree cross-section. Give each student blank sticky labels. They can write events of their life on the labels and attach them to different years on the tree cross-section.

Lesson Extender:
Have students create a chart with information they know, want to know and what they have learned. Then, students fill the chart with possible questions like: How do trees make their own food? How do leaves breathe? What do humans use trees for? What happens when air cannot get to a tree?

"Grow" Further:
Forests are for Kids http://www.idahoforests.org/kids1.htm
Anatomy of a Tree http://www.arborday.org/trees/RingsTreeNatomy.cfm

Other Possible Resources:
<u>I Can Name 50 Trees Today!</u> by Bonnie Worth; ISBN-13**:** 978-0375822773
<u>My Little Corner of the World</u> by Beth Burch Smith; ISBN-13**:** 978-1878096364
<u>The Tree Farmer</u> by Chuck Leavell & Nicholas Cravotta; ISBN-13: 978-0615355207

Used with permission from the *Top 40 Hits of Planet Earth.*

Every Tree For Itself

For use with pages 20-21 in <u>Farmer George Plants a Nation</u>

Objective: Students will simulate how trees compete for their essential needs and describe how varying amounts of light, water, and nutrients affect a tree's growth.

Common Core: CCSS.ELA-Literacy.W.4.1; W.4.2; SL.4.1; SL.4.1b; SL.4.4

Next Generation Science Standards: Inheritance and Variation of Traits: Life Cycles and Traits: 3-LS3-2; | Interdependent Relationships in Ecosystems: 3-LS4-4; 3-LS4.C

Materials Needed:
- Tree trunk or branch cross-sections
- Three colors of poker chips (red, white, blue)
- Pieces of paper or paper plates

Background:
What do trees need so they can grow? Some of their needs are the same as those of people and other animals. For example, trees need plenty of water. They also need plenty of nutrients, which they get from food. But trees and people don't get food in the same way. Plants make their own food by using energy from the sun.

If trees don't get enough water, nutrients, or sunlight, they may grow slowly or die. Growth rings show this graphically. In general, wide rings indicate good conditions for growth (plenty of nutrients, water, and sunshine) while narrow rings often indicate less favorable conditions for growth (drought, insect damage, lack of nutrients, competition.)

Directions:
1. Pass out cross-sections from several trunks or branches (tree cookies), and have your students examine the growth rings. (If you don't have an actual cross-section, draw a big one on the chalkboard.) Explain that the number of rings indicates a tree's age.
2. Give a large piece of paper or a white paper plate to each student.
3. Tell students to imagine that they are trees.
4. Have students stand about three feet apart on their cross-sections. Students must stand in place and must keep one foot planted on their cross-section at all times.
5. Equally distribute the poker chips on the floor around the students so that the chips are about two feet apart.
6. Tell students that they'll be playing a game called "Every Tree for Itself." The object of the game is for the "trees" to gather as many poker chips as they can. Explain that each colored chip represents a tree requirement. Blue represents water, white represents air, and red represents nutrients (such as nitrogen, oxygen, or carbon dioxide.)

Every Tree For Itself

Activity Continued

7. Give a signal to start the first round. Have student "trees" reach with their roots and branches (arms and legs) to gather their requirements. Tell students that one foot (their tap root) must remain planted on their cross-section at all times. They are not allowed to slide their cross-section along the floor or step off it; they will be disqualified for doing so.
8. Allow student trees to gather these requirements for one 30-second round. (They can either collect all types of requirements at once or one type of requirement each round.) Have students use a notebook to record how many of each color requirement they gathered. Use the following questions to discuss the results of the first round.
- How many requirements did each tree get?
- Does any tree lack a particular requirement?
    a. What might happen to a real tree that lacked one of its requirements?
        It might grow slowly or eventually die.
    b. Is there such a thing as too much water, sunlight, or nutrients?
        Yes, every species has optimum levels beyond which the tree becomes stressed.
9. Have students stand on their cross sections in groups of three to five. Gather the colored chips and spread them around the room again. Play another round and have student trees record their results.
10. Compare results of this round with those of the first. In most cases, students will notice that each tree gathered fewer requirements. Ask if they can reach any conclusions about trees that grow close to each other. Ask if any trees "died" because they couldn't get a particular requirement.

Lesson Extender:
Try several more rounds, comparing results each time. Suggestions for rounds include:
- Have all students stand closer together.
- Use fewer water chips, representing drought.
- Use fewer sunlight chips, representing lack of sunlight due to overcrowding.
- Use fewer nutrient chips, representing poor soil quality.
- Have students write a report that addresses how each condition affects the trees growth.
- Have students write a report addressing their opinion on which poker chip (resource) is most important and why.

Other Possible Resources:
IAITC Tree Ag Mag
I Can Name 50 Trees Today! by Bonnie Worth; ISBN-13**:** 978-0375822773
The Tree Farmer by Chuck Leavell & Nicholas Cravotta; ISBN-13: 978-0615355207

For more lessons, visit *The Top 40 Hits of Planet Earth* on our website: www.agintheclassroom.org

Stick Horse

For use with pages 22-23 in <u>Farmer George Plants a Nation</u>

Objective: After completing this activity, students will have a better understanding of horses, their traits, and their uses and how technology has played a role in how we use them.

Common Core: CCSS.ELA-Literacy.RI.2.2; RI.2.3; W.2.2; W.2.7; W.2.8; SL.2.1; SL.2.2

Next Generation Science Standards: Interdependent Relationships in Ecosystems: 2-LS2-2

Materials needed per student:
- Scissors
- Construction Paper
- Cardboard or heavy weight paper
- Yard stick or a card board tube from wrapping paper
- Yarn
- Glue
- Markers
- Tape

Directions:
1. Give each student the pre-cut Horse Heads (2 per student) or have older students cut them out.
2. Have students decorate with construction paper and markers. Have them try to duplicate coat colors and patterns that you have talked about previously.
3. Use yarn to make a mane and forelock, glue on the inside of the horse heads. Once the mane and forelock are glued on finish gluing the horse heads together.
4. Cut three foot piece of yarn and glue to the mouth to serve as the reins.
5. Now that the horses are complete, you could organize activities to use them.

Lesson Extender:
1. Stick horse races, horse obstacle courses that resemble horse jumps or running barrels.
2. Students could also practice the gaits of a horse: walk, trot, lope, run.
3. Talk about traits of horses (color, muscle, height, etc.). Which genes did they inherit from their parents? Have a class discussion about what genes we inherit from our parents.
4. Have a class discussion about the uses of horses currently and in the past (work vs. pleasure).
5. Write a paragraph explaining how technology has changed and how we use horses today.
6. What did George Washington do to change how he used his horses? Describe the connection between the series of historical events that take place in the book.

Other possible resources:
<u>Horse Dictionary: An A to Z of Horses</u> Scholastic; ISBN-13: 978-0439926317
<u>Leah's Pony</u> by Elizabeth Friedrich; ISBN-13: 978-1563978289
IAITC Horse Ag Mag

Paper Bag Horse

For use with pages 22-23 in <u>Farmer George Plants a Nation</u>

Objective: After completing this activity, students will have a better understanding of horses, their traits, their uses, and how technology has played a role in how we use them.

Common Core: CCSS.ELA-Literacy.RI.2.1; RI.2.3; W.2.1

Next Generation Science Standards: Interdependent Relationships in Ecosystems: 2-LS2-2

Materials Needed:
- Lunch bags
- Markers
- Yarn
- Scissors
- Old newspaper
- Glue or staples
- 20mm Wiggle eyes (optional)

Directions:
1. Cut the top ¾ of the bag off making sure to not cut the bottom of the bag.
2. Before unfolding cut the ears out of the bottom portion of the bag.
   Should look similar to figure 1 but it is recommended to round the tips of the ears more.
3. Open bag up and stuff with old newspaper. Then glue or staple shut.
4. Now take the top of the bag and round one end or the corners off so the piece looks like a U.
5. Glue the flaps shut. Should resemble figure 2.
6. Next take the top U piece and glue to the bottom of figure one.
7. Now have students decorate by placing eyes, drawing nostrils and facial markings.
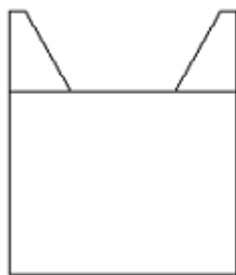8. Use yarn for mane.

Figure 1   Figure 2   Figure 3

Writing Prompt:
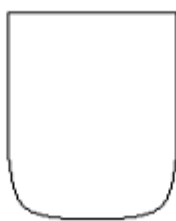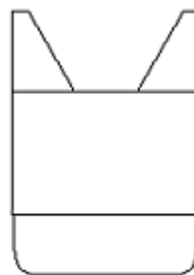What did George Washington create using horses and donkeys? In your opinion, was this a good idea? Use key details drawn from the book. Support your opinion using words and reasons from the book.

Other possible resources:
<u>Horse Dictionary: An A to Z of Horses</u> Scholastic; ISBN-13: 978-0439926317
<u>Leah's Pony</u> by Elizabeth Friedrich; ISBN-13: 978-1563978289
IAITC Horse Ag Mag

Hoofing it Through History

For use with pages 22-23 in <u>Farmer George Plants a Nation</u>

Objective: After completion of this activity, students will be more familiar with reading maps and labeling locations on maps. Students will also learn the location of important battles of the American Civil War. Through the use of these maps, students will practice with latitude and longitude.

Common Core: CCSS.ELA-Literacy.RI.4.3; RI.4.7; RI.4.10

Introduction:
In the time of the American Civil War, horses were an important factor in the outcome of the war. The horses that served the Confederate and Federal armies left lasting impressions on all that surrounded them. These horses worked tirelessly to carry their masters through the battle fields. The horse of a commanding officer was generally as well known to the rank and file as the general himself, and the soldiers were as affectionately attached to the animal as they were to their commanding officer.

The following is an excerpt from the website: www.civilwarhome.com/horses.htm, and is an account of General Ulysses S. Grant's beloved war horses. Grant had a fondness for horses that can be seen in the writings of his son, Fredrick Dent Grant. For more information on war horses and their Generals, visit the listed website.

This activity relates the horse and history directly. Have students read the writings of Fredrick Dent Grant. After reading the passage, have students complete the ISAT questions then research the sites found in the reading. Have students map the different locations on the maps provided. This exercise uses Google Earth.

Lesson Extender!
1. Have students do an Internet search for images of American Civil War horses or War horses in general and create a display or bulletin board in class with the photos they found. Use your display to explain the historical events.

Other possible resources:
IAITC Horse Ag Mag

This is a AITC SMART lesson! Log on to www.agintheclassrom.org to have your students learn more about horses, the Civil War and General Ulysses S. Grant.

Wheat Milling

For use with pages 26-27 in <u>Farmer George Plants a Nation</u>

Objective: This lesson will introduce students to wheat as a plant and how that plant becomes food(s).

Common Core: Language Arts: CCSS.ELA-Literacy.RI.4.3; RI.4.4; RI.4.5; RF.4.3a

Next Generation Science Standards: Interdependent Relationships in Ecosystems: 3-LS4-3; Structure, Function and Information Processing: 4-LS1-1

Materials Needed:
- Wheat Stalks
- Salt or Pepper Grinder

Directions:
1. Show students wheat stalks.
2. Go over the parts of the wheat stalk with the students to familiarize them with the parts so they can understand the directions for dissection.
    A. Stalk—the entire plant
    B. Head—the part of the wheat plant that contains the kernels
    C. Beard—the bristle-like parts of the wheat plant that cover and protect the kernels
    D. Kernel—the seed from which the wheat plants are grown or that people harvest from the wheat plant to grind into flour
    E. Stem/Straw—the part of the wheat plant that supports the head and is known as straw after harvest
3. Dissect the wheat using the following steps:
    A. Hand out stalks of wheat to the students.
    B. Break the head off the stem.
    C. Make a straw out of the stem by breaking it to avoid the nodes.
    D. Lay the wheat head flat on a hard surface and pat with your hand to shake out the kernels.
    E. Have the students count their kernels.
4. Put the kernels of wheat into a salt or pepper grinder and have the students mill their wheat into flour. What simple machines are being used?
5. Talk about different ways to grind wheat. The Native Americans did it using rocks, etc. Have students design their own method of grinding wheat and then test their machines.
6. Talk about the uses of wheat flour to make pastas, breads, desserts, etc.

Lesson Extender!
1. Have students find the gluten in wheat by chewing the kernels. Before there was chewing gum in the store, farmers made their own with grains of wheat! This and other activities can be found in the back of the book <u>Bread Comes to Life</u> listed below.

Other possible resources:
<u>Bread Comes to Life</u> by George Levenson; ISBN 1-58246-114-7
<u>Bread Comes to Life</u> DVD Scholastic; ISBN 0-545-05034-0
<u>Bread Bread Bread</u> by Ann Morris; ISBN-13: 978-0-688-12275-1
<u>From Wheat to Pasta</u> by Robert Egan; ISBN 0-516-26069-3
Machines mAGic Kit (see your county AITC Coordinator)

Navigating Illinois

For use with <u>Farmer George Plants a Nation</u>

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

Common Core: Language Arts: CCSS.ELA-Literacy.RI.4.1; RI.4.7; RF.4.4; W.5.7

Next Generation Science Standards: Interdependent Relationships in Ecosystems: 3-LS4-3

Materials Needed:
- Access to the Internet   • Illinois Maps   • Markers or crayons
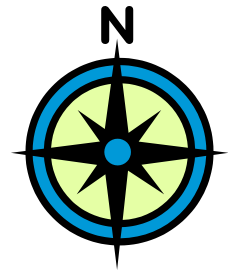
Activity Instructions:
Using the Illinois county map on the next page, follow the directions below:

- Using blue markers or crayons draw the Illinois and Mississippi Rivers on the map. These rivers are used to ship many agricultural products.
- Morton, Illinois is the Pumpkin Capital of the World. Find the county that Morton is located in and draw a pumpkin inside of it.
- Route 66 provides excellent access for products and agricultural commodities to be hauled from Chicago to the Pacific Coast. Trace out Route 66 and place the number 66 along the line.
- Ray Kroc opened his first McDonald's in Des Plaines, Illinois. Find the county Des Plaines is located in and draw a large letter "M" inside of it.
- The Horseradish Capital of the World is located in Collinsville, Illinois. Find the county that Collinsville is located in and color it gray.
- You can find one of the nation's top bacon companies right here in Illinois. Oscar Mayer is located in Chicago, Illinois. Find the county it's located in and color it brown.
- Bees are very helpful in the pollination of specialty crops. Sasse's Apiary is located in Chestnut, Illinois. Find Logan County and color it black and yellow.
- Illinois grows more soybeans than most states, and Decatur is called the "Soybean Capital of the World." Find Macon County and color it light green.
- Many consumers flock to Christmas tree farms to cut their own tree for the holidays. Richardson's Christmas Trees is located in Spring Grove, Illinois. Find its county and color it dark green.
- The University of Illinois has one of the top ranked agriculture programs in the nation. Find Champaign County and color it orange.
- Corn is so important to McLean County agriculture that the baseball team, the "Normal CornBelters," is named after it! Find McLean County and color it purple.

Lesson Extender:
- Research why some crops grow better in some areas. Does Illinois grow oranges? What about sugar? Write two paragraphs to explain factors that influence the growth of crops in different regions.

Other possible resources:
<u>There's a Map On My Lap</u> by Tish Rabe; ISBN: 0375910999
<u>Scrambled States of America</u> by Laurie Keller; ISBN: 0439136482
Illinois AITC Specialty Crop Ag Mag

Illinois county map

Jo Daviess, Stephenson, Winnebago, Boone, McHenry, Lake

Carroll, Ogle, De Kalb, Kane, Du Page, Cook

Whiteside, Lee, Kendall, Will

Rock Island, Henry, Bureau, La Salle, Grundy

Mercer, Putnam, Kankakee

Stark, Marshall

Knox, Livingston, Iroquois

Warren, Peoria, Woodford

Henderson

Fulton, Tazewell, McLean, Ford

Hancock, McDonough

Mason

Schuyler, Logan, De Witt, Champaign, Vermilion

Adams, Brown, Menard, Piatt

Cass, Macon

Pike, Scott, Morgan, Sangamon, Douglas, Edgar

Moultrie, Coles

Greene, Christian, Clark

Calhoun, Shelby, Cumberland

Montgomery

Macoupin, Fayette, Effingham, Jasper, Crawford

Jersey, Bond

Madison, Clay, Lawrence

Marion, Richland

Clinton, Wabash

St. Clair, Wayne, Edwards

Washington

Monroe, Jefferson, White

Perry, Hamilton

Randolph, Franklin

Jackson, Saline, Gallatin

Williamson

Union, Johnson, Pope, Hardin

Alexander, Pulaski, Massac

W N E S

Illinois Agriculture in the Classroom

13

A Trip Through Illinois

Either work individually, in pairs or in groups to complete the following worksheet. Using the clues listed on the left, find the Illinois County described, using the Illinois County Map found in the Background Information, and write the answer on the right.
(Used with permission from the Illinois mAGic Kit)

1. A piece of furniture　　　　　_____

2. A fishing place　　　　　　　_____

3. Boy's name　　　　　　　　_____

4. Breed of dairy cattle　　　　　_____

5. Colorful county　　　　　　　_____

6. Well known fruit jar　　　　　_____

7. Person who prepares food　　　_____

8. A state or variety of apple　　　_____

9. Our state capital is here　　　　_____

10. Indian tribe　　　　　　　　_____

11. Two presidents with this last name　_____

12. President on $20 bill　　　　　_____

13. Railroad　　　　　　　　　_____

14. First signer of the Declaration
    Of Independence　　　　　　_____

15. A girl's name　　　　　　　_____

16. 42nd President of the U.S.　　_____

17. Brand of tissue　　　　　　　_____

18. County you live in　　　　　　_____

19. Brand of car　　　　　　　　_____

20. Form of money or interest　　　_____

21. Mountain range　　　　　　　_____

22. A famous mountain　　　　　_____
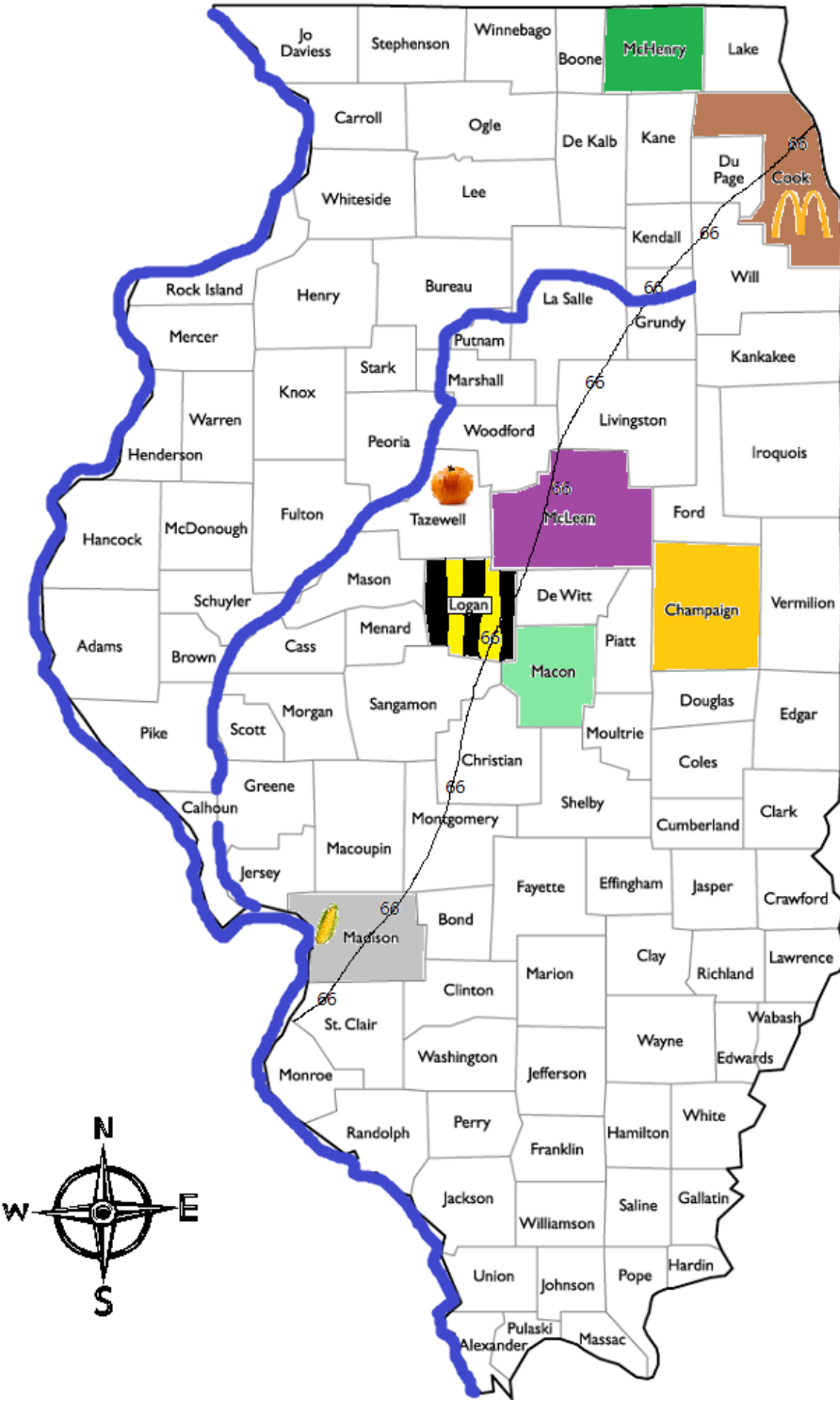
A Trip Through IL
1. Bureau
2. Lake
3. Will, Henry, Scott, Warren (and more)
4. Jersey
5. Green, Brown, White
6. Mason
7. Cook
8. Washington
9. Sangamon
10. Massac, Iroquois
11. Adams
12. Jackson
13. Union
14. Hancock
15. Shelby, Carroll, Morgan (and more)
16. Clinton
17. Scott
18. will vary
19. Ford
20. Bond
21. Cumberland
22. Pike

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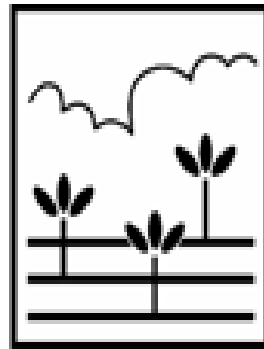
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