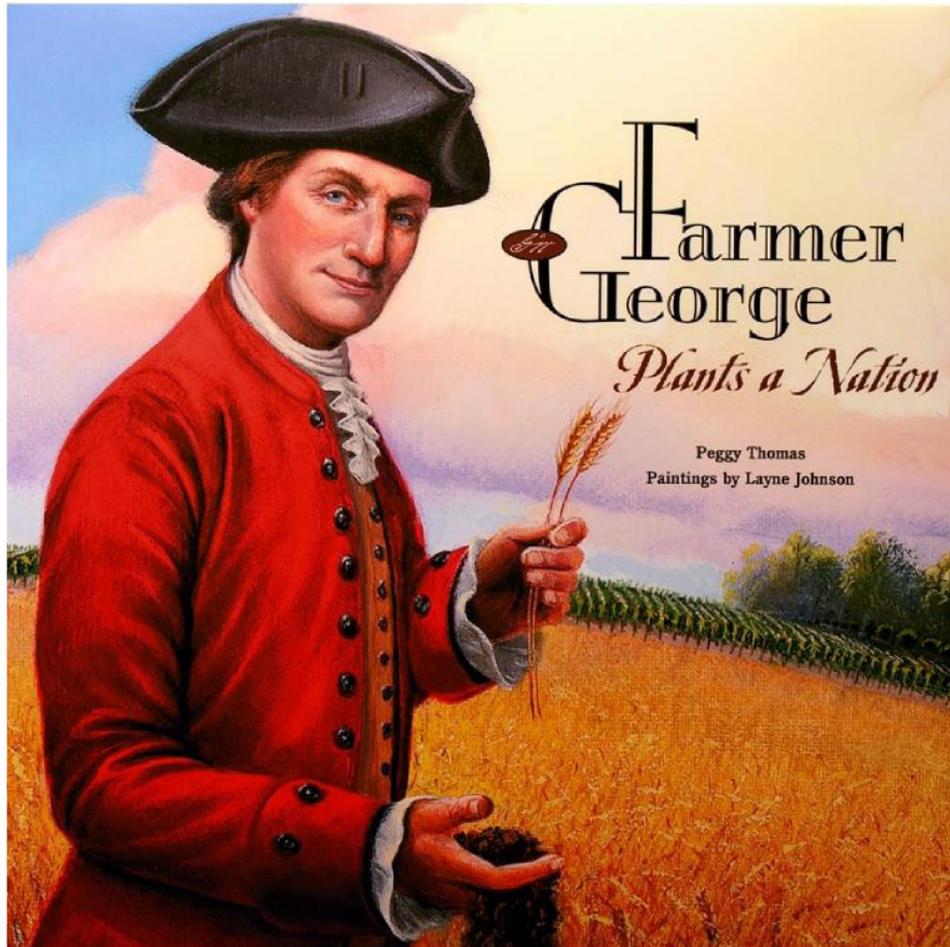


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# Farmer George Plants a Nation



*A Complementary Lesson Booklet for Farmer  
George Plants a Nation*

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# Soil Sam



## Objective:

*Students will:*

1. Have a better understanding of the growth and development of a seed
2. Understand the factors that affect the growth of a seed

*On Farmer George Pages:*  
10 - 11

*Curriculum Standards:*  
Common Core:

- Mathematics: CCSS.Math. Content.4.MD.A.2

Next Generation Science Standards:

- Matter and Energy in Organisms and Ecosystems: 5-PS3-1; 5-LS1-1
- Structure Function and Information Processing: 4-LS1-1.A

*Other Resources:*

*Diary of a Worm Doreen Cronin;*  
ISBN-13: 978-0060001506

*A Handful of Dirt by Raymond Bial;*  
ISBN-13: 978-0802786982

## Materials Needed:

- |                                       |   |
|---------------------------------------|---|
| <input type="checkbox"/> Potting Soil | <input type="checkbox"/> Untreated Grass Seed |
| <input type="checkbox"/> Fabric       | <input type="checkbox"/> Baby Food Jars       |
| <input type="checkbox"/> Water        | <input type="checkbox"/> Knee High Stockings  |
|                                       | <input type="checkbox"/> 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.

**Objective:**

*Students will:*

1. Observe the germination process
2. See what factors encourage and discourage growth

*On Farmer George Pages:*  
10 - 11

*Curriculum Standards:*  
Common Core:

- MCCSS.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

*Other Resources:*

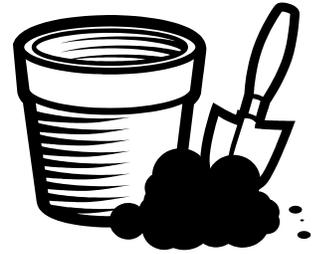
*Planting a Rainbow by Lois Ehlert;*  
ISBN-13: 978-0152626105

*The Tiny Seed by Eric Carle; ISBN-13:* 9780140557138

*Tops and Bottoms by Janet Stevens; ISBN-13: 978-0152928513*

*Pick, Pull, Snap by Lola M. Schaefer;*  
ISBN-13: 978-0688178345

# Growing Letters!



**Materials Needed:**

- |                                  |   |
|----------------------------------|---|
| <input type="checkbox"/> Seeds   | <input type="checkbox"/> Construction Paper           |
| <input type="checkbox"/> Glue    | <input type="checkbox"/> Spray Bottle with Water      |
| <input type="checkbox"/> Crayons | <input type="checkbox"/> 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 response, 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.

# Tree Rings

## Objective:

### Students will:

- Learn about the parts of a tree
- Understand telling signs of significant life events

*On Farmer George Pages:*  
20 - 21

### Curriculum Standards:

#### 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

#### Michigan Social Studies GLCE:

- I. Historical Perspective Early Elementary

### Other Resources:

*I Can Name 50 Trees Today!* by Bonnie Worth; ISBN-13: 978-0375822773

*My Little Corner of the World* by Beth Burch Smith; ISBN-13: 978-1878096364

*The Tree Farmer* by Chuck Leavell & Nicholas Cravotta; ISBN-13: 978-0615355207

## Materials Needed:

- Crayons
- Pens/ Pencils
- Tree trunk or branch cross-sections
- White Paper Plates
- Blank Sticky Labels

## 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.

## “Grow” Further:

Michigan Forests Forever Program: <http://mff.dsisd.net/TreeBasics/TreeBasics.htm>

Forests are for Kids <http://www.idahoforests.org/kids1.htm>

Anatomy of a Tree <http://www.arboday.org/trees/RingsTreeNatomy.cfm>

# Every Tree For Itself

## Objective:

### *Students will:*

- Simulate how trees compete for their essential needs
- Learn how varying amounts of light, water, and nutrients affect a tree's growth

*On Farmer George Pages:*  
20 - 21

### *Curriculum Standards:* 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

### *Other Resources:*

*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

### *Materials Needed:*

- Tree trunk or branch cross-sections
- Three colors of poker chips (White, Blue, Red)
- 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.)
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

# Every Tree For Itself

## *Activity Continued*

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.
9. How many requirements did each tree get?
10. Does any tree lack a particular requirement?
11. What might happen to a real tree that lacked one of its requirements?
12. It might grow slowly or eventually die.
13. Is there such a thing as too much water, sunlight, or nutrients?
14. Yes, every species has optimum levels beyond which the tree becomes stressed.
15. 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.
16. 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 a drought.
- Use fewer nutrient chips, representing poor soil quality.
- Have students write a report addressing their opinion on which poker chip (resource) is the most important and why.

# Paper Bag Horse



Objective:

*Students will:*

- Learn about the role of horses and donkeys in production agriculture.

*On Farmer George Pages:*  
22 - 23

*Curriculum Standards:*  
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

Michigan Social Studies GLCEs:

- I. Historical Perspective (later elementary) II. Geographic Perspective (later elementary)

*Other Resources:*

*Horse Dictionary: An A to Z of Horses Scholastic; ISBN-13: 978-0439926317*

*Leah's Pony by Elizabeth Friedrich; ISBN-13: 978-1563978289*

## Materials Needed:

- |                                     |  |                                      |
|-------------------------------------|--|--------------------------------------|
| <input type="checkbox"/> Lunch bags | <input type="checkbox"/> Scissors        | <input type="checkbox"/> 20mm Jiggle |
| <input type="checkbox"/> Markers    | <input type="checkbox"/> Old Newspaper   | eyes (Optional)                      |
| <input type="checkbox"/> Yarn       | <input type="checkbox"/> Glue or Staples |                                      |

## Directions:

1. Cut the top 3/4 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.

## Writing Prompt:

Have students read pages 22-23 of Farmer George. What did George Washington create using horses and donkeys? In your opinion, was this a good idea? How does this compare to farming today? Use key details drawn from the book. Support your opinion using words and reasons from the book.

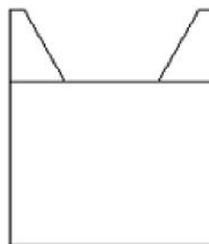


Figure 1



Figure 2

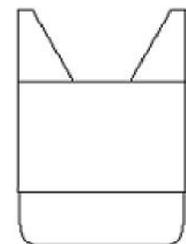


Figure 3

# Wheat Milling



## Objective:

### Students will:

- Be introduced to the commodity of wheat.
- Learn how the wheat plant becomes food.

### On Farmer George Pages:

26 - 27

### Curriculum Standards:

#### Common Core:

- CCSS.ELA-Literacy.RI.4.3; RI.4.4; RI.4.5; RF.4.3a

#### Michigan Social Studies GLCEs:

- I. Historical Perspective (Middle School) II Geographic Perspective 1 & 2 (Late Elementary/Middle School)

#### Next Generation Science Standards:

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

### Other Resources:

*Bread Comes to Life by George Levenson; ISBN 1-58246-114-7*

*Bread Comes to Life DVD Scholastic; ISBN 0-545-05034-0*

*Bread Bread Bread by Ann Morris; ISBN-13: 978-0-688-12275-1*

*From Wheat to Pasta by Robert Egan; ISBN 0-516-26069-3*

## 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.
  - Stalk—the entire plant
  - Head—the part of the wheat plant that contains the kernels
  - Beard—the bristle-like parts of the wheat plant that cover and protect the kernels
  - Kernel—the seed from which the wheat plants are grown or that people harvest from the wheat plant to grind into flour
  - 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:
  - Hand out stalks of wheat to the students.
  - Break the head off the stem.
  - Make a straw out of the stem by breaking it to avoid the nodes.
  - Lay the wheat head flat on a hard surface and pat with your hand to shake out the kernels.
  - 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:

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 *Bread Comes to Life* listed to the left.

# Navigating the Mitten

## Objective:

### Students will:

- Have a better understanding of reading maps
- Learn the diversity of the specialty crops grown in Michigan

### Curriculum Standards:

#### Common Core:

- CCSS.ELA-Literacy.RI.4.1; RI.4.7; RF.4.4; W.5.7

#### Michigan GLECs:

- II. Geographic Perspective 2. (Later Elementary)
- V. Inquiry 1. (Later Elementary)

#### Next Generation Science

##### Standards:

- Interdependent Relationships in Ecosystems: 3-LS4-3

### Other Resources:

USDA National Agricultural Statistics online at [www.nass.usda.gov/Statistics\\_by\\_State/Michigan/](http://www.nass.usda.gov/Statistics_by_State/Michigan/)

## Materials Needed:

- Map of Michigan on page 11
- Markers or Crayons
- Internet access

## Instructions:

Have students research online to the answers to the below questions. Then have them write down each county in the black space and color in the county on the map.

1. This county is the smallest county in the state and is home to one of the largest retailers of dried fruit, Graceland Fruit. (yellow): \_\_\_\_\_
2. Largest county in the state that has approximately 300 lakes. (orange): \_\_\_\_\_
3. The National Cherry Festival is held annually in this county that is well-known for its historic fruit production on the Old Mission Peninsula (red): \_\_\_\_\_
4. This county is known for their National Asparagus Festival and the Silver Lake Sand Dunes. (green): \_\_\_\_\_
5. Least populated county in the state with the largest black bear population. (yellow): \_\_\_\_\_
6. Most populated county with the most owned livestock animal being poultry (purple): \_\_\_\_\_
7. Counties with a girl's name. One starts with the letter "C" and has 460 farms while the other starts with an "I" and has 1,020 farms! (pink): \_\_\_\_\_ & \_\_\_\_\_
8. County with a boy's name. This county starts with the letter "M" and is in the heart of the fruit belt of Michigan (blue): \_\_\_\_\_
9. Is another term for the limb of a tree. 75% of this county is farm land (brown): \_\_\_\_\_
10. This county name matches the name of the president who is on the \$20 bill. This county is #3 in beef cows, goats, and sheep production. (green): \_\_\_\_\_
11. The county that houses our state capitol \_\_\_\_\_
12. Shares the same name as a body of water where you can go fishing. Most of this county's agriculture sales are in cut Christmas trees and hay. (blue): \_\_\_\_\_
13. Is a type of metal and the two main activities here are mining and logging. (orange): \_\_\_\_\_

# Navigating the Mitten

## *Activity Continued*

14. This county's name is a Native American word meaning "a beautiful plain". It is known for maple syrup production (brown): \_\_\_\_\_
15. A county whose name is a body of water that is not a sea or a lake, and is covered by 64% farmland. (blue): \_\_\_\_\_
16. Most Western county in Michigan and is #1 in the state for wild rice production. (purple): \_\_\_\_\_
17. Most Eastern county in Michigan and has 1,049 farms! (pink):  
\_\_\_\_\_
18. This county is home of the magnificent Tahquamenon falls and is named after a Native American tribe. It is the #3 in the state for aquaculture production. (green): \_\_\_\_\_
19. This county shares its name with a Greek letter and is known as the butterfly capitol of the state, with thousands of Monarch butterflies stopping here as they migrate South. (yellow): \_\_\_\_\_
20. A county that shares a name with one of our great lakes and produces 1/3 of the state's 150,000 acres in sugar beets production. (red):  
\_\_\_\_\_

# Navigating the Mitten



# Navigating the Mitten

## *Activity Continued*

### *Answers*

1. Benzie
2. Marquette
3. Grand Traverse
4. Oceana
5. Keweenaw
6. Wayne
7. Clare & Isabella
8. Mason
9. Branch
10. Jackson
11. Ingham
12. Lake
13. Iron
14. Alcona
15. Bay
16. Gogebic
17. St. Clair
18. Chippewa
19. Delta
20. Huron