



Our Family's Tree Farm: Math Lesson

Grade Level/Age Range

3rd - 4th grade, 8-10 years old

Time

45 minutes

Purpose

To create an awareness of Georgia's forest industry and its importance to the students' everyday lives while emphasizing how tree farmers utilize math to manage their farms.

Georgia Standards of Excellence

3rd Grade

- **MGSE3.MD.7b:** Multiply side lengths to find areas of rectangles with whole number side lengths in the context of solving real world and mathematical problems, and represent whole-number products as rectangular areas in mathematical reasoning.
- **MGSE3.MD.8:** Solve real world and mathematical problems involving perimeters of polygons, including finding the perimeter given the side lengths, finding an unknown side length, and exhibiting rectangles with the same perimeter and different areas or with the same area and different perimeters.

4th grade

- **MGSE4.Md.3:** Apply the area and perimeter formulas for rectangles in real world and mathematical problems.
- **MGSE4.MD.8:** Recognize area as additive. Find areas of rectilinear figures by decomposing them into non-overlapping rectangles and adding the areas of the non-overlapping parts, applying this technique to solve real world problems.

Materials

- *Our Family's Tree Farm* by Steve McWilliams
- *Our Family's Tree Farm* Perimeter vs Area Worksheet
- Perimeter vs Area PowerPoint lesson

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Resources

- Georgia Forestry Foundation: gfagrow.org/foundation
- Georgia Tree Farm Program: treefarmssystem.org/georgia
- Georgia Forestry Commission: www.gatrees.org
- Society of American Foresters: www.eforester.org/

Vocabulary

Acre: unit of measuring land, about the size of a football field; 43,560 square feet

Area: the amount of space inside a boundary

Controlled Burning: a planned fire in a forest to clean out smaller vegetation that competes with trees for nutrients and that adds material to a wildfire that might cause it to burn out of control

Erosion: the movement of topsoil, the most fertile layer of soil, by water, wind, and other forces

Forest: a large or small area of land that contains mostly trees

Forestry: the practice of planting, managing, and caring for forests

Germinate: when plants take root, sprout and begin to grow

Harvest: the process of gathering crops, removing them from the place where they have grown

Logging: the business of cutting down (harvesting) trees and delivering them to a mill

Perimeter: total length of the sides; total distance around an area

Renewable Resource: any resource such as wood or solar energy that can be replenished over time

Thinning: the selective removal of some trees to improve the growth rate or health of the remaining trees

Tree Farm: privately owned forests that are managed for the owner's enjoyment and that help the environment and provide wood-related products

Wildfire: a large, destructive fire that spreads quickly over woodland or brush

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Background

Tree farms play a vital role in their local communities, providing many wood-related products and employment for the surrounding area. Georgia has more than 500,000 family tree farms supporting the forest industry. Math is consistently used by tree farmers. For example, farmers need to determine how many acres they want to plant and how many seedlings they will need for planting. Eventually, farmers will determine the amount of wood (volume) which will be harvested and what their total profits may be. To keep this lesson at a third grade level, the topics of focus will be on perimeter and area.

Procedures

1. Read *Our Family's Tree Farm* to the students or have them read to themselves. Provide time for them to review all information and make observations.
2. Lead discussion with the students about the following:
 - a. Was there any information which was surprising and new to them?
 - b. Were there any numbers they remember seeing in the book? What did those numbers represent?
 - i. 2,200 acres: how big the farm is, p4
 - ii. 500,000 family tree farms: how many family tree farms in Georgia, p4
 - iii. 23 million acres: how many acres the trees cover in Georgia, p4
 - iv. 200 years: how old the family tree farm is, p5
 - v. 50 years: more trees now than 50 years ago, p9
 - vi. 5,000 products: number of products made from trees, p9
 - vii. 700 seedlings: number of seedlings that can be planted in one acre, p12
 - viii. 80-90%: survival rate (amount which survives) of seedlings with good growing conditions, p12
 - ix. 100 rings: the number of dark rings which can be counted on a 100 year old tree, p14
 - x. 25-30 years: how long it takes for a tree to grow to become a utility pole, p20
 - xi. 150 countries: number of countries to which Georgia ships tree products, p 21
 - xii. 200 years: number of years girls want their family farm to continue to exist, p23
 - c. How do they think farmers use math?

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3. Explain that a tree farmer uses math, such as perimeter and area, to help plan what he/she wants to grow or raise on the farm. Use the PowerPoint lesson to assist.
 - a. If students already understand perimeter and area, then describe how a tree farmer uses these concepts to help plan the future of the farm.
 - i. If a farmer needs fencing, then he/she needs to know the perimeter of the farm.
 - ii. If a farmer needs to know the number of trees to plant on the farm, then he/she needs to know the area of the farm.
 - b. If the students do not know perimeter and area, then introduce these concepts by using the PowerPoint lesson.

4. Provide the *Our Family's Tree Farm* Perimeter and Area Worksheet for each student or student group to complete.

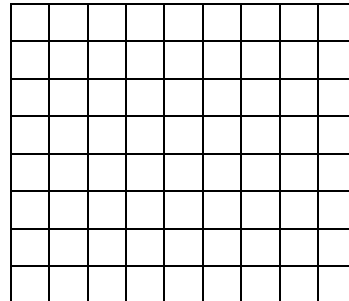
5. Answer key for worksheet

Perimeter

- 1) 3,050 ft
- 2) 1,500 ft
- 3) 211 ft

Area

- 4) 72 acres
 - 5) 28 acres, draw an array
- Putting it to use!: 2,800 seedlings



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Other Reading Connections

- **The Tree Farmer** by Chuck Leavell and Nicholas Cravotta
A grandfather who owns a tree farm takes his grandson on a magical journey through the forest, where trees become musical instruments, books, a baby's crib, and more.
- **Christmas Tree Farm** by Ann Purmell
This book examines the production and marketing of Christmas trees. It begins with harvest on a family-owned tree farm but progresses to planting tree seedlings in the spring.
- **Forestry** by Jane Drake, Ann Love, and Pat Cupples
Examines commercial forestry-the process and benefits. Includes research and development, raising seedlings, planting trees, tree farming, harvesting, lumber mills and papermaking.

Did You Know? (Fun Facts)

- Georgia is number one in:
 - Commercially available timberland (land available for growing trees).
 - Export of pulp, paper, and paperboard products; 21% of U.S.'s exports of pulp and paper.
 - Export of wood fuel; valued at \$165 million.
- 144,000 jobs are created in Georgia, directly and indirectly, from the forest industry.
- Georgia sportsmen spend more than \$1.8 billion annually, which contributes to 31,000 jobs.

Extensions

- **Go outside!** Have the students practice calculating perimeter and area with your school's playground.
 - Is a fence already available? Have them measure the perimeter of the fence to determine how much fence was used.
 - Have your students determine how many students can fit in a field by calculating the area. If each student needs 2 square feet of space, then how many children can fit in that field?
- Contact the Georgia Forestry Commission or the Georgia Forestry Association to request that a forester or a tree farmer visit the classroom. Have the students ask questions about the type of math they use in their careers.
- Have students record how their families use math every day for a week outside of school. Review what math was used and how it impacted them.



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Sources

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