

## Technology Lesson Plan

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**Title of Lesson:** “A Geometric Walk Through Tennessee”  
**Subject:** Resource Math II and III – “Foundations II”  
**Grade(s):** Ninth and Eleventh (combined class)

**Description of Project or Narrative:** Students will be guided through a review of finding the perimeter and area of polygons, and the circumference and area of circles. At the same time the students will also take a guided tour of the State of Tennessee discovering along the way not only geometric structures and shapes found in the state but also important geography facts that they should know as Tennessee citizens.

**Associated Curriculum Standard(s):** Foundations II

**Standard Number:** 2.0 Estimation, Measurement, and Computation

**Standard:** The student will apply appropriate tools and units of measurement, develop effective estimation and computation strategies, and calculate using appropriate tools such as mental mathematics, technology, manipulatives, and pencil-and-paper.

**Learning Expectations:** The student will

- .....2.1 select and apply an appropriate method for computing with real numbers, and evaluate the reasonableness of results;
- .....2.2 communicate the concepts and strategies being used in estimation, measurement, and computation;
- .....2.3 perform operations on simple algebraic expressions, and informally justify justify the procedures chosen;
- .....2.4 use concepts of length and area, including surface area and volume, to estimate and solve real-world problems (e.g., parallelograms, triangles, right rectangular prisms, circles, right cylinders, spheres, and pyramids);
- .....2.5 apply measurement concepts and relationships in algebraic and geometric problem-solving situations;

**Integration/Linkages:** Mathematics – Geometry

Geography – connect Geometry to art, architecture, construction, etc. in the state of Tennessee

**Standard Number:** 3.0 Patterns, Functions, and Algebraic Thinking

**Standard:** The student will describe, extend, analyze, and create a wide

variety of patterns and solve real-world problems using appropriate materials and representations.

**Learning Expectations:** The student will

.....3.1 recognize, extend, and create geometric, spatial, and numerical patterns;

.....3.2 analyze mathematical patterns related to algebra and geometry in real-world problem solving;

.....3.3 solve problems in number theory, geometry, probability and statistics, and measurement and estimation using algebraic thinking and symbolism;

.....3.4 communicate the meaning of variables in algebraic expressions, equations, and inequalities;

.....3.5 interpret the results of algebraic procedures;

**Hardware and Software Required:** Four lap top computers are needed for the lesson to be carried out by the students. An Internet access point is also required.

**Timeline:** The students will be given a 90-minute period to complete their assignment. Because it is third period and during the lunchtime schedule there will be some extra time past the 90-minute framework. Being a class of Special Education students the time frame may not be adequate as noted in individual IEP's – additional time

May be required as needed.

**Teacher Preparation:** Teacher preparation for this lesson involves teaching and preparing the students about formulas of circumference and area of circles, and formulas of perimeter and area of polygons prior to the lesson. A survey to be given ahead of time on each student's knowledge of computers is also necessary. A PowerPoint presentation on circumference, perimeter, and area of circles and polygons was created in preparation for the lesson of 50+ slides. The teacher must do a computer set up of the teaching lesson to be presented and set up for the student's computers. A box of puzzle pieces must also be prepared for each group of students in addition to supplies that will be used such as pencil, paper, and glue sticks. An explanation of what the students will encounter in their "Geometric Walk Through Tennessee" will also be discussed the day before the lap top lesson.

**Prerequisite Skills Needed:** Prerequisite skills needed by the teacher are a working knowledge of power point and how to do a web search. The teacher must learn how to create a slide, duplicate a slide, import graphics, create and hide links, and insert mathematical symbols. The importation of color and music also provides extra incentive for the students. Prerequisite skills needed for the students are knowledge of recognizing geometric shapes and the ability to use formulas in solving circumference, perimeter, and area. Students need to have prerequisite skills of algebraic equations set-ups. The students must also be acquainted with the computer and how to use the mouse; have a working knowledge of how to use hyperlinks and do a web search.

**Activities and Procedures:**

There will be two students per lap top computer. The students will also have pencil, paper, a puzzle box with puzzle pieces, and a glue stick. Each group of two students will be given the task of solving a total of twenty problems involving circumference, perimeter, and area. In each problem they will be given a narrative question, a pictorial representation, an algebraic set up for solving the problem, and a choice of four answers. There are hints and suggestions throughout to help stimulate thinking. Hyperlinks will be provided that will take them to definitions and illustrations of terms used that they are not quite sure of...examples: pi, polygon, quadrilateral. Hyperlinks will also be provided for the various formulas. The students will work the problems with paper and pencil before choosing their answer A., B., C., or D. Upon choosing each answer the students will immediately be reinforced and discover whether they have been successful or not.

Upon solving and choosing the correct answer the students will be immediately hyperlinked to a puzzle geometric question about their state of Tennessee. They will then link to a website where they will do a web quest searching for the puzzle solution. Example: What quadrilateral is the state of Tennessee. Once they discover the answer to their puzzle they will go to a puzzle box provided and search for their geometric shape. Upon finding it they will follow the directions given on the puzzle page and number the puzzle piece and glue to the base shape that they have discovered on the first puzzle. There is a puzzle piece for all twenty problems. When reaching the twentieth puzzle the students will be taken to a Tennessee State Website where they will take a short quiz about their state. Throughout their puzzle walk and search they will have encountered the answers to each of the questions asked. They will take the quiz on the computer and print. Upon completion of the last puzzle piece, the quiz, they will turn it in along with the puzzle and the hard copy of problems that they have completed.

**Sample(s) of Student Work:**

See Hardcopy.

**Assessment and Evaluation:** Each student or group of students will be evaluated by their ability to successfully complete the twenty problems given in the power point presentation. A hard copy of the formula used for each and the steps leading to and final solution must be presented at the completion of the lesson. Each student or group of students must also turn in a completed map of the state of Tennessee with its numbered puzzle parts to demonstrate their accomplishments of searching the web and discovering geometric shapes which are found in the state. A project grade will be given for each of these parts. A participation grade will also be given to each student based upon his, her or his or her ten-question Tennessee quiz at the end of the lesson.

Describe to the learners how their performance will be evaluated. Specify whether there will be a common grade for group work vs. individual grades.

Each student or group of students will receive two grades for the assignment. The first grade will be given on their hard copy work that is submitted after the completion of the assignment. This consists of the correct solving of the geometric problems in the power point presentation. Because the presentation is set up with multiple choice answers and is self-correcting there should be no wrong answers on their hard copies. The teacher will be looking for algebraic formulas for each problem and the step by step process in showing how the problem is to be solved by substituting the correct numerals for the variables in the formulas. The correct solution will also be important as well as the correct unit of measure. The teacher will also be looking at the completed puzzle to see whether the student has integrated and recognized the geometric shapes in his or her environment. The second grade given will be a participation grade. This grade will reflect the amount of effort put into the presentation assignment. Because the student will be given the opportunity whether to work in pairs or alone the main part of this grade will be that of staying on task and completion of the assignments given. The students will each be given the Rubric which follows with their evaluation.

**RUBRIC EVALUATION:**

	<b>Beginning (50%)</b>	<b>Developing (70%)</b>	<b>Accomplished (90%)</b>	<b>Exemplary (100%)</b>	Score
	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	
<b>Use geometric formulas to calculate perimeter, circumference, and area of various figures</b>	Student will recognize and classify common geometric polygons according to the number of sides. He will also recognize other integral parts such as height, base, and right angles as well as circles with components of pi, radius and diameter.	Student will recognize and associate the formulas for finding the perimeter and areas of basic two-dimensional figures, including rectangles, parallelograms, trapezoids, squares, triangles, and circles. The student will also differentiate the difference in the unit of measure	Student will routinely use formulas for the finding of perimeter and areas of basic two-dimensional figures, including rectangles, parallelograms, trapezoids, squares, triangles, and circles.	Student will recognize, appreciate, and integrate the many applications of geometry in their state and the world around them.	

		associated with perimeter and area.			
<b>Participation</b>	Student stayed on task.	Student worked effectively through & completed problems using the hyperlinks provided.	Student followed directions and completed the pencil/paper task part of the assignment.	Student searched the web and found the puzzle pieces needed to complete the assignment.	

**Follow-up Activities:** The day after the presentation each group of students will share the puzzle map of Tennessee that they have created. As a class the students will discuss each piece inside the puzzle and the facts that they have learned about each geometric shape while doing their web search. The students will also be given an opportunity to do another web quest finding more geometric shapes hidden in their state of Tennessee.