## MATH Learning Plan

<table>
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<tr>
<th>Topic of lesson:</th>
<th>Euclidian geometry</th>
<th>Subject Area:</th>
<th>Mathematics</th>
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<td>Grade level:</td>
<td>Cycle 1</td>
<td>Unit:</td>
<td>The Influence of Ancient Greece on Western Societies (Interdisciplinary)</td>
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### Big Idea:
How Geometry/Math Applies to Everyday Life

### Essential Questions:
1. Can I find geometric shapes (i.e., triangles) in day-to-day life?
2. How can I usefully model the world using geometry?
3. What important geometric relationships will help me solve these real-world problems?

### Understandings:
Explanation of how to compare areas of shapes. Interpretation of a mathematical formula. Application of the equations to cutting out shapes. Self-knowledge to reconsider initial assumptions.

### Resources Required:
- Teacher needs blackboard and chalk
- Students need construction paper, pencil, ruler, string, scissors, calculator

### Learning objectives:
- To learn the equation for perimeter of a rectangle and triangle
- To learn the equation for area of a rectangle and triangle

### Learning activities:
- Today’s lesson will be very hands-on, allowing the students to “play” with the mathematics.
- Question: Ask students to name as many geometric shapes as they can.
  - Expected answers: square, rectangle, triangle, circle, pentagon, parallelogram, etc.
  - Keep a list of student answers on blackboard.
- Question: Ask students something interesting they could name about these shapes.
  - Expected suggestions: number of sides, length of sides, “pointy” vs. “round” shapes
  - Keep a list of student suggestions on blackboard.
- Introduction to the concept of perimeter
  - Group activity: Students will be put into groups.
    - Each group creates a shape on the floor with provided string and tape.
    - Each group reports back on how many “steps” it takes to walk along the string of the shape.
- Introduction to the concept of area
  - Students remain in their same groups, with the same shapes outlined in string on the floor.

### Cross Curricular Competencies (CCC):
- CCC #1: Uses information
  - Systematizes the information gathering process
  - Puts information to use
- CCC #5: Adopts effective work methods

### SAC Subject Area Competencies (SAC):
- SAC #2: Uses mathematical reasoning
  - Relationship between concepts and processes
  - Establishes conjectures
- SAC #3: Communicates by using mathematical language
  - Analyzes a situation mathematically
  - Produces a mathematical message

### QEP Subject Area Competencies (SAC):
- SAC #3: Communicates by using mathematical language
  - How to calculate perimeter of various shapes
  - How to calculate area of various shapes
  - How to construct these shapes to have specific properties

### Students will understand (learning objectives):
- What perimeter is
- What area is
- That properties of different shapes are (or are not) related

### Relevance:
We often encounter geometry problems in areas of life we might consider unrelated to math! For example, in carpentry, we need to know how to cut the wood to proper shapes and dimensions to build a [heck]

### Materials:
1. Can I find geometric shapes (i.e., triangles) in day-to-day life?
2. How can I usefully model the world using geometry?
3. What important geometric relationships will help me solve these real-world problems?

### Comments:
- **LJS1**: There are 2 cycles – what grade level or section is this for? Is Grade 7 in Sec. 1?
- **LJS2**: I don’t think you need this question. The other two are better and will help students get a where they need to go.
- **LJS3**: I suggest choosing fewer understandings to create more focus and depth of understanding.
- **LJS4**: True but how many students actually do this? Try to consider what they actually do. Would this work? Getting to school, taking shortcuts, having intersections where students could cross diagonally because all of the lights are red as opposed to crossing one direction, having to wait then crossing the other direction.
- **LJS5**: Don’t forget to include the actual content or key things they must learn i.e. Formula or equation.
- **LJS6**: Include explanation of what happened last day and how it relates to today.
- **LJS7**: Explain these more specifically in relation to the learning in THIS lesson. Just listing it does not demonstrate that you understand what they are and how to address them effectively.
- **LJS8**: Are they using tools to do this (ruler and calculator)? If so they will also have to know how to use the tools.

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1 Template based on a modified version of Understanding By Design (UBD): some notation used as suggested by Reyana Hadef
Each group sees how many feet/shoes they can fit into the inside of the shape (there will be more than enough students to "fill" each shape).

- Report back as to how many feet/shoes they were able to fit inside the shape
- Summarize the findings of the groups based on the different shapes they had
  - If possible, infer characteristics about certain shapes versus others, e.g. does same perimeter mean same area? Use judgement based on how "accurate" the students' results seem to be
- Create actual "equation sheet" on the blackboard, to remain for rest of class time
  - Similar to [http://imgur.com/2yDAHQQ](http://imgur.com/2yDAHQQ)
- Handing out required materials (construction paper, scissors, etc.), ask students to individually trace and then cut out a rectangle
- Swap rectangles with a friend next to you, and calculate the perimeter and area of your friend's rectangle using your ruler and calculator
- Ask students to create a triangle whose area is exactly 40 cm², to be handed in as an "exit slip"

- Learns to effectively translate words of a problem first into geometry, and then into measurements, allowing for solution through geometric formulations
- CCC #8: Cooperates with others
- Learns to complete group activity through teamwork

**Differentiated Instruction:**
Varied presentation of the math, using hands-on activities, pictures, and formulas.

**Further considerations:**
Appeal to various learning styles by differentiating the content. Creativity and higher order thinking encouraged by multiple hands-on activities; first in peer groups to break the tension of the new subject, and then later on individually to allow certain students to accelerate their pace while others can be given more focused attention.

**FORMATIVE - Assessment FOR learning:**
Having students do the group activity of "walking off" the rope that makes up a shape, or seeing how many "feet" they can fit inside that shape provides motivation to wanting to learn how to more definitively talk about these ideas of perimeter and area.

**FORMATIVE - Assessment AS learning:**
Having students swap geometric shapes and "correct" their partners' perimeters and areas shows understanding of the content.

**SUMMATIVE - Assessment OF learning:**
Handing in their constructed triangle as an exit slip to see if they understood how to create a geometric shape with a specified area

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**Comment [LJS9]:** Unless you are actively teaching them how to work collaboratively, this is more of a corollary than a focus. Plus just having them work together does not mean they are learning how to do it well.

**Comment [LJS10]:** How will they get feedback? If they do this activity wrong, how will they know?

**Comment [LJS11]:** Good idea.