Lesson Plan

Name: John Walker
Grade level(s)/Subject taught: Math 7
Objectives: Students will be able to • Determine the area for Monroe, Wayne and Victor Counties by measuring the size of each county. • Utilize the Arc GIS program (or Google Earth). • Determine the accuracy of your answer by referring to the ArcView data table. • Use conversion factors.

1. <u>Mathematical Concept:</u>

Students will determine the area of several counties.

2. <u>Materials:</u>

   1. 6 computers with GIS or google earth
   2. 1 printer networked to the computers
   3. 6 calculators
   4. 25 pencils
   5. 25 answer sheets

3. <u>Lesson Format:</u>

INTRODUCTION: As students enter the class, they will be placed into groups of three or four at each computer station. Students will receive a review of basics of using the ARC GIS program (or google earth). A bellwork handout with three questions pertaining to the area will be given. Once students have completed their bellwork, as a class we will review ARC GIS (or google earth) and discuss the following:
 	
    -how to add layers to a map
    -how to zoom in on a particular area
    -how to calculate the distance of certain points using the measuring tool
    -how to convert units

DIRECTIONS:

ArcView Steps for Problem Set 1

Step 1   Open ArcView.

Set your Working Directory.

PC   Start ArcView by selecting: Start | Programs | ArcView |
Users:
Open ArcView and select File | Open Project | ArcView Projects | Mathematics-7th | MathL3.apr

Set your Working Directory.

Step 2   To view the data you must display the themes or data layers.
Make **counties** visible by checking the box to the left of the name.
With your teacher's permission you may change the colors and symbols displayed in the view.

Step 3   In order for you to have access to the data you must make the data layer active.

Make the layer active by clicking on it. The button should appear to be raised.
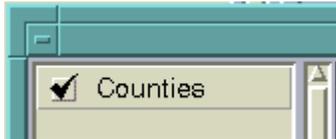
Step 4   Zoom to the extent of the counties, which is now your active layer. When you zoom to the extent of a theme, you are able to view the entire data layer.

Questions for Problem Set 1

Note: Refer to the Area section of your textbook.

Question 1	For Question 1 you will determine the approximate area for Monroe, Wayne, and Victor Counties located in New York.

a) How would you determine area if all you were given was the shape of the county and a unit of measurement?

b) What is the formula used to determine the area of a square?

c) What is the formula used to determine the area of a rectangle?

You will be using the **Measure Distance** tool to determine the length of county boundaries.

First, **Zoom In** on **Monroe County**. Click on the **Measure Distance** tool , a small crosshair and a right angle rule should appear in the view (make sure the cursor is in the view window).

Place the crosshair on a corner of the county. Hit the one button of your mouse and then drag the ruler to the opposite corner and hit the one key of your mouse again.

Note: To reset the Measure Distance tool you must re-click on the icon.

As you drag the crosshair across the screen look in the lower left hand corner of the ArcView window. You should see numbers defined as **Segment Length** and **Length**. These indices are measuring the distance the ruler is moving across the map in the map units.

d) What unit of measurement is the map being measured in?

Take a few seconds to get use to the Measure Distance tool.

Now, as precisely as possible use the **Measure Distance** tool to measure the width and height of the rectangle (Monroe County).

Remember to click on the **Measure Distance** tool each time you measure a new length.

e) Determine the area for Monroe County. Be careful of your units.

You now want to view the entire state. Use the Zoom to extent of all themes button.

Question 2   **Determine the area for Wayne County.**
Repeat the steps from question one, using the **Measure Distance** tool 📐
and the **Zoom In** 🔍 tool.

Question 3   **Determine the area for Victor County.**
Repeat the steps from question one, using the **Measure Distance** tool 📐
and the **Zoom In** 🔍 tool.

Question 4   Use the **Identify** tool 🛈 to select and list the ArcView county data. Click the
Identify tool on Monroe, Wayne, and Victor Counties. Notice how the
information in the table changes as you select different counties.

**a) What are the ArcView areas displayed in the 'Identify Results' table
for Monroe, Wayne, and Victor Counties?**

**b) How do your results for Monroe, Wayne, and Victor Counties
compare to the ArcView data?**

Close the 'Identify Results' table. Click on the ⬚ in the upper left hand
corner of the table and zoom out to full extent of the theme 🗺️

Question 5   For the last question of Problem Set 1, you will convert the area of Monroe
County to acres.
Use the ArcView data you recorded from the 'Identify Results' table.

1 square mile = 640 acres

Convert area in square miles for Monroe County to acres.

*That's all for
today*   Click on the Unselect All button ▦.

With your teacher's permission you may exit Arcview. Click on File/Exit.

PRODUCT:
Today you will complete one answer sheet per person.

CLEAN-UP:

1. Make sure that all materials are back in the basket.
2. Make sure that you have logged out of the computer.

ASSESSMENT:

Students will be assessed on a 4 point scale:

Score	Description
4 points	Answer sheet is accurate, worked well at computer station, stayed focused, and participated in class discussion.
3 points	Worked well at computer station, stayed focused, and participated in class discussion.
2 points	Stayed focused and participated in class discussion.
1 point	Participated in class discussion.

Sample
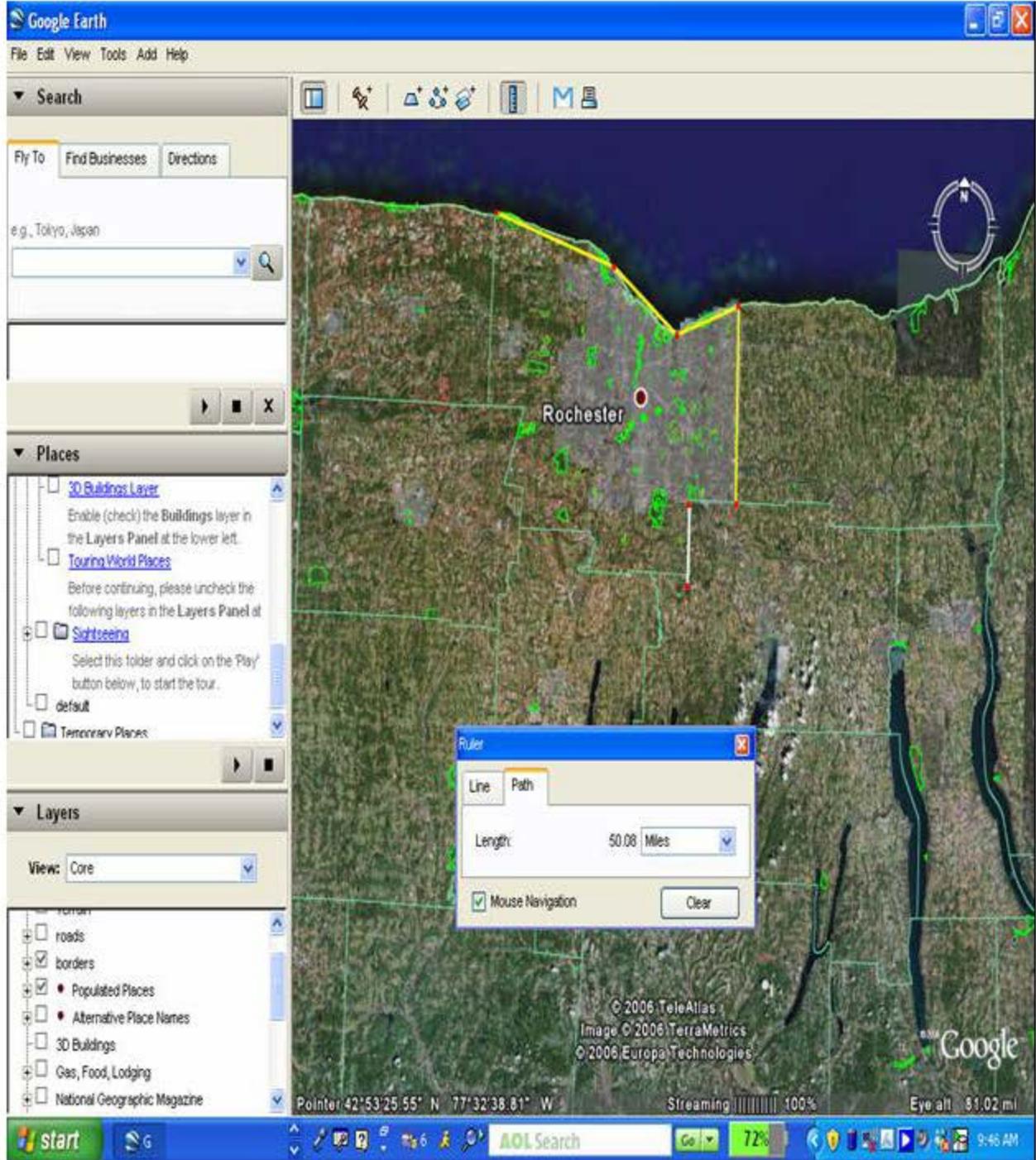
CONCLUSION:

At the end of the lesson students will be able to

- Demonstrate proficiency in ARC GIS (or google)
- Determine the area of real life situations
- Label and calculate properties of polygons
- Display the purpose of visual representations of data

REVIEW:

Students will complete a "ticket out the door" where they will discuss one thing that went well in the class and one thing that could have gone better.