Name: Kilo-centi-milli What?

Subject: Geography and Math

Grade: 6-8

Goal:

This lesson will help students understand the basic concepts of measuring distance in a GIS and converting distance units by hand.

This lesson is great to use for National Metric Week (celebrated during the week in which October 10 falls).

Materials:

- Pictometry Online (http://pol.pictometry.com/)
- Computers for each student or pair of students
- Conversions Worksheet
- Calculator (students)
- Pencil (students)

Expected Duration: One 45 to 50 minute period with homework

Objectives

Academic Standards:

Pennsylvania:

7.1.6A
Describe how common geographic tools are used to organize and interpret information about people, places, and environment.

2.3.8A
Develop formulas and procedures for determining measurements (e.g., area, volume, distance).

2.3.8F
Estimate and verify measurements of rate and mass.

Assessment

Student understanding will be assessed by successful completion of a homework assignment based on what was learned in class.

Student Objectives: (*related to assessment)*

As a result of this lesson, the students will be able to:

1) Measure distance between two places
2) Convert measurements to and from metric and from various metric units

Lesson Development

Anticipatory Set

Ask students to show you how far various measurements are using their bodies. Centimeter, meter and feet are good measurements to use for this. Tell students they will be measuring distances between places in Pittsburgh.

Teaching Procedures/Instructional Process:

1. Explain to students the difference between the U.S. Customary Units System, used by the United States, and the Metric System, used commonly in scientific fields and by many other countries. Explain that it is easy to convert between these two measurement systems, using simple conversion factors. Also explain that it is easy to convert between units in the metric system, because it is based on powers of ten.
2. Show students how to do a basic conversion from standard units to metric units and metric to metric conversion.
3. Have students log onto Pictometry Online via the website http://pol.pictometry.com/
4. Distribute the distance conversions worksheet to students. Explain that they are only to complete part one in class. Part two will be completed at home for homework, and they may only start working on it in class if they have finished part one.
5. Show students how to measure distance using the POL software.
6. Allow students to work independently, or in groups of no more than two, to measure the distances between the Pittsburgh locations. Make yourself available to assist any student that needs help.
7. Five minutes prior to the end of the period have students stop working and get ready to head to their next class. Make sure to remind students that part two of their worksheet will be due the following day, and that each student must turn in a worksheet, regardless of whether they worked in pairs to do the measurements or not.
8. Dismiss students at the bell only if they have cleaned up their work area.

Guided Practice/ Monitoring

Students will measure distance using POL software. This can be done individually or in pairs.

Closure

While students are cleaning up, ask them if it is realistic to say that they will walk a distance in centimeters or that their pet fish is so many kilometers long? Why are units important?

Independent Practice / HW

Students will complete part two of their worksheet, converting distance into various units. Students MUST show all work to receive full credit.

Differentiated Instruction

Modify the worksheet so that students have fewer conversions to do. Make sure that these conversions are similar (cm->km, km->miles, etc). Pair IEP students with each other, so that students have a support system.

Content Notes and Questions for Students

Common Metric Conversions:

Length	millimeter	mm	10 mm = 1 cm
	centimeter	cm	100 cm = 1 m
	meter	m	
	kilometer	km	1 km = 1000 m

1 centimeter = 0.393700787 inch

1 kilometer = 0.621371192 miles

Name: _____

Measuring and Converting Distance with Pictometry Online

Part One

Directions: *Measure the following distances using the Pictometry Online Software. Record the distances below. Measure all distances in miles!*

1. Carnegie Science Center to Heinz Field

2. Heinz Field to PNC Park

3. Cathedral of Learning to Phipps Conservatory

4. Phipps Conservatory to Schenley Park

5. Schenley Park to the National Aviary

6. Station Square to Mount Washington

7. Mellon Arena to the location of the Consol Energy Center (at the intersection of: Washington Place, Centre Ave. and Fifth Ave. near Mellon Arena)

8. PPG Place to Gateway Center

9. Carnegie Mellon University to the University of Pittsburgh

10. Shadyside to Bellefield (Pittsburgh Neighborhoods)

Part Two

Directions: *Convert the distances you measured using the Pictometry Software into the units given. You must show ALL work to receive full credit. You may attach additional pages to show work, but answers must be recorded on this page.*

1. Carnegie Science Center to Heinz Field in **INCHES**

2. Heinz Field to PNC Park in **FEET**

3. Cathedral of Learning to Phipps Conservatory in **METERS**

4. Phipps Conservatory to Schenley Park in **KILOMETERS**

5. Schenley Park to the National Aviary in **KILOMETERS then METERS**

6. Station Square to Mount Washington in **FEET**

7. Mellon Arena to the location of the Consol Energy Center (at the intersection of: Washington Place, Centre Ave. and Fifth Ave. near Mellon Arena) in **KILOMETERS THEN MILLIMETERS**

8. PPG Place to Gateway Center in **INCHES THEN CENTIMETERS**

9. Carnegie Mellon University to the University of Pittsburgh in **CENTIMETERS**

10. Shadyside to Bellefield (Pittsburgh Neighborhoods) in **KILOMETERS THEN CENTIMETERS THEN INCHES**