Lesson Title	Units, Units, Units
Length of Lesson	50 minutes
Created By	Shane A. Irvin
Subject	Algebra, Geometry, Math SL
Grade Level	9^{th} –12^{th}
State Standards	Algebra 4a
DOK Level	DOK 2
DOK Application	Verify, Inquire, Understand, Measure, Determine
National Standards	Understand measurable attributes of objects and the units, systems, and processes of measurement
Graduate Research Element	Unites are important in my research and writing. I deal with many water quality parameters with similar units but completely different methodology. It is important to track every unit I use to prevent mixing parameters.

Student Learning Goal:
As the students conclude the year, one thing that they can leave the classroom with feeling strong about is units and their application in mathematics. Some of the students throughout the year have always given correct answers but no units. It is important that the students realize the importance of such a small detail. By going over my personal research with the students and also showing them specifics where units can make or break a calculation, the students will see this importance.

The learning goal of this lesson is to show the students specific measurements and test. Using their own judgment, the students will have to specify what they think is the best unit. Examples of this will be through analysis of the experiment that the student is conducting. The students will be in charge of figuring out what units should go with what due to what their original procedures were (i.e. part A = mg, part B = liter, part A / part B = mg/liter). This analysis will show them how easy unit collection is but also how important it is for all aspects of science and mathematics.

Materials Needed (supplies, hand-outs, resources):
Construction paper, objects around the room, writing utensil, paper

Lesson Performance Task/Assessment:
The assessment for this lesson will involve the students and their ability to measure and determine the best units for specific objects. While most of the activity is exploratory, the students will be required to explain how they came up with specific units. Since some of the units will be fictitious, the students will have to explain why they chose the units and why they may or may not be fictitious (i.e. it takes 15 books to cover the table so, the area of the table is 15 books per table). In this case the units are fictitious, or not defined for normal usage. While the units are not defined for normal usage, they can and

should still be used for the assessment. The students cannot just say the table is 15…15 what???

Lesson Relevance to Performance Task and Students:
The lesson is relevant to the students because they will continue to see units the further in education they get. In most cases, the students will only be faced with more and more units. It is important that the students start to connect with all units, even ones they do not fully understand. While they may not understand the units at a specific time, as they learn more about what the unit is used for it will begin to click.

The students' relevance to their task at the time is a continuation on the development of units in mathematics. Numbers are important in mathematics and sometimes units are ignored. This prevent full understand and can harm the student in later science and upper mathematics classes.

Anticipatory Set/Capture Interest:
The students' anticipatory set that is designed to capture their interest will be involved with my research as well with normal science nomenclature. The problem will be put on the board. How many milligrams per liter is in one part per million? This question will get the students wondering what each unit is. They will try and decipher through the difference in units and the application of numbers, just to be revealed that the numbers are essentially the same.

Guided Practice:
The students will be walked through examples of units and their importance to mathematics and science. The students will be shown a few diagrams and try and determine the units used in those diagrams.

Some of these diagrams will include linear measurements, temperature, cubits, etc. The students will be given in detail what will need to be done for the independent practice by showing them examples of objects around the room.

Independent Practice:
The students will be responsible for making one out of construction paper. A shape outside the normal boundary shapes will be encouraged. The students will then try and measure this with object within the means of another object. They will try and determine the amount of the created shape compared to other objects around the room including other students' work.

The objects will then be shown to the teacher as well as the units behind the object, whether it is the objects amount compared to one single object or another object of many compared to the created one (i.e. 15 chesspieces/shape), with chesspieces/shape being the unit.

While the lesson is elementary, it helps the students practice their units and will show the students the importance of not forgetting them.

Remediation and/or Enrichment:

Remediation:

In situations that remediation is needed the student can see the instructor for one on one tutoring. The student can also be paired with a high performing student with full understanding of the lesson.

Enrichment/Extension:

All of these extensions depend on the students' ability and knowledge of the subject matter. The student will have the opportunity to explain specifics about how they came up with specific units. Advanced students will be able to try and classify their created units with real world units.

Check(s) for Understanding:

If the student can disclose what they found out without hesitation and explain why they chose specific units, the student will be determined that he/she understands the subject material.

Closure:

The students will receive a closing discussion about the importance of units in research and documentation. Without units, many discoveries would be sent back and never published because other people must know units. Units also help with determining fake or incomplete measurements.

Possible Alternate Subject Integrations:

This lesson can be created and modified for any subject area. It is a great lesson to be taught at the beginning of a unit intensive science or mathematics class.

Teacher Notes:

http://www.onlineconversion.com/

http://en.wikipedia.org/wiki/Units_of_measurement

http://www.digitaldutch.com/unitconverter/