Kai Wang **10/25/04**
8th Grade Science
Units

AGENDA: Students will be able to understand the concepts of different conversion units and their importance in everyday life

STANDARD 1: Recognize and interpret different units
Understand which units are used for measuring what dimensions

STANDARD 2: Be able to convert different units into their respective dimensions

STANDARD 3: Present and explain their findings

Time Frame: 1 class period (45 min)

Materials: Rulers – any type will do, as long as it at least has US standard on it

1) Activator: Question/Answer: match correct quantity with their correct units of measurement – to be done on the board (actual conversion units need not be written down on board at first), mix up units and have students match them, add in kN, g, and cm to see if they get confused with prefixes. Add in material that we've done in the past (acceleration, temperature)
Note: so that students don't get bored, let them know that our purpose here is to expose them to the material

Useful Wesbite: Mars climate orbiter incident –

http://www.cnn.com/TECH/space/9911/10/orbiter.03/

Conversion Units from:
"Engineering Mechanics: Statics and Dynamics 8th edition, R.C. Hibbeler"

Force	lb	4.4482 N
Mass	slug	14.5938 kg
Length	ft	0.3048 m
Volume	L	
Time	sec	
Kilo-	10^3	
Mili-	10^{-3}	
Centi-	10^{-2}	

1 ft = 12 in
1 mi = 5280 ft
1 kip (kilopound) = 1,000 lb
1 ton = 2000 lb

(No more than 10 minutes)

2) Instruction/Interaction:
   a) Have each student measure the length and width of their desk using their hands at first, then their notebook

   b) Have each student calculate the area of their respective objects

(ideally approx 20 min)

3) Discussion/Results: Complete in-class worksheet and explain how to convert units

(approx 10min)

4) Wrap Up / Assessment: For homework, students are to an assessment worksheet of 9 questions which tests their knowledge of the concept being taught

(approx 5min)

5) Worksheet Questions:

1) Calculate the height of a 5 foot man in cm and in mm (1 inch = 2.54 cm)

2) Calculate the capacity in liters of a 10 gallon aquarium (1 gallon = 3.78 L)

3) How many seconds are there in 3 hours?

4) How meters are there in 5 miles? (1 mile = 1.61 km)

5) How many Newtons are there in 150 lbs? (1 lb = 4.4482 N)

6) If your driving at 50 mi/hr for 10 hours, how far have you traveled?

7) If your speed has changed from 50 mi/hr to 70 mi/hr over a period of 10min, what is your acceleration?

8) If it takes a ball 7 min to drop in the moon, calculate the distance that it fell knowing that the acceleration on the moon due to gravity is $1.7\frac{m}{s^2}$

(Recall that for an object falling from rest, we use the equation d = $\frac{1}{2}at^2$)

9) One day on Mars is the same as 24 hours and 37 minutes on Earth.
   a) How many "Earth Seconds" are there on Mars?

b) How many "Earth Years" are there on Mars?

http://pweb.jps.net/~gangale3/krutein/

MARS AND EARTH DATA

Mars		Earth
4,242 Miles	Diameter	7,973 Miles
668 Sols	Length of Year	365 Days
24 Hours, 37 Minutes	Length of Day	24 Hours
142.5 Million Miles	Distance from Sun	93.5 Million Miles
0.379g	Surface Gravity	1g
10 Millibars	Atmospheric Pressure	1,000 Millibars