



*Drexel-SDP GK-12 ACTIVITY*

## Activity Template

**Subject Area(s):** Measurement

**Associated Unit:** None

**Associated Lesson:** None

**Activity Title:** Metric Scavenger Hunt

**Grade Level** 6 (5-7)

**Activity Dependency:** None

**Time Required:** 30 minutes

**Group Size:** 1

**Expendable Cost per Group:** US \$0

### Summary

Students learn about the metric system by using objects in the classroom. First, students are given the conversion factors from the US standard system then they find objects in the classroom and estimate how long they are. The students then measure the object and calculate the difference between their estimate and the actual value. Students are familiarized with the metric system by directly implementing it.

### Engineering Connection

Engineers need to be very comfortable with the metric system, estimation, and error calculations. This activity allows students to become familiar with the metric system by using estimation techniques and then calculating their error. Engineers also must be skilled in order of magnitude approximations; this activity allows students to practice these approximations.

### Keywords

error, estimation, measurement, metric system,

### Educational Standards

- Science: 3.1D

- Math: 2.3

### **Learning Objectives**

After this lesson, students should be able to:

- Estimate the lengths of objects using the metric system
- Be familiar with metric prefixes
- Calculate the difference between estimated and actual values

### **Materials List**

Each group needs:

- A metric ruler with millimeter markings

To share with the entire class:

- A few meter sticks

### **Introduction / Motivation**

In September 1999, NASA lost a 125 million dollar Mars orbiter because one team working on the orbiter used metric units and another team used English units. Understanding units is important to everyone because we use units everyday. The grocery store has items that are priced per pound or per ounce and construction sites use different units of length all the time. In order to be successful, people must know how to convert units and give a rough estimate of how big or small something is. Most scientists and engineers use the metric system because it is easy to convert between units in the system. For example a kilometer is 1000 meters, so converting between meters and kilometers involves a factor of 1000. In this activity we will learn the conversion factors between the English system and the metric system and then practice estimating lengths of different objects in the classroom using the metric system.

### **Procedure**

#### **Before the Activity**

- Make copies of the worksheet.

#### **With the Students**

1. Have a discussion with the students by asking them to brainstorm as many units as they can and categorizing them into the English system and the metric system.
2. Ask the students to list as many metric prefixes as they can.
3. Hand out the worksheet and explain the different conversion factors.
4. Have the students fill out the estimated length column before giving them rulers and meter sticks.
5. After they have finished the estimated length column, have the students fill out the actual length column and calculate the error for each item.

### **Attachments**

metric\_savenger\_hunt\_worksheet.doc

### **Troubleshooting Tips**

If the students have trouble understanding what to do for the worksheet, you can do one example as a class first to show them.

## **Investigating Questions**

Can you think of reasons why the metric system is the preferred choice of units for scientists and engineers?

## **Assessment**

### **Pre-Activity Assessment**

*Class Discussion:* This will allow you to see how much the students know about units and their exposure to the metric system.

### **Activity Embedded Assessment**

*Worksheet:* You will be able to assess the students' estimation skills as well as their comfort with the metric system in their measurements and errors.

### **Post-Activity Assessment**

*None*

## **Activity Extensions**

You could do a similar activity using mass. The students would estimate objects mass in grams and then check their estimates using a metric scale.

## **References**

"NASA's metric confusion caused Mars orbiter loss." CNN. Posted September 20, 1999.  
Accessed December 4, 2008. <<http://www.cnn.com/TECH/space/9909/30/mars.metric/>>

## **Owner**

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Name: \_\_\_\_\_

### Metric Scavenger Hunt

### Conversions

1 inch = 2.54 centimeters (cm)

1 foot = 3.0 decimeters (dm)

1 yard = 0.91 meters (m)

10 millimeters (mm) = 1 centimeter (cm)

10 centimeters (cm) = 1 decimeter (dm)

10 decimeters (dm) = 1 meter (m)

Fill out the table. If the object is given, estimate the length, then measure it and find the difference between estimated and actual length. If the estimated length is given guess an object that you think is close to the given length, then measure the actual length and calculate the difference between estimated and actual length. For the last four pick any object you would like and fill out the chart.

Make sure to put units after your numbers.

	Estimated Length	Actual Length	Difference
1.Length of Pencil____	_____( )	_____( )	_____( )
2._____	__2__( m )	_____( )	_____( )
3._____	__5__( cm )	_____( )	_____( )
4.Width of Pencil____	_____( )	_____( )	_____( )
5._____	__3__( dm )	_____( )	_____( )
6.Your Height____	_____( )	_____( )	_____( )
7._____	_____( )	_____( )	_____( )
8._____	_____( )	_____( )	_____( )
9._____	_____( )	_____( )	_____( )
10._____	_____( )	_____( )	_____( )