



Republic of the Philippines  
Department of Education  
Region IV (A) – CALABARZON  
**City Schools Division Office of Antipolo**  
District I – A



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## STUDENT's ACTIVITY SHEET FOR **GENERAL PHYSICS 1**

### STUDENT's ACTIVITY SHEET FOR MELC 1(MODULAR MODALITY)

#### TITLE/LESSON: SCIENTIFIC NOTATION AND CONVERSION OF UNITS

**OBJECTIVES:** At the end of the lesson, you are expected to:

- explain scientific notation and conversion of units;
- solve measurement problems involving conversion of units, expression of measurements in scientific notation; and
- appreciate the importance of measurements in real life situations.

#### A. Content Standard:

The learner demonstrates an understanding of the effect of instruments on measurements.

#### B. Performance Standard:

The learners shall be able solve using experimental and theoretical approaches, multi concept, rich-context problems involving measurement,

#### C. Most Essential Learning Competency/ies:

Solve measurement problems involving conversion of units, expression of measurements in scientific notation. (STEM\_GP12EU-Ia-1)

## II: LEARNING RESOURCES

- Materials/IMs Needed
- References
- Additional Materials and Learning Resources

## III: TIME FRAME: 50 min or 1 day (30 min will be allotted for the lecture part).

## IV: INTRODUCTION/RATIONALE

### **Scientific Notations**

Scientists and engineers have to work with really big numbers. These numbers are inconvenient to write and difficult to read. They can be expressed with the help of power of ten notations. The shorthand method is called scientific notation, helps easily deal with really large or really small numbers. It can be represented by the expression:

$A \times 10^n$

Where A is the number between 1 and 10, while n is a positive or negative exponent.

The physical quantity appearing in mechanics and dynamics is determined by giving them length, mass, and time. A unit system that adopts meter(m), kilogram(kg), second(s) as their standard is called MKS unit system. When working with equations, you have to make sure working in a consistent set of units.

**Conversion of Units**

A conversion factor is a ratio expressed as a fraction that equals 1. When you use conversion factors to convert units, we multiply our original measurement by the conversion factors to get the same measurement expressed in new units.

# What I Need to Know

This activity sheet was designed and written with you in mind. It is here to help you master the Scientific Notation and Conversion of Units. The scope of this activity sheet permits it to be used in many different learning situations. The language used recognizes the diverse vocabulary of students. The lessons are arranged to follow the standard sequence of the course.

This activity sheet is compromised only of one lesson:

- Scientific Notation and Conversion of Units

After going through this activity sheet, you are expected to:

1. explain scientific notation and conversion of units;
2. solve measurement problems involving conversion of units, expression of measurements in scientific notation; and
3. appreciate the importance of measurements in real life situations.

# What I Know

**Activity 1.1 Fill Me!**

**Directions:** Fill in the blanks in the Table below. (2 minutes)

MKS System	British System
2.54 centimeters	1 inch
1 meter	_____feet
_____meter	1 feet

# What's In

**Activity 1.2 Draw Me!**

**Directions:** Draw at least 5 examples of measuring instruments. Identify the uses and indicate the units used in each instrument. (2 minutes)

# What's New

Consider the distance that light travels in one second. This is about 299800000 meters. For scientists and students, writing numbers in this way can be a waste of time, energy, ink and paper. Therefore, for every large and very small numbers, we use what is now called as Scientific notation.

We take the example above:

$$299800000 = 2.998 \times 100,000,000$$

we have the standard scientific notation,

$$299800000 = 2.998 \times 10^8$$

This is read as, "Two point nine-nine-eight times ten to the power eight."

## Activity 1.3 Express Me!

**Directions:** Use the text and example/s above to answer the a-c questions.  
Write the following numbers in scientific notation. (2 minutes)

- a) 3450000 = \_\_\_\_\_
- b) 70680000 = \_\_\_\_\_
- c) 0.00000036 = \_\_\_\_\_

# What is It

## Conversion of Units

A conversion factor is a number used to change one set of units to another, by multiplying or dividing. To convert a quantity expressed in a certain unit to its equivalent in a different unit of the same kind, multiplying or dividing it by 1 does not affect its value. Conversion of unit requires conversion factors which are obtained by comparing the standard units in the different system of units.

Unit conversion is a multi- step process that involves multiplication or division by a numerical factor, selection of the correct number of significant digits and rounding.

- Examples of conversion factors include:
- 1 gallon= 3.78541 liters
  - 1 pound=16 ounces
  - 1 kilogram= 1000 grams
  - 1 minute= 60000 milliseconds
  - 1 square mile=2.58999 square kilometers

There are seven basic units in the SI system: The meter(m), the kilogram (kg), the second(s), the Kelvin (K), the ampere(A), the mole (mol), and the candela(cd).

When working with equations, you have to make sure you're working in a consistent set of units, or you won't get the correct answer.

## RULES OF WRITING NUMBERS IN SCIENTIFIC NOTATION

1. Determine A by moving the decimal point in the original number to the left or to the right until the number is between 1 and 10.
2. Determine n by counting the number of times the decimal point has been moved to the left (positive) and to the right (negative).

# What's More

## Activity 1.4 Put Your Best!

**Directions:** Answer the following. (3 minutes)

I. Determine the value of the following and express the numbers in scientific notation.

1. The mass of the earth
2. The density of air
3. The period of visible light

II. Convert the following:

1. 60cm \_\_\_\_\_ mm
2. 100km/h \_\_\_\_\_ mi/h

# What I Have Learned

## Activity 1.5 Highlights Zone!

**Directions:** Read the paragraph below. Calculate the density of an average human cell. Express your final answer in scientific notation. (2 minutes)

Human cells come in a wide variety of shapes and sizes. The mass of an average human cell is about  $2 \times 10^{-11}$  grams. Red blood cells are one of the smallest types of cells, clocking in at a volume of approximately  $10^{-6}$  meters. Biologist have recently discovered how to use the density of some types of cells to indicate the presence of disorders such as sickle cell anemia or leukemia. Calculate the density of an average human cell.

# What I Can Do

## Activity 1.6 A Job for Me!

**Measures of Length, Mass, and Time (3 minutes)**

**Materials:** Book, ruler, weighing scale, stopwatch

**Procedure:**

1. Measure the length of a book in centimeter and get the mass using weighing scale in grams. From the obtained measurement value, convert the length in meter and mass in kilogram respectively.
2. Take note the time you walk through the stairs in seconds. Convert the resulting value in minute and hour.

# Assessment

**Quiz #1**

**Directions:** Solve the following problems:( 5 minutes)

1. The speed of light is  $3 \times 10^8$  m/s. If the sun is  $1.5 \times 10^{11}$  meters from earth, how many seconds does it take for sunlight to reach the earth? Write your answer in scientific notation.
2. A car travels 750 km/h. What is the equivalent speed in m/s?

# Additional Activities

## Activity 1.7 A Time to Shine!

**Directions:** Answer the following questions: **(3 minutes)**

- 1. An irregularly shaped chip of mineral is slowly released in a graduated cylinder which initially had water up to the 147 ml mark. If the water level rose to 190 ml, what is the volume of the chip? Express both in milliliters and in cubic centimeters.
- 2. What is the equivalent of 50° F in the Centigrade and Kelvin scales?

**V. REFLECTION: (5 minutes)**

Base on the activity/ies conducted, complete the phrases stated below:

✓

I understand that

✓

I realize that

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