

## 6<sup>th</sup> Grade Physical Science: Q1 Test 1 Study Guide

**General Topics:** [What is Science, Lab Safety and Equipment, Scientific Method, Scientific Models, KFS, Unit Conversions (Factor-Label Method), Density, Weight, Mass]

Concepts and Terms to know (Test is scheduled for \_\_\_\_\_):

One of the best safety rules is to always follow instructions from your teacher.

Know basic safety symbols: flammable, chemical safety (or hazard), clothing protection, eye protection, sharp objects, etc.

The base units in metric system for length, mass and volume are: meters, grams\*, and liters. Technically, for the SI system, the preferred standard units are meters, kilograms and liters. Note kilogram is actually preferred standard unit of mass in SI units, even though grams are considered "base unit" of mass.

Some common tools a scientist may use to measure, gather, and process data: meter stick, balance, thermometer, computer, timing device, etc.

Physical Science is primarily the study of the relationships between matter and energy.

Two main branches of Physical Science are Chemistry and Physics.

**Scientific definition of energy:** the ability to do work.

**Scientific definition of mass:** the amount of matter in an object.

**Scientific definition of volume:** the amount of space something occupies.

**Scientific definition of density:** the amount of matter in a given volume.

**Scientific definition of temperature:** how hot or cold an object is, usually measured in degrees Celsius or Kelvin. [Note: The Kelvin scale uses "absolute zero" as the coldest any object in the universe can attain.] Later, we will examine a more sophisticated definition related to the average kinetic energy of the molecules of a substance.

**Scientific definition of observation:** the use of the human senses to gather information. [Note: we can enhance the human senses through technology with such tools as microscopes, telescopes, infrared and x-ray scanners, but ultimately we need to observe with our senses.]

**Scientific definition of Scientific Law:** The summary of many results and observations (that have been tested over time). A good explanation of how things behave, but not necessarily why.

**Scientific definition of hypothesis:** an explanation that is based on observations and can be tested (through observations and experiments).

**Scientific definition of theory:** an explanation for many hypothesis and observations.

**Scientific definition of scientific model:** a representation of an object or system that can help us better visualize and understand the nature of the system. Most models are "scaled down", or simplified.

Three common types of scientific models include: physical (wind tunnel); mathematical (weather predictions); conceptual (how planets and galaxies formed; typically using super computers).

**The Scientific Method** is an ongoing process that scientists use to answer questions and solve problems.

One of the first steps in gathering scientific knowledge is to ask questions, but prior to that, one must make observations of nature with their senses.

For more a flow chart of scientific method, refer to "Scientific Method Handout".

Extra notes:

Name: \_\_\_\_\_ STUDY GUIDE FREE RESPONSE (KFS)

Practice showing all work in the space provided. Please use the KFS method. All final answers must be boxed in space provided with correct units shown. Practice using calculators; and bring to test.

Useful information:  $1\text{ml} = 1\text{ cm}^3$ ;  $D=m/V$ ;  $W=mg$ ; let  $g = 9.8\text{m/s}^2$ ; should know metric ladder

**KFS Example #1)** You are conducting a lab to determine the density of an irregularly shaped metal object. To determine the volume, you use a graduated cylinder that has an initial volume of water of 150ml. After you insert the metal object in the cylinder, the water level rises to 165ml. The mass of the object is 150g. Show all work to calculate density in  $\text{g/cm}^3$  using KFS method outlined below.

Known:  $m =$  \_\_\_\_\_

Find: \_\_\_\_\_

$V_i =$  \_\_\_\_\_

$V_f =$  \_\_\_\_\_

Solve: First find volume (show calculation):

$V =$  \_\_\_\_\_

Next write density equation without numbers:

Now substitute values of knowns:

Final Answer: \_\_\_\_\_

**KFS Example #2)** Convert 762 meters into hectometers using factor-label method.

Known:  $L_1 =$  \_\_\_\_\_

Find:  $L_2$  (Hm)

KEY: \_\_\_\_\_

Two Conversion factor fractions:

\_\_\_\_\_

Solve: (show work)

Final Answer: \_\_\_\_\_

**KFS Example #3)** If you have a mass of 60 kg, determine your weight in Newtons on Earth? Will your weight increase, decrease or stay the same if you go to the moon? What about your mass?

Known:

Find:

Solve:

Final Answers: \_\_\_\_\_