

Sci 265 Exam 2 Learning Goals

Density, Volume, Mass and Weight

Students will be able to:

- Define density as mass divided by volume
- Identify the relative density of different objects by observing how they float or sink in water
- Define volume
- Define how to measure volume by either using a meter stick or water
- Define mass
- Explain how mass does not change depending on location
- Define weight as how hard gravity pulls on an object (mass x gravity)
- Explain how weight changes on different planets because gravity of each planet is different
- Identify which type of scale will measure mass correctly on other planets and which type will measure weight correctly on different planets.

Measurement

Students will be able to:

- Identify which units are usually used to measure the following in the laboratory: mass, length, area, volume, temperature.
- Describe and demonstrate how mass, length, area, volume and temperature are usually measure in the laboratory.
- Apply the factor-label method to example problems and describe its advantages.

Metric system

Students will be able to:

- Describe when and why the modern metric system was developed.
- Explain and provide examples of why the mnemonic “King Hector's daughter made delicious cinnamon muffins,” which is often used by some teachers to remember the metric system, is grossly inadequate?
- Define the three fundamental units of measurement in the modern SI system.
- Show what the units are that can be derived from these three fundamental units.
- Explain and demonstrate how the metric system appears to be based on a factor of ten for common units and then show that it really relies mostly on a different factor.
- calculate simple conversions between metric units.

Periodic table

Students will be able to:

- define when, why, and by whom the modern periodic table was developed.
- define a family, group, row and series on the periodic table.
- Define and demonstrate how elements are basically arranged in the periodic table.

- Identify the major divisions of the periodic table (representative elements, transition elements, metals, non-metals, noble gases)
- Explain what the alkali metals, alkali earth metals, halogens, and noble gases are.
- Show and provide examples of how the periodic table gives an indication of the arrangement of electrons in atoms.
- Define the difference between an atom and an ion.

Energy

Students will be able to:

- Explain why energy does not contain mass
- Identify the form of energy that an object has depending on its motion or position
- Compare the amount of potential energy objects have depending on their height and mass.
- Compare the amount of kinetic energy objects have depending on their speed and mass
- Identify the energy form before and after a particular event
- Apply conservation of energy to different events
- Explain what “The lion eats the sun” means in terms of conservation of energy
- Predict the final location of an object (pendulum or skater) based on its initial height
- Explain the behavior of electrically charged objects
- Explain some differences between magnets and electrical charges. For example, electric charges are attracted to all metals but magnets are not attracted to all metals, only those that can be magnetized.
- Explain that a positive charge can exist separately from a negative charge; however a magnetic North pole cannot exist without a magnetic South pole.
- Describe how induction occurs and which variables increase the induction
- Describe how a generator produces electricity from a water wheel
- Describe how a wind turbine produces electricity and trace the energy conversions a step at a time from wind to the motion of electrons
- Describe the difference between a direct current (DC) and an alternating current (AC)
- Describe how an AC or DC current is able to light a light bulb or heat a toaster
- Calculate the horsepower produced by a person based on data from running up a set of stairs.