Name ______________________

1. You've probably heard terms like, 'The Theory of Relativity,' 'Newton's Laws,' 'Archimedes' Principle', etc. What is the meaning of these terms: Principle, Theory, Law, and are they different? What distinguishes them? Can you think of some additional examples?
   Law:

   Principle:

   Theory:

2. This semester we will learn about Newton's Laws, which describe the motions of objects. Some people say Newton was wrong and modern theories of physics like General Relativity and Quantum Mechanics are correct. Why should you still learn about Newton's laws?

3. Could we use Newton's laws (classical physics) to accurately describe the motions of
   - objects moving very fast, near the speed of light?
   - very tiny objects, about the size of atoms?
   - everyday objects moving at moderate speeds, such as people, airplanes, cars, footballs?

4. Practice with Scientific Notation:
   (a) What is 20129484 in scientific notation?
   (b) What is $0.00036m$ in scientific notation?
      A. 3.6×10^{4}
      B. 36×10^{6}
      C. 3.6×10^{-3}
      D. 3.6×10^{-4}
      E. 36×10^{-5}
   (c) How would you say the number 4.5×10^{4} in words?
   (d) Write out the number 1.2×10^{-2}
   (e) Write $204m$ in km
   (f) Write $55cm$ in m
   (g) Write 78 million in scientific notation

5. Fill out the table with the SI unit.

Fundamental Physical Quantity	SI Unit	Derived Physical Quantity	SI Unit
Time		Velocity (Speed)	
Length		Acceleration	
Mass		Force	

6. The world record deadlift is $501kg$. What is that in pounds? The conversion factor is $1kg = 2.2lb$.

7. Earth's gravitational acceleration is $g = 9.81m/s^2$, meaning if you were to jump from a plane (ignoring air resistance), your speed would increase by $9.81m/s$ every second. How much, in km/hr, would your speed increase every second, i.e. what is g in $(km/hr)/s$?

8. The volume of a box is $20cm^3$. What is the volume in cubic feet, ft^3? ($1m = 3.28\text{ft}$)

   A. 706 ft^3
   B. 65.6 ft^3
   C. 0.061 ft^3
   D. 7.06×10^{-4} ft^3
   E. 6.56×10^{-5} ft^3

9. If you could count \$1 per second, how many years would it take you to count 1 billion dollars?

10. A neutron star is a dead star that is extremely dense, with typical densities in SI units of about $1 \times 10^{18} \frac{kg}{m^3}$. How much mass, in kg, would be contained in $1cm^3$ (about a spoonfull) of this star? Hint: Recall that density $= \frac{\text{mass}}{\text{Volume}}$