

## 6<sup>th</sup> Grade Physical Science Study Guide for Semester 1 Final Exam

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

Section: \_\_\_\_\_

A gas has fast moving particles that have no definite shape or volume.

At higher temperatures, particles move faster.

The reverse of condensation ( $g \rightarrow l$ ) is evaporation ( $l \rightarrow g$ ); the reverse of freezing ( $l \rightarrow s$ ) is melting ( $s \rightarrow l$ ); the reverse of sublimation ( $s \rightarrow g$ ) is deposition ( $g \rightarrow s$ )

Physical properties include: density, boiling point, melting point, size, shape, etc.

Chemical properties include: reactivity with acids

A compound is formed when two or more elements join together chemically.

An atom is the smallest particle which an element can be divided and still be the same substance.

According to ancient Greek definition an atom is a particle that cannot be cut.

An electron has the least mass compared to other particles which make up an atom, such as protons and neutrons. In fact protons and neutrons, which make up the nucleus of an atom, have about 1800 times the mass of an electron.

The nucleus is the central region of the atom where most of the mass is concentrated.

An electron is a negatively charged particle discovered by J.J. Thomson.

A neutron is subatomic particle in center of atom that has no charge.

A proton is a subatomic particle with a positive charge.

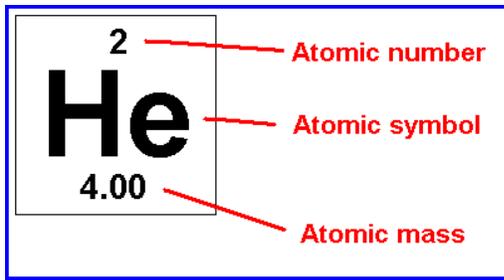
An electron cloud is a region where electrons are likely to be found.

Atomic mass unit is a unit of mass that describes the mass of an atom or molecule.

The number of protons define an element. An isotope has the same number of protons, but different numbers of neutrons. So for example, all isotopes of Carbon have 6 protons, and all isotopes of Oxygen have 8 protons.

The atomic mass or mass number is the total of protons and neutrons, usually found at bottom of element symbol. So, if helium has 2 protons and 2 neutrons, it has an atomic mass, or mass number of 4, as shown in diagram.

The atomic number is the number of protons, usually found at top of element symbol.



The Periodic Law states that properties of elements change periodically with the elements' atomic numbers.

Each vertical column on the periodic table is called a group, since they have similar chemical properties.

Each horizontal row is called a period.

Two factors that determine speed are distance and time.

The main difference between speed and velocity is velocity has direction and speed does not.

A force is a push or a pull exerted on an object to change the object's motion.

When Net forces equal zero, they are balanced.

Only an unbalanced force can change the direction or speed of an object.

Newton's 3 Laws:

Law 1: The law of Inertia, which states an object at rest wants to stay at rest, and an object moving at a constant speed in a straight path will continue to do so, unless an unbalanced force acts on it.

Law 2:  $F = ma$ , or  $a = F/m$ ; acceleration is caused by a force acting on a mass

Law 3: Action-Reaction; For every action, there is an equal and opposite reaction.

Friction is the force that opposes the motion between two surfaces in contact.

Kinetic friction is the force caused when two surface are moving relative to each other. For instance, when a crate is sliding on a floor.

Static friction is the force that keeps two surfaces held in place, until a large enough applied force overcomes it.

As the distance between two masses increases, the force due to gravity decreases.

Weight is a measure of the gravitational force acting on an object.

The law of Universal Gravitation developed by Newton says that the gravitational force is related to mass and distance.

The net force is the sum total, or combination, of all forces acting on an object. A force is a vector, so direction must be considered. For instance if a force of 12N north and a force of 6N south is applied to an object, what will be the net force? \_\_\_\_\_

Mass is the measure of the amount of matter in an object.

Archimedes' Principle is used to determine buoyant force.

Bernoulli's Principle states that the pressure in a fluid decreases as the fluid's velocity increases.

Pascal's Principle is used by hydraulic devices to multiply force.

Buoyant force is the upward force exerted by a fluid that increases as the density of the fluid increases.

Thrust is the forward force produced by an airplane's engine.

Drag is the force that works against the forward motion of a plane.

The SI unit for both speed and velocity is m/s.

If you apply a horizontal force to a block on a table, and it does not move, the static friction force is keeping the block in place.

Any object that increases its velocity will increase its momentum.

The law of conservation of momentum states that when two (or more) objects collide, their combined momentum remains the same after the collision.

Astronauts in space appear weightless since they are in continuous free fall while in orbit.

All projectile motion is accelerated vertically downward (toward center of Earth).

Examples of projectile motion include: cannon balls, baseballs, javelins, jumping crickets while in "flight". A sliding hockey puck would NOT be an example of projectile motion.

All objects, regardless of their mass, will fall at the same rate when dropped from rest, and will hit the ground at the same time, assuming there is no air resistance.

The more mass an object has, the more inertia it has. Inertia is the property mass has that causes it to resist a change in motion. A 2 kg mass has less inertia than a 3000 g mass.

The momentum of a 60 kg cart with a constant velocity of 2 m/s is \_\_\_\_\_.

An object reaches terminal velocity when force of gravity is equal to the air resistance.

The SI unit for pressure is \_\_\_\_\_.

The atmospheric pressure increases as you go from the top of a mountain to sea level.

A fluid will flow from an area of high pressure to an area of low pressure.

When air is pumped into a tire, the force per unit area increases. The force per unit area is also known as the \_\_\_\_\_.

The equation for pressure is:  $P = \frac{F}{A}$ .

A machine is a device that makes work easier by changing the size or direction of force.

The work done by a machine is called the work output. The work you do on a machine is called the \_\_\_\_\_.

The number of times a machine multiplies force is known as the mechanical advantage. The general equation for mechanical advantage is:

MA = \_\_\_\_\_.

A ramp, which is a simple machine, makes lifting a heavy object easier by allowing you to use less force over a longer \_\_\_\_\_.

Jim applies a force of 200 N over a distance of 4 m. How much work is done by Jim?

\_\_\_\_\_.

If you exert 20 N on a screwdriver and it exerts 60 N on a paint can lid, what is the mechanical advantage? \_\_\_\_\_.

In order for work to be done on an object, it must move in the same direction as the force.

A wheel and axle is a machine with 2 circular devices of different sizes connected together.

An Olympic lifter does 1000 J of work in 2 seconds. What is the power output?

\_\_\_\_\_.

When there is friction on a roller coaster, some of the initial potential energy is not converted to kinetic energy.

Whenever one form of energy is converted to another, some of the original energy is always converted to thermal energy.

**\*\*Look over your C5 Quiz Study Guide for Energy review\*\***

**\*\*\* Look over Useful Information sheet\*\*\***