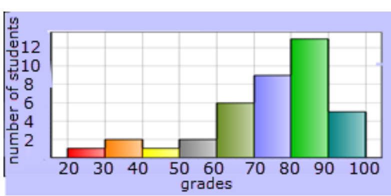
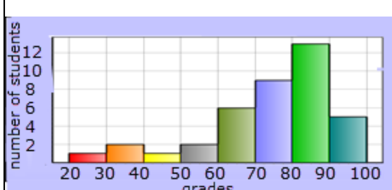
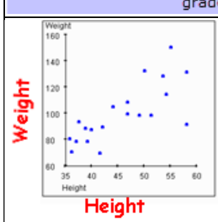
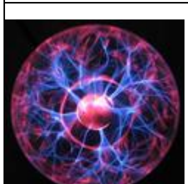
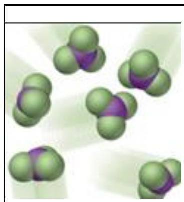
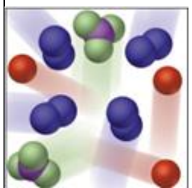
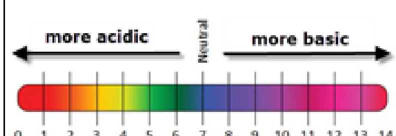
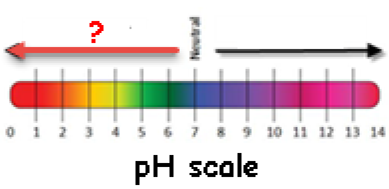
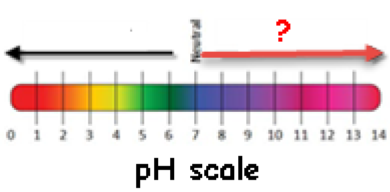
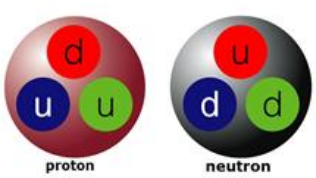
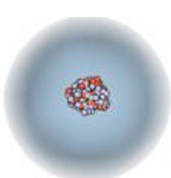
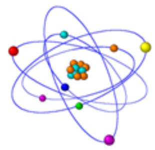
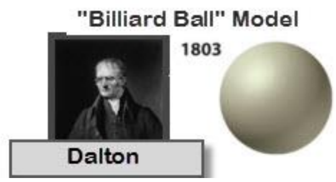
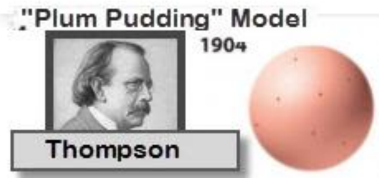
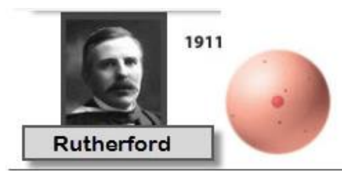
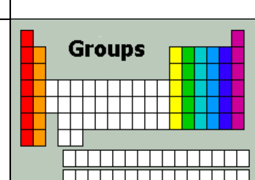
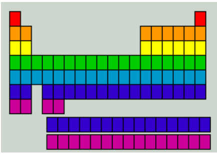
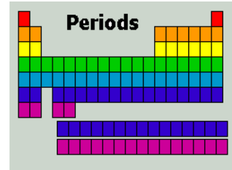
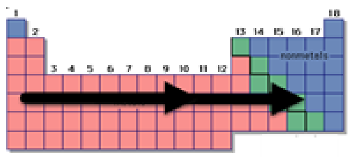
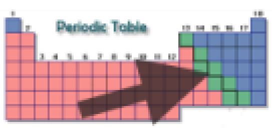
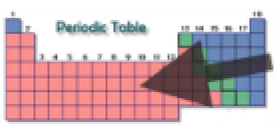
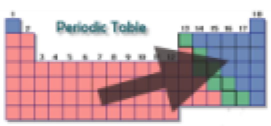
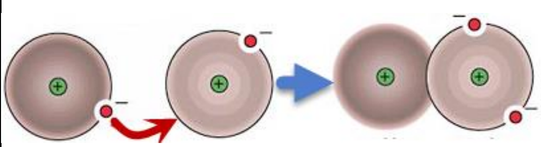
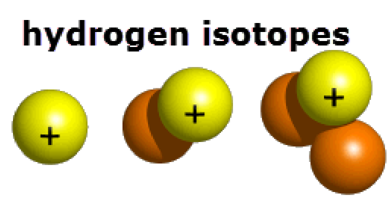
 Used for making scientific measurements	Probeware	Ps.1
 What is this called and what does it measure?	Spring scale – measures weight (not mass)	Ps.1
 **What is this called and what does it measure?**	Triple beam balance. Measures mass.	Ps.1
Unit used to measure weight	Newton	Ps.1
1 meter = ? millimeters 1 liter = ? milliliters 1 kilometer = ? meters 1 kilogram = ? grams	1,000 1,000 1,000 1,000	Ps.1
1 meter = ? centimeters 1 centimeter = ? millimeters	100 10	Ps.1
 Type of graph?	Histogram	Ps.1
 **What information does this histogram provide?**	**The columns in a histogram show the number in each category. Categories in this case are grade ranges. So graph tells is that 13 children received grades of 80-90.**	
 **What kind of graph is this and what does it show?**	**Scatterplot – shows the relationship between two variables, in this case, height and weight.**	Ps.1

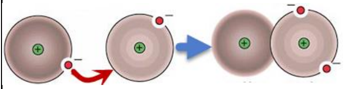
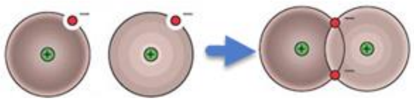
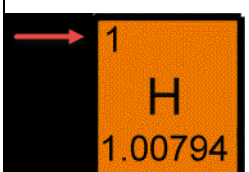
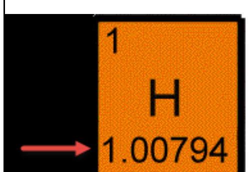
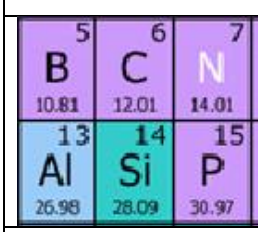
Study of materials at the molecular scale that are no longer visible to the naked eye.	Nanotechnology PS.1
What is a nanometer?	One-billionth of a meter Ps.1
Often used to establish a standard for comparing the results of manipulating the independent variable	Control Ps.1
Scientific method always starts with:	A question that is based on observation, evidence or reason Ps.1
 Metric units for measuring liquid volume.	Liter (milliliter) PS.1
Anything that has mass and occupies space	Matter PS.2
Small particles that make up all matter	Atoms PS.2
Four states (phases) of matter	Solid, liquid, gas, & plasma PS.2
 Matter found in stars and neon signs	Plasma PS.2

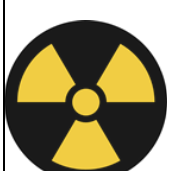
 Two or more elements that are chemically combined in a fixed ratio	Compound PS.2
 Two or more substances that are not chemically combined	Mixture PS.2
Two ways to classify compounds	- acids, bases, salts - inorganic and organic PS.2
Contain hydrogen ions that are released when dissolved in water	Acids PS.2
Substances that release hydroxide ions (OH–) into solution	Bases PS.2
pH	A measure of the hydrogen ion concentration in a solution PS.2
pH scale	 Range from 0–14 PS.2
	Solutions with a pH lower than 7 are acids. PS.2
	Solutions with a pH greater than 7 are basic PS.2

Formed when an acid reacts with a base	A salt PS.2
What all organic compounds contain -	carbon PS.2
Physical properties of matter	Shape, density, solubility, odor, melting point, boiling point, and color PS.2
Chemical properties of matter	Acidity, basicity, combustibility, and reactivity PS.2
Particle Theory of Matter	PS.2 1. All matter is made of extremely tiny particles. 2. Particles are held together by strong electric forces. 3. All particles are moving. 4. Particles at higher temperatures move faster than those at lower temperatures.
Similar to a gas, but the atoms are made up of free electrons and ions	Plasma PS.2
Subatomic particles comprising the atom	Proton (positive charge), neutron (no charge), electron (negative charge), and quark PS.3
 Protons and neutrons are made up of these smaller particles	Quarks PS.3
 Model that best represents our current understanding of the structure of the atom.	The “electron cloud” model PS.3

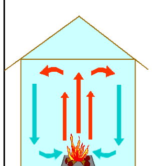
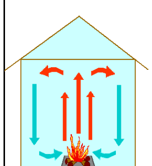
 Model that does not depict the three-dimensional aspect of an atom, and implies that electrons are in static orbits	The Bohr model PS.3
In 1803, he proposed that the indivisible unit of the element is the atom	 PS.3
In 1904, he discovered electrons.	 PS.3
In 1911, he demonstrated the existence of a positively charged nucleus that contains nearly all of the mass of the atom	 PS.3
Number of known elements	110 PS.3
Elements with atomic numbers greater than 92	Artificially produced in a laboratory setting PS.4
 Used to organize information about the elements	Periodic table PS.4
The basis for the arrangement of atoms on the periodic table	Number of protons PS.4
 Vertical columns in the periodic table	 Groups or families PS.4

 Horizontal rows	Periods  PS.4
Elements in the same column (family) of the periodic table -	Contain the same number of electrons in their outer energy levels and have similar properties PS.4
The elements as one reads from left to right across the periodic table 	Increasingly nonmetallic in character PS.4
 Elements along stair-step line	Metalloids, which have properties of metals and nonmetals PS.4
 **These elements tend to lose electrons in chemical reactions, forming positive ions**	Metals PS.4
 These elements tend to gain electrons in chemical reactions, forming negative ions	Nonmetals PS.4
 An atom that has gained or lost an electron	An ion PS.4
An atom that has gained or lost a neutron	An isotope  PS.4
An atom that has gained or lost a proton	A different element PS.4

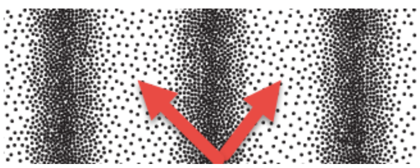
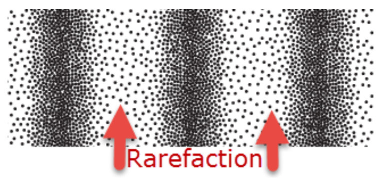
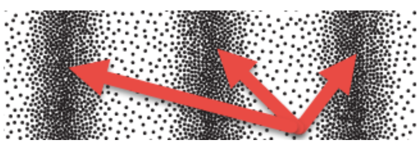
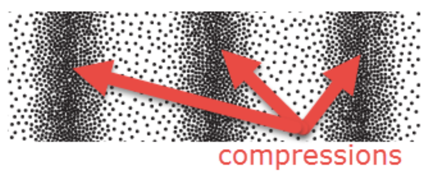
Bonds formed when a metallic element reacts with a  nonmetallic element, their atoms gaining and losing electrons respectively	Ionic bonds PS.4
Bonds formed when two nonmetals react and  atoms share electrons.	Covalent bonds PS.4
What determines an element's chemical properties and reactivity?	The number of electrons in the outermost energy level PS.4
Why do atoms gain, lose or share electrons?	To become stable PS.4
 What is this number?	Atomic number (number of protons) PS.4
 **What is this number?**	Atomic mass PS.4
What determines the atomic mass?	The number of protons plus the number of neutrons. PS.4
 Carbon (atomic number 6) shown here is carbon-12. Carbon has an isotope known as Carbon-14. How is it different?	Carbon 14 has two more neutrons than carbon-12. PS.4
Physical changes	The chemical composition of the substances does not change (i.e. phase changes) PS.5

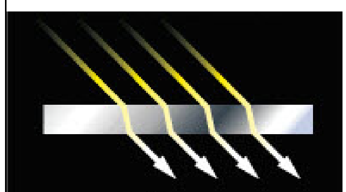
Chemical changes	Chemical composition of substances changes and different substances are formed. PS.5
The Law of Conservation of Matter (Mass)	Regardless of how substances within a closed system are changed, the total mass remains the same. PS.5
The Law of Conservation of Energy	Energy cannot be created or destroyed but only changed from one form to another PS.5
$2H_2 + O_2 \rightarrow 2H_2O$? ?	$2H_2 + O_2 \rightarrow 2H_2O$ reactants products PS.5
Two types of chemical reactions	exothermic (energy is released) endothermic (energy is absorbed) PS.5
Chemical reaction that releases energy (heat) 	Exothermic PS.5
Energy stored in the nucleus of an atom	Nuclear energy PS.5
 Two ways of creating nuclear energy from matter	-joining nuclei together (fusion) -splitting nuclei (fission) PS.5
 Potential negative effects of using nuclear energy	- Radioactive nuclear waste storage and disposal - Accidents PS.5

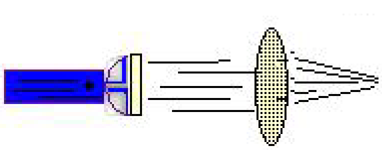
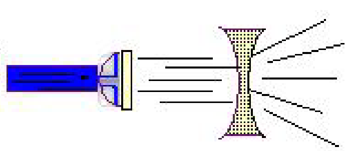
PS.6	
Definition of energy	The ability to do work
Energy exists in these two states	Potential and kinetic
Potential energy	The amount of energy stored in an object based on its position or chemical composition
Kinetic energy	The energy of motion
Determines the amount of kinetic energy in an object	The mass and velocity of the moving object
Name important forms of energy	Radiant (light), thermal (heat), electrical, mechanical, nuclear
Examples of mechanical energy	Sound Kinetic energy (objects in motion) Potential energy
Examples of radiant energy	Visible light Energy of electromagnetic waves (x-rays, microwaves, light)

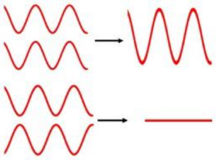
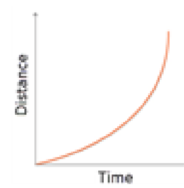
When one type of energy is transformed into another type, this is lost	Thermal energy lost (heat)
PS.7	
The transfer of thermal energy between substances of different temperature	heat
The measure of the average kinetic energy of the molecules of a substance	temperature
The theoretical point at which molecular motion stops	absolute zero (–273oC/0K)
Three ways the transfer of thermal energy occurs	Conduction, convection, and radiation.
 Transfer of thermal energy in liquids and gases	Convection
 What is convection?	Method of transferring thermal energy by heating a substance and then allowing the substance to move, carrying the thermal energy with it.
Molecules transfer thermal energy by colliding with adjacent molecules 	Conduction

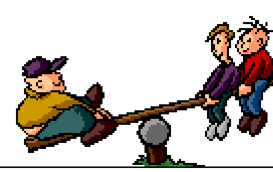
 Transfer of thermal energy in solids (by direct contact)	Conduction
 Transfer of thermal energy by electromagnetic waves	Radiation
 Transfer of thermal energy through empty space	Radiation
Why there is no change in temperature during a phase change (freezing, melting, condensing, evaporating, boiling, and vaporizing).	Energy is being used to make or break bonds between molecules.
Kelvin scale	Temperature scale designed so that zero degrees K is defined as absolute zero
Celsius scale	Temperature scale designed so that freezing point is taken as 0 degrees and the boiling point as 100 degrees
PS.8	
A type of mechanical energy produced by vibrations	Sound
Sound travels as this type of wave	A compression wave (matter vibrates in the same direction in which the wave travels)

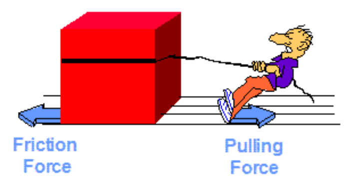
Relationship between wavelength and frequency	As wavelength increases, frequency decreases
Determines speed of sound	The medium through which the waves travel and the temperature of the medium.
The tendency of a system to vibrate at maximum amplitude at certain frequencies	Resonance
Wavelength	Measured as the distance from one compression to the next compression or the distance from one rarefaction to the next rarefaction
 ?	
 ?	
Applications of interference patterns and ultrasonic technology	Sonar and medical diagnosis
 Reason for Tacoma Narrows Bridge collapse	resonance
Examples of resonance	Musical instruments, Tacoma Narrows Bridge, crystal stemware

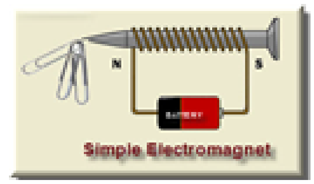
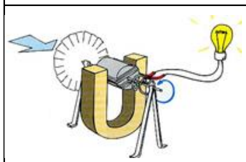
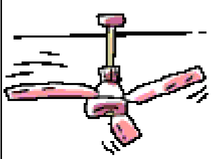
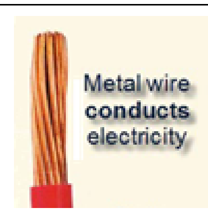
PS.9	
A form of radiant energy that moves in transverse waves	Visible light
Relationship between frequency and wavelength	Inverse – when one increases, the other decreases
When radiant energy, which travels in straight lines, strikes an object, this happens	It can be reflected, absorbed, or transmitted
 Results when visible light travels through different media (for instance air to water)	 Refraction (bending) due to a change in speed
How electromagnetic waves are arranged on the electromagnetic spectrum	By wavelength
Speed of all electromagnetic radiation	Speed of light
Types of electromagnetic radiation, from shortest to longest wavelength	Gamma rays, X-rays, ultraviolet, visible light, infrared, and radio and microwaves.
Lowest energy waves with the longest wavelength and the lowest frequency	Radio waves

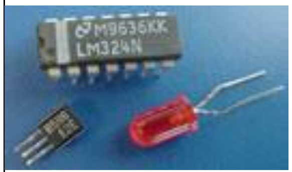
The highest energy waves with the shortest wavelength and the highest frequency	Gamma rays
Location of visible light on the electromagnetic spectrum	In the middle
What mirrors do	Reflect light
 These mirrors diverge light and produce a smaller, upright image	Convex mirrors
 These mirrors converge light and produce an upright, magnified image if close and an inverted, smaller image if far away	Concave mirrors
What lenses do	Refract light
 Lenses that converge (narrow) light	Convex
 Lenses that diverge (spread) light	Concave
When light waves strike an obstacle and new waves are produced	Diffraction

 When two or more waves overlap and combine as a result of diffraction	Interference
PS.10	
The change in velocity per unit of time	Acceleration
Acceleration of an object moving with constant velocity	No acceleration
A decrease in velocity	Negative acceleration or deceleration
Shape of a distance-time graph for acceleration	A curve 
Why objects moving with circular motion are constantly accelerating	Because direction (and hence velocity) is constantly changing
Newton’s three laws of motion	Describe the motion of all common objects
Newton’s first law of motion	An object at rest will remain at rest unless acted on by an unbalanced force. An object in motion continues in motion with the same speed and in the same direction unless acted upon by an unbalanced force. This law is often called "the law of inertia"

Newton's second law of motion	Acceleration is produced when a force acts on a mass. The greater the mass (of the object being accelerated) the greater the amount of force needed (to accelerate the object)
Newton's third law of motion	For every action there is an equal and opposite re-action
The amount of matter in a given substance	Mass
A measure of the force due to gravity acting on a mass	Weight
Weight - unit of measure	Newton
Force – unit of measure	Newton
A push or pull	Force
The change in position of an object per unit of time	Speed
A device that makes work easier	A simple machine 

distance/time	Speed (s = d/t)
mass × acceleration	Force (F = ma)
force × distance	Work (W = Fd)
work/time	Power (P = W/t)
Concept that simple machines make work easier	Mechanical advantage
The work put into a machine is always greater than the work output due to this.	Friction 
The ratio of work output to work input	Efficiency
PS.11	
A property of matter that affects the flow of electricity	Resistance

 Electrical charges built up on an object	Static electricity
Related to electricity	Magnetism
Can produce a magnetic field and cause iron and steel objects to act like magnets.	Electricity
Temporary magnets that lose their magnetism when the electric current is removed	Electromagnets 
 A device that converts mechanical energy into electrical energy	A generator
 How does a generator work?	Steam, wind, or water drive the turbine (a large propeller) and, in turn, rotate the copper coils of the generator. As the copper coils spin within the magnets, electricity is produced.
 Convert electrical energy into mechanical energy that is used to do work	Electric motors
A material that transfers an electric current well.	A conductor 
A material that does not transfer an electric current	An insulator 

 In between a conductor and an insulator.	A semiconductor
 A semiconductor device that acts like a one way valve to control the flow of electricity in electrical circuits	Diode 
Made of semiconductor diodes that produce direct current (DC) when visible light, infrared light (IR), or ultraviolet (UV) energy strikes them	Solar cells 
 Emit visible light or infrared radiation when current passes through them.	Light emitting diodes (LED) 
Some examples of technologies that us LEDs.	TV remote; LED TV or notebook computer screen 
 Semiconductor devices used to amplify electrical signals (in stereos, radios, etc.) or to act like a light switch turning the flow of electricity on and off.	Transistors