7th	Grade 7 SCIENCE: Content Map Quarter 1 2 3 4 Teacher:_____	Content (*Specific* text, chapter, lesson, etc.)

	ATOMIC STRUCTURE	Weeks 1-3	Weeks 4-6	Weeks 7-9
1. Atomic Structure	Review (from grade 5): Structure of atoms: protons, neutrons, electrons o Molecules o Compounds are formed by combining two or more elements and have properties different from the constituent elements.			
	Early theories of matter o The early Greek theory of four elements: earth, air, fire, and water o Later theories of Democritus: everything is made of atoms and nothing else • ("atom" in Greek means that which can be cut or divided); atoms of the same kind form a pure "element" o Alchemy in middle ages			
	Start of modern chemistry o Lavoisier and oxygen: the idea that matter is not gained or lost in chemical reactions o John Dalton revives the theory of the atom. o Mendeleev develops the Periodic Table, showing that the properties of atoms of elements come in repeating (periodic) groups. o Niels Bohr develops a model of the atom in shells that hold a certain number of electrons. Bohr's model, plus the discovery of neutrons helped explain the Periodic Table: atomic number, atomic weight, and isotopes.			
	CHEMICAL BONDS & REACTIONS	**Weeks 1-3**	**Weeks 4-6**	**Weeks 7-9**
2. Chemical Bonds & Reactions	To get a stable outer shell of electrons, atoms either give away, take on, or share electrons.			
	Chemical reactions rearrange the atoms and the electrons in elements and compounds to form chemical bonds.			
	When single atoms combine with themselves or with other atoms, the result is a molecule. o O_2 is a molecule of oxygen. NaCl is a molecule of salt, and because it has more than one element is called a compound.			
	Ionic bond o Atoms like sodium that have just one or two extra electrons are very energetic in giving them away. Elements with the same number of extra or few electrons can join with each other to make an ionic bond. Example: NaCl, table salt.			
	Metallic bond o In the metallic bond, electrons are not given away between elements, but are arranged so that they are shared between atoms. Pure metals show this sharing, and the atoms can rearrange themselves in different ways, which explains why you can pound metals into different shapes.			

2. Chemical Bonds & Reactions (continued)	Covalent bond o Some atoms share electrons in a definite way, making them very stable and unreactive. • Examples are H_2 and O_2. Carbon, which can take up or give away 4 electrons in covalent bonds, can help make molecules that can adopt almost any shape. It is the basis of life.			
	Kinds of reactions o Oxidation: a chemical reaction that commonly involves oxygen. More generally, oxidation is a reaction in which an atom accepts electrons while combining with other elements. The atom that gives away electrons is said to be oxidized. • Examples: rusting of iron, burning of paper. Heat is given off. o Reduction: the opposite of oxidation. Reduction involves the gaining of electrons. An oxidized material gives them away and heat is taken up. o Acids: for example, vinegar, HCL, H_2SO_4; sour; turn litmus red o Bases: for example, baking soda; bitter; turn litmus blue pH: ranges from 0-14; neutral = 7, acid = below 7, base = above 7 o Reactions with acids and bases • In water solution, an acid compound has H ion (a proton lacking an electron), and the base compound has an OH ion (with an extra electron). • When the two come together, they form HOH (water) plus a stable compound called a "salt."			
	How chemists describe reactions by equations, for example: HCl + NaOH = NaCl + H_2O			
	A catalyst helps a reaction, but is not used up.			
	CELL DIVISION & GENETICS	**Weeks 1-3**	**Weeks 4-6**	**Weeks 7-9**
3. Cell Division & Genetics	Cell division, the basic process for growth and reproduction o Two types of cell division: mitosis (growth and asexual reproduction), meiosis (sexual reproduction) o Asexual reproduction: mitosis; diploid cells (as in amoeba) o Sexual reproduction: meiosis: haploid cells; combinations of traits o How change occurs from one generation to another: either mutation or mixing of traits through sexual reproduction o Why acquired characteristics are not transmitted			
	Gregor Mendel's experiments with purebred and hybrid peas o Dominant and recessive genes o Mendel's statistical analysis led to understanding that inherited traits are controlled by genes (now known to be DNA).			

7th	Grade 7 SCIENCE: Content Map Quarter 1 2 3 4 Teacher:_____	Content (*Specific* text, chapter, lesson, etc.)		
3. Cells (continued)	Modern understanding of chromosomes and genes o Double helix (twisted ladder) of DNA coding; how DNA makes new DNA o How DNA sequence makes proteins; one gene equals one protein o Genetic engineering o Modern researchers in genetics: Francis Crick, James Watson, Severo Ochoa, Barbara McClintock			
	HISTORY OF THE EARTH & LIFE FORMS	**Weeks 1-3**	**Weeks 4-6**	**Weeks 7-9**
4A. Paleontology	Fossils as a record of the Earth's history and past life forms			
	How fossils are formed, and types of fossils (mold, cast, trace, true-form)			
4B. Geologic Time	The age of the earth is about 4.6 billion years, based on geologic evidence and radioactive dating. Life has existed on earth for more than 3 billion years. o How movements of the earth's plates have affected the distribution of organisms			
	Organizing geologic time: Scientists have organized the earth's history into four major eras: o Precambrian Era (earliest forms of life, such as bacteria and blue-green algae; later in the period, invertebrates such as jellyfish) o Palezoic Era (Pangaea; invertebrate life, such as trilobites, early in this era, followed by development of vertebrates later in the era, including fish; development of insects, amphibians, and the beginnings of reptiles; development of simple plants, such as mosses and ferns) o Mesozoic Era (Pangaea separates into continents: "Age of Reptiles"; dinosaurs, flowering plants, small mammals and birds) o Cenozoic (Present) Era (Ice Age; mammoths; gradual development of mammals, birds and other animals recognizable today; humans; flowering plants, forests, grasslands)			
	EVOLUTION	**Weeks 1-3**	**Weeks 4-6**	**Weeks 7-9**
5A. Evolution	Evolution is the change in a population of organisms over time caused by both genetic change and environmental factors. o Adaptation and mutation			
	Charles Darwin: voyages of the *Beagle*; *Origin of Species* (1859)			

7th	Grade 7 SCIENCE: Content Map Quarter 1 2 3 4 Teacher:_____	Content (*Specific* text, chapter, lesson, etc.)		
5B. Natural Selection	Natural selection as mechanism of evolution: Darwin's theory that life forms better adapted to their current environment have a better chance of surviving and will pass on their traits to their offspring o Trait variation and change from generation to generation			
	Evidence for theory of evolution includes comparative anatomy, geology, fossils, and DNA research.			
5C. Extinction & Speciation	Extinction occurs when an environment changes and a species is no longer adapted to it.			
	New species can develop when part of the population becomes separated and evolves in isolation.			
	Life forms have evolved from simple organisms in oceans through amphibians to higher forms such as primates.			
	SCIENCE BIOGRAPHIES	Weeks 1-3	Weeks 4-6	Weeks 7-9
6. Biographies	o Charles Darwin (Evolution) o Antoine Lavoisier (Atomic Structure: Start of Modern Chemistry) o Lise Meitner o Dmitri Mendeleev (Atomic Structure: Start of Modern Chemistry)			