INTRO TO CHEM & MATTER& ENERGY (Chapter 1)

Part I. C H E M I S T R Y

The study of matter and its changes. What are things made up of and how do they change physically and chemically?

AREAS OF STUDY:
Physical Inorganic Organic Analytical Biochemistry

PURE AND APPLIED CHEMISTRY: Most of the time, they work together.

Pure -Gaining knowledge, but the no expectation of practical use.
Applied - It is directed to a goal

WHY STUDY CHEMISTRY? It is useful in explaining about the natural world, preparing people for career opportunities, and producing informed citizens.

Part II. CHEMISTRY FAR AND WIDE

MATERIALS - Chemists design materials to fit specific needs - Burrs and hook-&-loop tape (Fig 1.6)

ENERGY - For matter to change, energy is necessary - Chemists plan an important role in finding ways to conserve, produce, and store energy.

MEDICINE & BIOTECHNOLOGY - Chemistry supplies the medicines, materials, and technology that doctors use to treat their patients.

AGRICULTURE - Chemists help to develop more productive crops and safer, more effective ways to protect crops. (plastic tubes around tomatoes)

THE ENVIRONMENT - Chemists help to ID pollutant and prevent pollution. (lead)

THE UNIVERSE - To study the universe, chemists gather data from afar and analyze matter that is brought back to Earth.

Part III. PROBLEM SOLVING IN CHEMISTRY & SCIENTIFIC METHOD

Review the parts of the Scientific Method

COLLABORATION AND COMMUNICATION - When scientists collaborate and communicate, they increase the likelihood of a successful outcome.

SKILLS USED IN SOLVING PROBLEMS - Effective problem solving always involves developing a plan and then implementing that plan.

SOLVING NUMERIC PROBLEMS: 1) Analyze, 2) Calculate, 3) Evaluate

Part IV. OF MATTER

MATTER – anything that takes up space and has mass.
Ex. Water, desk, air, glass

STATES OF MATTER

	VOLUME	SHAPE	COMPRESS
S	definite	definite	incompressible
L	definite	indefinite	incompressible
G	indefinite	indefinite	compressible
Plasma	??????????????????????????????		

Part V. Matter and Change Concept Map

SUBSTANCE
Matter w/a uniform
& definite composition
ex. Salt

MIXTURES
Blend of 2 or more
substances
ex. Soil, toothpaste

heterogeneous – different in composition ; ex. Granite
homogeneous – same in composition; ex. Homogenized milk
solution - homogeneous mixture with a particular part called a phase.

Part VI. ELEMENTS AND COMPOUNDS
How can you break down compounds?
A chemical reaction

Chemical symbols are used to represent an element by using a capital letter or combination of capital letter + a lower case letter.
Latin names for elements are still used in some parts of the world.

Ex. Cu – copper – cuprum

Part VII. Is it PHYSICAL AND CHEMICAL?

A. PROPERTIES

1. Physical property – quality a substance possesses that can be observed w/o changing the composition.
Ex. Color, solubility, mass, odor, hardness, density, conductivity, magnetism, b.p., m.p., dissolvibility

2. Chemical property – quality a substance possesses that can ONLY be observed during a chemical rxn (reaction).

B. CHANGES

1. Physical changes: grinding, bending, ripping, tearing, melting, freezing, hardness,etc.
2. Chemical changes: rusting, souring, burning, gas evolution, precipitate (ppt), tarnishing, light or heat given off – ex. Electrolysis

Part VIII. ENERGY: capacity for doing work; potential and kinetic
ex. Thermal, chemical, electrical, radiant, mechanical, nuclear, etc.

ex. Drying your hair with a dryer
What are the conversions of energy?

2 Laws for chemical reactions:
LAW OF CONSERVATION OF ENERGY –In any chemical or physical process, energy can neither be created nor destroyed.

LAW OF CONSERVATION OF MASS – In any physical or chemical reaction, mass if neither created nor destroyed, but conserved.