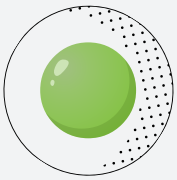
# CHEMISTRY
## CORE UNITS

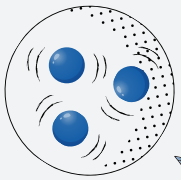
### Unit 1: Simple Particle

Every substance can be represented as a simple particle. Particles have mass and take up space. We learn particles and mass are conserved by observing changes in matter.



### Unit 2: Particles in Motion

Particles are in constant, random motion. We observe that particle speed is related to temperature. We learn particles interact with each other through collisions.

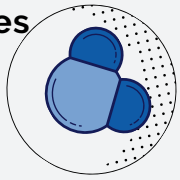


### Unit 3: Particles Store & Transfer Energy

Particles exert attractions on one another. We learn that energy affects particle interactions and motion. We explore energy storage and transfer mechanisms.

### Unit 4: Compound Particles

Particles can combine to form new substances. We learn to differentiate between elements, mixtures, and compounds.

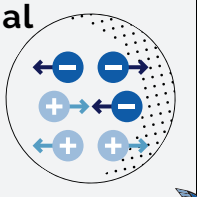


### Unit 5: Atoms & Molecules Have Definite Mass

Particles are assigned relative masses. Using the work of Avogadro we learn how to count particles by weighing. We define the mole concept.

### Unit 6: Atoms Have Internal Structure

Particles have positive cores and mobile negative electrons. We identify different ways particles bond based on differences in their internal structures. We learn naming conventions for compounds.

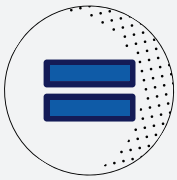


### Unit 7: Atoms in Compounds Can Rearrange

Chemical reactions involve rearrangement of atoms to form new substances. We model energy storage and transfer during chemical change. We represent this using balanced equations.

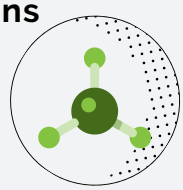
### Unit 8: Intro to Stoichiometry

Chemical equations can be used to relate relative quantities of substances in a chemical reaction. We apply previous knowledge to solving stoichiometric problems.



### Unit 9: Further Applications of Stoichiometry

Equations representing chemical reactions can also relate numbers of particles to volumes of gasses, solutions and to the change in chemical potential energy.

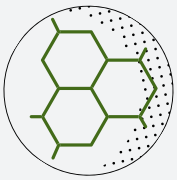


### Continue to "Beyond Core"

If it is necessary to follow the traditional sequence and address the internal workings of the atom in the first semester, you can do units 10 & 11 (in Chemistry 'Beyond Core') right after Unit 6. Then return to Units 7-9

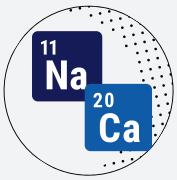
# CHEMISTRY
## ADVANCED UNITS

### Unit 10: Models of the Atom



From an examination of the radiation emitted by hot metals and atomic gases we conclude that atoms must have internal structure beyond positive cores and mobile electrons.

### Unit 11: Periodicity & Bonding




We extend our current model to many-electron atoms, using it to provide a structural explanation for the organization of the Periodic Table. We develop a model to explain both ionic and covalent bonding.

Choose **Unit 12 A** to delve more deeply into the difference between energy and temperature.

**OR**

Choose **Unit 12 B** if the course precedes a capstone biology course, or if you wish to investigate basic biochemistry.

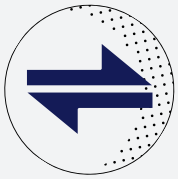
### Unit 12A: Temperature & Thermal Energy

We know when the energy in the chemical account of a system changes, energy in the thermal account also changes, eventually resulting in a transfer of energy between the system and the surroundings. We adopt a "kinetic" view of temperature to account for the direction of energy flow.

### Unit 12B: Intermolecular Attractions & Biological Macromolecules

We suggest a model to account for attractions between molecules and the effect on physical properties. We move to an investigation of organic molecules important to life.

### Unit 13: Equilibrium



We employ a kinetic view of particles moving back and forth across an interface to model a variety of processes (both physical and chemical) as they approach and reach the state of equilibrium.

### Unit 14: Acids & Bases


We extend what we've learned about equilibrium to the Brønsted-Lowry model of acids and bases, characteristics of strong and weak acids, and neutralization reactions.