Huntsville City Schools

Pacing Guide 2017 - 2018

Chemistry and Honors Chemistry Grades 10 - 12

KEY Vocabulary terms Science	Volume	Chemical Symbols	Electromagnetic radiation
Observation	Matter	Periodic table	Electromagnetic spectrum
Hypothesis	Pure substance	Period	Electron configuration
Variable	Element	Group	Electron dot symbol
Theory	Compound	Representative elements	Electronegativity (trend)
Law	Bonds	Group number	Electron affinity (trend)
Model	Mixtures	Transition elements	Atomic radius (trend)
Scientific notation	Homogeneous	Alkali metals	Energy level
Celsius Temperature scale (C^o)	Solution	Alkaline earth metals	*f* block
Centimeter (cm)	Heterogeneous	Halogens	Frequency
Conversion Factor	Chromatography	Noble gases	Ionization energy (trend)
Precision	Filtration	Metals	Metallic character
Accuracy	Distillation	Nonmetals	Orbital
Cubic centimeter (cm^3)	Conductivity	Metalloids	Orbital diagram
Cubic meter (m^3)	States of matter	Atoms	*p* block
Density	Solid	Dalton's Atomic Theory	Photon
Exact number	Liquid	Subatomic particles	Principal quantum number
Gram	Gas	Proton	*s* block
SI units	Physical properties	Neutron	Sublevel
Kelvin Temperature Scale (K)	Physical change	Electron	Valence electrons (trends)
Kilogram (kg)	Chemical properties	Nucleus	Wavelength
Liter (L)	Chemical Change	Atomic mass unit (amu)	Lone pairs of electrons
Mass	Fahrenheit	Atomic number	
Measured number	Absolute zero	Mass number	
Meter (m)	Work energy	Isotopes	
Metric system	Kinetic energy	Atomic symbol	
Milliliter (mL)	Potential energy	Atomic mass	
Prefix	Heat	Bright line spectra	
Scientific notation	Joule (j)	Atomic size	
Second (s)	calorie (cal)	Atomic spectrum	
Significant figures (SF's)	Specific heat (SH)	*d* block	
Temperature	Calorie (Cal)		

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First Nine Weeks

Standard	Resources	Approximate Pacing Number of Days
QC I.A.1.f Safely use laboratory equipment and techniques when conducting scientific investigations. Scientific Process and Application Skills QC I.A.2.a-c, e-g; II.A.1.b Use Mathematics and measurement in science appropriately.	**See ion sheet note with Nomenclature (chapter 6) **http://www.apluscollegeready.org/teachers** ASIM website: https://cws.auburn.edu/asim/Home/Home (Scroll down to Pre-AP Chemistry link for resources) In Nature of Chemistry Unit: PPT: Lab Safety PDF: Safety Contract/Rules PPT: Lab Equipment Lab safety Test Lab Manual: Using Lab Equipment/Techniques Chapter 3 in Pearson Chemistry: SuccessNetPlus Platform *Honors - Chapter 2 Timberlake Lab Manual: Density Determination LTF: Foundation Lesson: Graphing Skills-Line (graph section only) LTF: Dimensional Analysis- problems Resources below from A+CR link- Nature of Chemistry Unit	1 days (With additions practice and reinforcement throughout the school year.) 6 days

	PowerPoints SI units/Significant Figures Quiz	
Differentiate among pure substances, mixtures, elements, and compounds. Distinguish among endothermic and exothermic physical and chemical changes. (QC II.1.B.a-e) ALCOS 4. Plan and conduct an investigation to classify properties of matter as intensive (e.g., density, viscosity, specific heat, melting point, boiling point) or extensive (e.g., mass, volume, heat) and demonstrate how intensive properties can be used to identify a compound	Chapter 2, Chapter 6 (metals) Chapter 17 (heat), in Pearson Chemistry; SuccessNetPlus *Honors - Chapter 3, Timberlake Text; MasteringChemistry.com Lab Manual: Chemical and Physical Changes Lab (Lab manual) Chemistry amend as needed From A+CR link- Nature of Chemistry Unit: PPT: Classification of Matter PPT: properties and changes of matter Identification of an Unknown metal as a teacher Demo Assessments ASIM Labs: Density of a liquid Melting points Specific Heat of a Metal Intensive and Extensive properties	5 days
ALCOS 1. Obtain and communicate information from historical experiments (e.g., work by Mendeleev and Moseley, Rutherford's gold foil experiment, Thomson's cathode ray experiment, Millikan's oil drop experiment, Bohr's interpretation of bright line spectra) to determine the structure and function of an atom and to analyze the patterns represented in the periodic table. ALCOS 2. Develop and use models of atomic nuclei to explain why the abundance-weighted average of isotopes of an element yields the published atomic mass ALCOS 3. Use the periodic table as a systematic representation to	Chapter 4, 5, 6 in Pearson Chemistry; SuccessNetPlus *Honors – Chapter 4-5 Timberlake ASIM: Labs: Atomic Theory Excited Electrons Journey Into the Atom From A+CR link- Structure of Matter Unit: PPT: History of PT *Honors – Chapter 4 Timberlake PPT: Chemical Families PPT: Wave-particle nature ASIM: Labs: Calculating Average Mass-Beadium Coinium (Elaborate for Beadium)	8 days

predict properties of elements based on their valence electron arrangement. ALCOS 3.a. Analyze data such as physical properties to explain periodic trends of the elements, including metal/nonmetal/metalloid behavior, electrical/heat conductivity, electronegativity and electron affinity, ionization energy, and atomic-covalent/ionic radii, and how they relate to position in the periodic table. (QC II.A.2.c; IV.B.1.a-f; IV.B.2.a-g)	*Honors – Chapter 4 Timberlake PPT: Atomic structure ASIM: Labs: Periodic Trends- 3,3a Para and Diamagnetism- 3,3a Properties of Elements- 3,3a Flame Test Lab (Lab manual) *Honors – Chapter 4 Timberlake PPT: orbital notation PPT: Periodic Trends LTF: Electron Configuration, orbit al notation and quantum numbers LTF: Do's and Don'ts of Periodic Principles- teacher resource	

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Second Nine Weeks

KEY VOCABULARY TERMS Single bond Double bond Triple bond Resonance and Structures Octet rule Valence shell electron-pair repulsion (VSEPR) Theory 3- D ball and stick model Space filling model polarity Nonpolar covalent bond Polar covalent bond Dipole Nonpolar molecule Polar molecule Alkanes Anion Cation	Expanded structural formula Ion Ionic bond Ionic charge Ionic compound Lone pair Chemical formula Molecular compound Organic compound Polyatomic ion Vapor pressure Boiling point Chemical reaction Chemical equation Reactants Products Balanced equation	Coefficients Law of Conservation of Matter Delta sign (Δ) Solid (s) Liquid (l) Aqueous (aq) Gas (g) Combination reaction Synthesis reaction Decomposition reaction Single replacement reaction Double replacement reaction Combustion reaction

Standard	Resources	Approximate Pacing Number of Days
QC I.A.1.f Safely use laboratory equipment and techniques when conducting scientific investigations.		Throughout the year
QC I.A.2.a-c, e-g; II.A.1.b Use Mathematics and measurement in science appropriately		Throughout the year
ALCOS 3.b. Develop and use models (e.g., Lewis dot, 3-D ball-and-stick, space-filling, valence-shell electron-pair repulsion [VSEPR]) to predict the type of bonding and shape of simple compounds. (QCIV.B.3.a-d)	ASIM website: https://cws.auburn.edu/asim/Home/Home Chapter 7, 8 Pearson Chemistry; SuccessNetPlus, *Honors - Chapter 10, Timberlake sections 1-3 MasteringChemistry.com From A+CR link above- Bonding and Nomenclature Unit: Chemical Bonding PowerPoint LTF: Molecular Geometry Covalent Molecules Lab (Lab Manual) ASIM: Labs: Bond Types & Physical Properties- 3b Covalent Bonding & Lewis Structures Activity- 3b Molecular Shape and Polarity- 3b [Intermolecular Forces will be covered with States of Matter during 2nd semester]	4 days
ALCOS 3.c. Use the periodic table as a model to derive formulas and names of ionic and covalent compounds (QC III.A.1.a-d;IV.B.3.a,d)	Chapter 9, Pearson Chemistry; SuccessNetPlus Mastering Chemistry *Honors - Chapter 6, Timberlake **Ion Sheet Regular Chemistry should not memorize ions but use the Ion Sheet as a reference. *Honors - We encourage Honors students to start learning ions many weeks before the topic is taught. One strategy is for students to make notecards and take quizzes over several weeks prior to this chapter. From A+CR link- Bonding/Nomenclature unit:	5 days

	student activities: LTF: Chemical Nomenclature Lesson- Use templates to as group activity. HW- Table C ASIM: Labs: Chemical Nomenclature Quality Core- module 14- student nomenclature practice	
ALCOS 5. Plan and conduct investigations to demonstrate different types of simple chemical reactions based on valence electron arrangements of the reactants and determine the quantity of products and reactants. (QC II.B.1.a; III.A.3.a-h; V.D.a-c)	Chapter 11, Pearson Chemistry; SuccessNetPlus *Honors - Chapter 8, Timberlake Masteringchemistry.com and activity series is in Chapter 15, p 535 From A+Cr link above- Chemical Reactions units Student activities, teacher demos, assessments Suggestion: Give a test on 4 types of reactions and separate quiz or test on redox Lab Manual: Types of reactions lab (modify for Chemistry) ASIM: Labs: Chemical Reactions- 5 Empirical Formula – 5,5a,5b Mass & Mole Relationships in a Chemical Reaction- 5a, 5b Aluminum Leftovers – 5a, 5b Aspirin Synthesis – 5a, 5b Using Stoichiometry to ID a Reaction- 5a, 5b *Honors - LTF- OIL RIG lesson	10 days 1 days for review 1 day for semester exam

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Third Nine Weeks

KEY VOCABULLARY TERMS Mole (mol) Avogadro's number Formula units Conversion factor Subscripts Molar mass Mass percent composition (Mass percent) Empirical formula Molecular formula Actual yield Endothermic reaction Exothermic reaction Heat of reaction Law of conservation of mass Limiting reactant Mole-mole factor Percent yield Theoretical yield	Intermolecular forces (IMF's) Dipole-dipole attractions Hydrogen bonds Dispersion forces Temporary dipole Changes of state melting Melting point (mp) Freezing Freezing point (fp) Boiling Boiling point (bp) Sublimation Deposition Vaporization evaporation condensation Heat of fusion Heat of vaporization	Endothermic Exothermic Heating curve Cooling curve Vapor pressure

Standard	Resources	Approximate Pacing Number of Days
ALCOS 5. Plan and conduct investigations to demonstrate different types of simple chemical reactions based on valence electron arrangements of the reactants and determine the quantity of products and reactants. (QC III.A.2.a,b; III.A.1.e,f)	Chapter 10, Pearson Chemistry; SuccessNetPlus *Honors - Chapter 7, Timberlake From A+CR link: Composition Stoichiometry Unit: Activities PowerPoints Chalk Talk activity ASIM: Labs: Chemical Reactions- 5 Empirical Formula – 5,5a,5b Mass & Mole Relationships in a Chemical Reaction- 5a, 5b Aluminum Leftovers – 5a, 5b Aspirin Synthesis – 5a, 5b Using Stoichiometry to ID a Reaction- 5a, 5b	6 days
ALCOS 5 a. Use mathematics and computational thinking to represent the ratio of reactants and products in terms of masses, molecules, and moles. (QC III.A.3.j-l)	Chapter 3 (%error) and 12 in Pearson Chemistry; SuccessNetPlus *Honors – Chapter 9, Timberlake From A+CR link- http://www.apluscollegeready.org/teachers Reaction Stoichiometry unit: Stoichiometry PowerPoint Student homework LTF- Exploring Molar Relationships ASIM: Labs: Specific Heat of Metals (also used in Standard 4) – 11, 11b ASIM Labs: Endothermic/Exothermic Reactions- 11, 11a	8 days
ALCOS 5 b. Use mathematics and computational thinking to support the claim that atoms, and therefore mass, are conserved during a chemical reaction.	Chapter 3 (%error) and 12 in Pearson Chemistry; SuccessNetPlus *Honors – Chapter 9, Timberlake	

ALCOS 11. Construct an explanation that describes how the release or absorption of energy from a system depends upon changes in the components of the system.	Chapter 13 and 7,8 (IMFs, solid) in Pearson Chemistry; SuccessNetPlus *Honors – Chapter 9, Timberlake ASIM: Labs: Specific Heat of Metals (also used in Standard 4) – 11, 11b	
ALCOS 11a. Develop a model to illustrate how the changes in total bond energy determine whether a chemical reaction is endothermic or exothermic.	Chapter 13 and 7,8 (IMFs, solid) in Pearson Chemistry; SuccessNetPlus *Honors - Chapter 9, Timberlake ASIM: Labs: Endothermic/Exothermic Reactions- 11, 11a	
ALCOS 11b. Plan and conduct an investigation that demonstrates the transfer of thermal energy in a closed system (e.g., using heat capacities of two components of differing temperatures).	Chapter 13 and 7,8 (IMFs, solid) in Pearson Chemistry; SuccessNetPlus *Honors - Chapter 9, Timberlake	
ALCOS 9. Analyze and interpret data (e.g., melting point, boiling point, solubility, phase-change diagrams) to compare the strength of intermolecular forces and how these forces affect physical properties and changes. (QC II.B.1.b.c; IV.A.1.a; IV.A.2.a; IV.B.3.f-k)	Chapter 13, and 7,8(IMFs, solids) in Pearson Chemistry; SuccessNetPlus *Honors - Chapter 10 in Timberlake Text (already completed sections 1-3) Teach section 4 (IMFs) and 5 (Solids and Liquids- this section is VERY lacking in details-MUST supplement for properties of solids and liquids) *Honors - Chapter 11 pages 367-368- for Vapor Pressure and Boiling Point From A+CR link above in States of Matter unit: Assessments, activities with graphs ASIM: Labs: Evaporation and Intermolecular Forces - 9 Fractional Distillation - 9 LTF- Don't Flip Your Lid Lab	4 days

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Fourth Nine Weeks

Standard	Resources	Approximate Pacing Number of Days
ALCOS 10. Plan and conduct experiments that demonstrate how changes in a system (e.g., phase changes, pressure of a gas) validate the kinetic molecular theory. (QC II.B.2.a-d)	Chapter 13, 14 in Pearson Chemistry; SuccessNetPlus *Honors - Chapter 11, Timberlake Chapter 11 in Timberlake Text; Masteringchemistry.com From A+CR link above- States of Matter Unit	6 days
ALCOS 10a. Develop a model to explain the relationship between the average kinetic energy of the particles in a substance and the temperature of the substance (e.g., no kinetic energy equaling absolute zero [0K or -273.15°C]). (QC II.B.2.a-d)	*Honors – Chapter 11, Timberlake http://www.apluscollegeready.org/teachers Guided reading note pages, activities ASIM: Labs: Kinetic Molecular Theory- 10 LTF- Boyle's Law and Practice using Gas Laws	
ALCOS 7. Plan and carry out investigations to explain the behavior of ideal gases in terms of pressure, volume, temperature, and number of particles. ALCOS 7 a. Use mathematics to describe the relationships among pressure, temperature, and volume of an enclosed gas when only the amount of gas	Textbook: Chapter 14 Pearson Chemistry; SuccessNetPlus *Honors - Textbook: Chapter 11 Timberlake Chapter 11, sections 7-10 in Timberlake Text; Masteringchemistry.com From A+CR link: States of Matter Unit:	

is constant. ALCOS 7 b. Use mathematical and computational thinking based on the ideal gas law to determine molar quantities. (QC II.B.2.e,f; II.B.3.a-e)	http://www.apluscollegeready.org/teachers Guided reading note pages, activities Molar Volume of a Gas Lab- Lab manual ASIM website: https://cws.auburn.edu/asim/Home/Home ASIM: Labs: Boyle's Law- 7,7a Gay Lussacs Law- 7, 7a ASIM: Labs: Ideal Gas Law and Molar Volume- 7,7b	
ALCOS 6. Use mathematics and computational thinking to express the concentrations of solutions quantitatively using molarity. ALCOS 6 a. Develop and use models to explain how solutes are dissolved in solvents. ALCOS 6 b. Analyze and interpret data to explain effects of temperature on the solubility of solid, liquid, and gaseous solutes in a solvent and the effects of pressure on the solubility of gaseous solutes. (QC V.A.1.a-l;V.A.2.a-c)	Chapter 15, 16 (solubility rules in Chapter11) in Pearson Chemistry; SuccessNetPlus *Honors - Chapter 12, Timberlake (skip Osmotic pressure); PowerPoints in masteringchemistry.com (Mole fraction is not in the text- can use LTF lesson "solution basics" for info) From A+CR link: http://www.apluscollegeready.org/teachers Solutions Unit- PowerPoint; notes; homework; solubility curve; assessments ASIM: Labs: Molarity- 6, 6a Conducting Solutions – 6c LTF- Colligative Properties Lab manual: Supersaturation	5 days
ALCOS 6 c. Design and conduct experiments to test the conductivity of common ionic and covalent substances in a solution. ALCOS 6 d. Use the concept of pH as a model to predict the relative properties of strong, weak, concentrated, and dilute acids and bases (e.g., Arrhenius and Brønsted-Lowry acids and bases). (QC III.A.1.d; V.B.1.h)	Chapter 19, in Pearson Chemistry; SuccessNetPlus *Honors - Chapter 14, Timberlake (Acids and Bases) masteringchemistry.com From Chapter 13 refer to writing equilibrium expressions From A+CR link- Acids and Bases Unit: http://www.apluscollegeready.org/teachers Assessments, notes, activities	6 days

	ASIM: Labs: Conducting Solutions – 6c Acid Ionization- 6d Acid Base Titration – 6, 6d Lab Manual: Titration Lab	
(QC V.E.a,b) Not in ALCOS Describe alpha, beta, and gamma decay, half-life and fission and fusion Write appropriate equations for nuclear decay reactions, using particle balance; describe how the nucleus changes during these reactions and compare the resulting radiation with regard to penetrating ability.	Chapter 25 in Pearson Chemistry; SuccessNetPlus From A + CR link: http://www.apluscollegeready.org/teachers Look in Unit 2 Structure of matter	2 days
Describe the structure of carbon chains, branched chains, and rings. (QC IV.B.3.e)	Chapter 22 in Pearson Chemistry; SuccessNetPlus *Honors - Chapter 17, (section 1) Timberlake Masterindchemistry.com Molecular model kits for demo	3 days
ALCOS 8. Refine the design of a given chemical system to illustrate how LeChâtelier's principle affects a dynamic chemical equilibrium when subjected to an outside stress (e.g., heating and cooling a saturated sugar-water solution). (QC V.B.1.a-f)	Chapter 18 in Pearson Chemistry; SuccessNetPlus *Honors - Chapter 13, (sections 1,2,3,5) Timberlake Masteringchemistry.com ASIM: Labs: LeChatelier's Principle-8	2 days 2 days for Exam Review

Listed below are the technology standards for grades nine through twelve. You are to make every effort to incorporate the applicable standards into your daily classroom lessons. These standards should be noted in your lesson plans.

Alabama Technology Standards Ninth – Twelfth Grade

Operations and Concepts

Students will:

2. Diagnose hardware and software problems.
   Examples: viruses, error messages
   Applying strategies to correct malfunctioning hardware and software
   Performing routine hardware maintenance
   Describing the importance of antivirus and security software

3. Demonstrate advanced technology skills, including compressing, converting, importing, exporting, and backing up files.
   Transferring data among applications
   Demonstrating digital file transfer
   Examples: attaching, uploading, downloading

4. Utilize advanced features of word processing software, including outlining, tracking changes, hyperlinking, and mail merging.

5. Utilize advanced features of spreadsheet software, including creating charts and graphs, sorting and filtering data, creating formulas, and applying functions.

6. Utilize advanced features of multimedia software, including image, video, and audio editing.

Digital Citizenship

9. Practice ethical and legal use of technology systems and digital content.
   Explaining consequences of illegal and unethical use of technology systems and digital content
   Examples: cyberbullying, plagiarism
   Interpreting copyright laws and policies with regard to ownership and use of digital content
   Citing sources of digital content using a style manual
   Examples: Modern Language Association (MLA), American Psychological Association (APA)

Research and Information Fluency

11. Critique digital content for validity, accuracy, bias, currency, and relevance.

Communication and Collaboration

12. Use digital tools to publish curriculum-related content.
    Examples: Web page authoring software, coding software, wikis, blogs, podcasts

13. Demonstrate collaborative skills using curriculum-related content in digital environments.

Examples: completing assignments online; interacting with experts and peers in a structured, online learning environment

Critical Thinking, Problem Solving, and Decision Making

14. Use digital tools to defend solutions to authentic problems.
    Example: disaggregating data electronically

Creativity and Innovation

15. Create a product that integrates information from multiple software applications.
    Example: pasting spreadsheet-generated charts into a presentation