

Fresno Unified School District Chemistry Course of Study



Introduction

The California Science Content Standards include Earth Science, Biology, Chemistry, and Physics. These standards are intended to prepare students for the more formal treatment of concepts, principles, and theories called for at the college level. In the middle school grades students should have developed and enhanced their formal reasoning abilities that reflect science as a way of knowing, and acquiring new science content knowledge. In grade 6-8 they connect concrete observations of a rich array of phenomena and unify models that help to simplify the ever-expanding body of science content knowledge. At the ninth grade level these skills will be revisited, reinforced and developed in depth. In the investigation and experimentation strand students are expected to: formulate hypotheses, to design experiments that will enable them to test predictions, and complete independent research projects utilizing the *World Wide Web*. They will also be expected to make oral reports and arguments based on evidence. In designing, carrying out, and reporting the results of experiments, they will be expected to make use of more complex mathematics.

Teaching and Learning

The National Research Council (1999) in How People Learn has recommended a framework to help guide the design and evaluation of environments that can optimize learning. (National Research Council, 1999, p.19). The framework identifies four interrelated attributes of learning environments that need cultivation:

1. Schools and classrooms must be learner centered. This incorporates prior knowledge, cultural differences, and students' own theories about intelligence and learning (p. 19-20).
2. Attention must be given to what is taught, why it is taught, and what mastery looks like. Many curricula fail to support learning with understanding that knowledge-centered environments emphasize (p. 21).
3. Formative assessments designed to provide evidence of learning are essential. Assessments must be learner friendly and provide the student with opportunities to revise and improve their thinking over a period of time (p. 22).
4. Learning is influenced in fundamental ways by the context in which it takes place. Teachers must design classroom activities and help students organize their work in ways that will build a community of learners. Teachers must also be able to create a community of learners among themselves (p. 22).

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The Role of Technology

The use of technology in schools and classrooms will create new opportunities for curriculum and instruction by bringing real-world problems into the classroom. Peck and Dorricott (1994), listed ten reasons for using technology:

1. Students learn and develop at different rates.
2. Graduates must be proficient at accessing, evaluating, and communicating information.
3. Technology can foster an increase in the quantity and quality of students' thinking and writing.
4. Technology can nurture artistic expression.
5. Graduates must be globally aware and able to use resources that exist outside the school.
6. Technology creates opportunities for students to do meaningful work.
7. All students need access to high level and high-interest courses.
8. Graduates must solve complex problems.
9. Students must feel comfortable with the tools of the Information Age.
10. Schools must increase their productivity and efficiency (p. 53).

Science leaders must keep informed about changes in technology and its trends. Rapid changes in communications technology can redefine what the classroom looks like. Technology can also be a powerful pedagogical tool for human interaction that supports learning (National Research Council, 1999; Posner, 1995).

In an effort to establish a consistent content for technology education in schools, the International Technology Education Association (ITEA) has created the Standards for Technological Literacy: Content for the Study of Technology. The standards and associated benchmarks created present a vision of what students should know and be able to do in order to be technologically literate. The intent of the publication is to influence what happens in every K-12 classroom in America through the development of new curricula, textbooks, and student assessments (International Technology Education Association, 2000).

Reading and Language Arts Improvement Through Science Curriculum-The Research

The demand for literacy skills in the U.S. workplace is at an all time high and public schools are attempting to respond by increasing the basic literacy requirements for K-12 students. Despite these efforts, reading scores nationally have not improved over the last 30 years as measured by the National Assessment of Educational Progress (NAEP), and the U.S. continues to lag behind most other countries on international assessments in reading. In addition, the relative poor performance of U.S. students in mathematics and science assessments internationally is believed to also be rooted in their poor performance as readers. The weakness is that reading is seldom effectively integrated across the various content areas in schools. Reading comprehension, in particular, has been identified as a critical skill children must possess to succeed in school beyond grade three. Even though texts remain the primary source of instruction for content, reading is seldom integrated into content area instruction. The development of reading skills is enhanced through the development of classification and oral communication skills and positive attitudes toward science (National Research Council, 2000; Lowery, 1995).

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Teaching science in a way that is understandable and meaningful to students, as it promotes increased literacy, can be developed for students using existing science and language arts curricula and recognized best practice strategies (Crandall, 1995). Evidence has been reported that shows inquiry-related teaching effective in fostering ways of thinking, talking, and writing (Fradd & Lee, 1999; Met, 1994; Mohan, 1990; Rosebery et al., 1992).

English Learner Student Achievement Will Improve With Science Learning

Inquiry-oriented science teaching that is contextualized is especially valuable for culturally and linguistically diverse students. Science learning and language acquisition for English Learner students is mutually dependent. Through the contextualized use of language in science inquiry, students develop and practice complex language forms and functions. Through the use of language functions such as description, explanation and discussion in inquiry science, students enhance their conceptual understanding (Merino & Hammond, 1998).

Inquiry-related teaching is also effective in developing vocabulary and conceptual understanding of science. When English Learner students use English to solve real world science problems their acquisition of the language is more effective (Merino & Hammond, 1998). Learning vocabulary and academic language in context is most effective because only the vocabulary needed is used. English Language Learners, in particular, do not need to practice isolated vocabulary that will never be used (Lloyd & Contreras, 1987). Evidence collected in classrooms shows that students with large science vocabulary knowledge learned through memorization give the false impression they have scientific knowledge. The fact is that they do not understand the meaning of the words at all (Fradd & Lee, 1999; Met, 1994; Mohan, 1990; Rosebery et al., 1992).

Reading in the Content Area of Science

Many studies cite that learning science through the use of the English language develops fluency much more effectively. Language-minority students acquire scientific ways of thinking, talking, and writing through inquiry-oriented teaching (August & Hakuta, 1997; Rosebery et al., 1992; Ballenger, 1997). The research also implies that there is a need for explicit instruction in both academic language and reading to learn through text (Holliday, 1994; Kuehn, 1998; Pressley, et al, 1989; Santa & Alvermann, 1991). How students learn science and how they develop language skills and reading skills are interconnected. The contextualized use of language in science inquiry provides students practice with complex language forms and functions. Further, this type of explicit instruction must be embedded in the natural context of effective science instruction (Casteel & Isom, 1994; Lee, Fradd, & Sutman, (1995); Warren & Rosebery, 1993), and teacher professional development (Diaz, 1994). Parallels between this research and the research on reading comprehension are strong. It is all the more reason that a quality standards-based program is important to include in strategic plans to improve student achievement.

Critical thinking is developed through cognitively demanding context-embedded tasks in which children try to make sense out of the world. Their worldview, influenced by cultural perspective and understanding of words in cultural context, determines what is feasible in a scientific sense. English Learner students often understand science concepts in their primary language and may constitute prior knowledge that is never acknowledged (Met, 1994; Lowery, 1995).

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Natural Sciences Sequence

<i>Middle School Grades 6-8</i>			<i>High School Grades 9-12</i>			
Grade 6	Grade 7	Grade 8	Grade 9	Grade 10	Grade 11	Grade 12
Earth Science emphasis integrated with Life and Physical Sciences	Life Science emphasis integrated with Earth and Physical Sciences	Physical Science emphasis integrated with Earth and Life Sciences	Introductory Earth Science, or Biology Course of Study	Biology, Chemistry, or Physics Course of Study	Chemistry, Physics, or other standards-based advanced science course	Options include *science electives, honors level, or advanced level course

**Science Electives: The fourth year of laboratory science may include optional courses such as Physiology, Environmental Science, Ecology, Zoology, or Advanced Topics. Some sites may not offer all elective courses.*

Advanced Placement coursework that is identified as one of the standards-based course titles qualifies as a “second year” course. For example: Biology and AP Biology, Chemistry and AP Chemistry, Physics, and AP Physics.

State augmented assessments as part of the STAR package are available only for Earth, Biology, Chemistry, Physics, and Integrated Science. Only students enrolled in those courses are eligible to take the exams.

Algebra is a recommended prerequisite for Grade 9 Earth Science and all other science courses.

Some aspects of all four California Content Standards – Biology, Physics, Chemistry, and Earth/Space Science – must be covered in depth. The main goal of the Natural Sciences Sequence is to revisit concepts, principles and theories at successively higher levels of abstraction over six years of schooling.

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CHEMISTRY



There is a single light of science, and to brighten it anywhere is to brighten it everywhere.
--Isaac Asimov

Chemistry Content Outline

Due to the nature of Chemistry topics, the opportunity for students to develop abstract thinking and higher order problem solving skills abound with every content standard. Academic growth with this course includes analytical and complex reasoning skills, advanced data collection and analysis, complex calculations, and report writing. As they progress through this course, self-confidence at having completed these challenging topics and concepts allows all students to increase their knowledge of scientific inquiry, and will become better equipped to be scientifically literate adults. Coupled with traditional topics of classic chemistry, this course includes current issues such as global warming, ozone depletion, and acid rain.

The high school science standards require more than two years of science courses for students to achieve the breadth and depth described. Schools and districts will be challenged to develop a science curriculum that meets the needs of their students and provides them the maximum opportunity to learn the standards while encouraging students to study further in science. In grades nine through twelve, standards that all students are *expected to achieve* in their science courses are unmarked; standards that all students should have *the opportunity to learn* in those courses are marked with an asterisk

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Investigation and Experimentation – Standard 12. Scientific progress is made by asking meaningful questions and conducting careful investigations.

Standards and Assessments “Students know...”	Task Analysis “Students are able to...”	Adopted Textbook Correlation(s)	Connections	App. Time (per 180 days)
<p>(12f) distinguish between hypothesis and theory as scientific terms.</p> <p>(12g) recognize the usefulness and limitations of models and theories as scientific representations of reality.</p> <div style="border: 1px solid black; padding: 2px; width: fit-content; margin: 10px auto;">ASSESSMENT</div> <p>[CST]</p> <p>CTR Ch. 1</p> <p>Computer Test Bank: Chapter 1</p>	<p>1.3.2 identify three steps in the scientific method.</p>	<p>Prentice Hall: Chapter 1.3</p> <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 10px auto;">LABS/DEMOS/ ACTIVITIES & RESOURCES:</div> <p>LM 1 Observing and Inferring</p> <p>SSLM 1 Making Observations of Matter</p> <p>SE Quick Lab: Bubbles, p. 23</p> <p>TE Class Activity: Invisible Ink, p. 21</p> <p>GRSW 1.3 Transparencies 5,6 CTR Ch. 1.3 Chapter Assessment p. 34-37</p>	<div style="border: 1px solid black; padding: 2px; width: fit-content; margin-bottom: 10px;">KEY VOCABULARY:</div> <p>Scientific method Observation Hypothesis Experiment Manipulated variable Responding variable Theory Law</p> <div style="border: 1px solid black; padding: 2px; width: fit-content; margin-bottom: 10px;">SKILLS FOCUS:</div> <p>Describe Identify Explain</p> <div style="border: 1px solid black; padding: 5px; width: fit-content; margin-bottom: 10px;">LITERACY CONNECTIONS</div> <p>Word forms Using prior knowledge Building vocabulary</p> <div style="border: 1px solid black; padding: 2px; width: fit-content; margin-top: 10px;">EL STRATEGIES</div>	<p>1-2 class periods</p>

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Investigation and Experimentation – Standard 12. Scientific progress is made by asking meaningful questions and conducting careful investigations.

Standards and Assessments “Students know...”	Task Analysis “Students are able to...”	Adopted Textbook Correlation(s)	Connections	App. Time (per 180 days)
<p>(12b) identify and communicate sources of unavoidable error.</p> <p>(12c) identify possible reasons for inconsistent results, such as sources of error or uncontrolled conditions.</p> <p>(12j) recognize the issues of statistical variability and the need for controlled tests.</p> <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 10px auto;">ASSESSMENT</div> <p>[CST]</p> <p>CTR Ch. 3</p> <p>Computer Test Bank: Chapter 3</p> <p>LP 3 Scientific Measurement</p>	<p>3.1.2 distinguish between accuracy, precision, and error of a measurement.</p>	<p>Prentice Hall: Chapter 3.1</p> <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 10px auto;">LABS/DEMOS/ ACTIVITIES & RESOURCES:</div> <p>TE Class Activity: Precision and Accuracy, p. 64</p> <p>TE Class Activity: Olympic Times, p.66</p> <p>LM 4 Mass, Volume, and Density</p> <p>GRSW 3.1 Transparencies 20,21 CTR Ch 13.1 Chapter Assessment p. 96-99</p> <p>Chem Alive Lab (DVD): “Giant Density Column”</p>	<div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 10px auto;">KEY VOCABULARY:</div> <p>Measurement Accuracy Precision Accepted value Experimental value Error</p> <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 10px auto;">SKILLS FOCUS:</div> <p>Convert Distinguish Determine</p> <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 10px auto;">LITERACY CONNECTIONS</div> <p>Paraphrase Using Prior Knowledge Building Vocabulary</p> <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 10px auto;">EL STRATEGIES</div>	<p>1-2 class periods</p>

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Atomic and Molecular Structure – Standard 1 - The periodic table displays the elements in increasing atomic number and shows how periodicity of the physical and chemical properties of the elements relates to atomic structure.

Standards and Assessments “Students know...”	Task Analysis “Students are able to...”	Adopted Textbook Correlation(s)	Connections	App. Time (per 180 days)
<p>(1a) how to relate the position of an element in the periodic table to its atomic number and atomic mass</p> <p>(1e) the nucleus of the atom is much smaller than the atom yet contains most of its mass</p> <div style="border: 1px solid black; padding: 2px; width: fit-content; margin: 10px 0;">ASSESSMENT</div> <p>[CST] CTR Chapter 4 Computer Test Bank: Chapter 4 Standardized Test Prep: Topic 1</p>	<p>4.2.1 Identify three types of subatomic particles</p> <p>4.2.2 Describe the structure of atoms according to the Rutherford atomic model</p> <p>4.3.1 Explain what makes elements and isotopes different from each other</p> <p>4.3.2 calculate the number of neutrons in an atom</p> <p>4.3.3 calculate the atomic mass of an element</p> <p>4.3.4 explain why chemists use the periodic table</p>	<p>Prentice Hall: Chapter 4.2 Chapter 4.3</p> <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 10px 0;">LABS/DEMOS/ ACTIVITIES & RESOURCES:</div> <p>SE Inquiry Activity: Electric Charge, p. 100</p> <p>SSLM Small Scale Lab: Isotopes and Atomic Mass, p. 53</p> <p>CTR Core Teaching Resource: The Atomic Mass of Cadium, p.102</p> <p>GRSW Guided Reading and Study Workbook: 4.1, 4.2, 4.3 Chapter Assessment, pages 122-125 Transparencies #43-56</p>	<div style="border: 1px solid black; padding: 2px; width: fit-content; margin-bottom: 10px;">KEY VOCABULARY:</div> <p>Atom Electrons Cathode ray Protons Neutrons Nucleus Atomic number Mass number isotopes Atomic mass unit (amu) Periodic table Period Group</p> <div style="border: 1px solid black; padding: 2px; width: fit-content; margin: 10px 0;">SKILLS FOCUS:</div> <p>Describe Explain Identify Understand Calculate</p> <div style="border: 1px solid black; padding: 2px; width: fit-content; margin: 10px 0;">LITERACY CONNECTIONS</div> <p>Visualize Build vocabulary Outline Graphic organizer</p> <div style="border: 1px solid black; padding: 2px; width: fit-content; margin: 10px 0;">EL STRATEGIES</div>	<p>5 class periods</p>

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Atomic and Molecular Structure – Standard 1 - The periodic table displays the elements in increasing atomic number and shows how periodicity of the physical and chemical properties of the elements relates to atomic structure.

Standards and Assessments “Students know...”	Task Analysis “Students are able to...”	Adopted Textbook Correlation(s)	Connections	App. Time (per 180 days)
<p>(1b) how to use the periodic table to identify metals, semimetals, non-metals, and halogens</p> <p>(1c) how to use the periodic table to identify alkali metals, alkaline earth metals and transition metals, trends ionization energy, electro negativity, and the relative sizes of ion and atoms</p> <p>(1d) how to use the periodic table to determine the number of electrons available for bonding</p> <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 10px 0;">ASSESSMENT</div> <p>[CST] CTR: Chapter 6 Computer Test Bank: Chapter 6</p> <p>Standardized Test Prep: Topic 2</p>	<p>6.1.1 Explain how elements are organized in a periodic table</p> <p>6.1.3 identify three broad classes of elements</p> <p>6.2.1 Describe the information in a periodic table</p> <p>6.2.2 Classify elements base on electron configuration</p> <p>6.2.3 Distinguish representative elements and transition metals</p> <p>6.3.1 Describe trends among the elements for atomic size</p> <p>6.3.2 Explain how ions form</p> <p>6.3.3 Describe periodic trends for the first ionization energy, ionic size and electro negativity</p>	<p>Prentice Hall: Chapter 6.1, 6.2, and 6.3</p> <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 10px 0;">LABS/DEMOS/ ACTIVITIES & RESOURCES:</div> <p>SE Inquiry Activity: Trends in Physical Properties, p. 154</p> <p>TE Teacher Demo: Differences in Reactivity of Metals, p. 165</p> <p>LM #9: Periodic Properties</p> <p>SE Quick Lab: Periodic Trends in Ionic Radii, p. 175</p> <p>CTR Section 6.1,6.2,6.3</p> <p>GRSW 6.1,6.2,6.3</p> <p>Chapter Assessment, pgs. 181-184</p> <p>Transparencies # 65-74</p> <p>Chem Alive Lab (DVD): “Making Sodium Chloride”</p> <p>Chem Alive Lab (DVD): “Superconductivity”</p>	<div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 10px 0;">KEY VOCABULARY:</div> <p>Periodic law Metals Nonmetals Metalloids Alkali metals Alkaline earth metals Halogens Noble gases Representative elements Transition metals Inner transition metals Atomic radius Ion cation anion ionization energy electro negativity</p> <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 10px 0;">SKILLS FOCUS:</div> <p>Explain, compare, identify, classify, distinguish,</p> <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 10px 0;">LITERACY CONNECTIONS</div> <p>Comparing and contrasting Build vocabulary/word parts Prior knowledge Relating texts and visuals Predicting Vocabulary—graphic organizer</p> <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 10px 0;">EL STRATEGIES</div>	<p>5 class periods</p>

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Nuclear Processes – Standard 11. Nuclear processes are those in which an atomic nucleus changes, including radioactive decay of naturally occurring and human-made isotopes, nuclear fission, and nuclear fusion.

Standards and Assessments “Students know...”	Task Analysis “Students are able to...”	Adopted Textbook Correlation(s)	Connections	App. Time (per 180 days)
<p>... (11a) protons and neutrons in the nucleus are held together by nuclear forces that overcome the electromagnetic repulsion between the protons (11b) the energy release per gram of material is much larger in nuclear fusion or fission reactions than in chem.. reaction. The change in mass($E=mc^2$) is small but significant in nuclear reactions. (11c) some naturally occurring isotopes of elements are radioactive, as are isotopes formed in nuclear reactions. (11d) the three most common forms of radioactive decay(alpha, beta, and gamma) and know how the nucleus changes in each type of decay. (11e) alpha, beta, and gamma radiation produce different amounts and kinds of damage in matter and have different penetrations</p> <p>CTR: chapter 25 STP Topic 11 Computer Test Bank: Chapter 25</p> <div style="border: 1px solid black; padding: 2px; width: fit-content; margin-top: 10px;">ASSESSMENT</div>	<p>25.1.1 explain how an unstable nucleus releases energy</p> <p>25.1.2 describe the three main types of nuclear radiation</p> <p>25.2.1 describe the type of decay a radioisotope undergoes</p>	<p>Prentice Hall: Ch 25.1 Ch 25.2 p.807 Ch 25.3 p.813</p> <div style="border: 1px solid black; padding: 5px; text-align: center; margin: 10px auto; width: 80%;">LABS/DEMOS/ ACTIVITIES & RESOURCES:</div> <p>Grsw-25.1 25.2, 25.3 CTR Ch. Assessment p.821-825</p> <p>TR 286-288 TR 289-292 TR 293</p>	<div style="border: 1px solid black; padding: 2px; margin-bottom: 10px;">KEY VOCABULARY:</div> <p>Radioactivity Radiation Radioisotopes Alpha particles Beta particles Gamma ray positron Transmutation fission</p> <div style="border: 1px solid black; padding: 2px; margin: 10px auto; width: 80%;">SKILLS FOCUS:</div> <p>Explain Describe</p> <div style="border: 1px solid black; padding: 2px; margin: 10px auto; width: 80%;">LITERACY CONNECTIONS</div> <p>Building vocabulary</p> <div style="border: 1px solid black; padding: 2px; margin: 10px auto; width: 80%;">EL STRATEGIES</div>	<p>5 class days</p>

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Chemical Bonds – Standard 2 - Biological, chemical, and physical properties of matter result from the ability of atoms to form bonds from electrostatic forces between electrons and protons and between atoms and molecules

Standards and Assessments "Students know..."	Task Analysis "Students are able to..."	Adopted Textbook Correlation(s)	Connections	App. Time (per 180 days)
<p>(2a) atoms combine to form molecules by sharing electrons to form covalent or metallic bonds or by exchanging electrons to form ionic bonds</p> <p>(2c) salt crystals, such as NaCl, are repeating patterns of positive and negative ions held together by electrostatic attraction</p> <div style="border: 1px solid black; padding: 5px; width: fit-content; margin-top: 20px;">ASSESSMENT</div> <p>[CST] CTR: Chapter 7 Computer test Bank: Chapter 7</p> <p>Standardized Test Prep: SE Chp7,p.211</p>	<p>7.1.1 determine the number of valence electrons in an atom of a representative elements</p> <p>7.1.2 Explain how the octet rule applies to atoms of metallic and nonmetallic elements</p> <p>7.1.3 describe how cations form</p> <p>7.1.4 Explain how anions form</p> <p>7.2.1 explain the electrical charge of an ionic compound</p> <p>7.2.2 describe three properties of ionic compounds</p> <p>7.3.1 model the valence electrons of metal atoms</p> <p>7.3.2 describe the arrangement of atoms in a metal</p>	<p>Prentice Hall: Chapter 7.1, 7.2, 7.3</p> <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 10px auto;">LABS/DEMOS/ ACTIVITIES & RESOURCES:</div> <p>SSLM #10:Electron Configurations of Atoms and electrons</p> <p>SE Quick Lab: Solutions containing ions, p.199</p> <p>SE Small-Scale Lab: Analysis of Anions and Cations, p. 200</p> <p>CTR7.1,7.2,7.3</p> <p>GRSW 7.1,7.2,7.3</p> <p>Chapter Assessment, pages 207-211</p> <p>Transparencies #75--84</p>	<div style="border: 1px solid black; padding: 5px; width: fit-content; margin-bottom: 10px;">KEY VOCABULARY:</div> <p>Valence electrons Electron dot structures Octet rule Halide ions Ionic compounds Ionic bonds Chemical formulas Formula unit Metallic bonds alloys</p> <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 10px auto;">SKILLS FOCUS:</div> <p>explain describe model</p> <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 10px auto;">LITERACY CONNECTIONS</div> <p>Summarizing graphic organizer preview paraphrase identify main ideas/details using prior knowledge relating cause and effect</p> <div style="border: 1px solid black; padding: 5px; width: fit-content; margin-top: 10px;">EL STRATEGIES</div>	<p>5 class periods</p>

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Chemical Bonds – Standard 2 - Biological, chemical, and physical properties of matter result from the ability of atoms to form bonds from electrostatic forces between electrons and protons and between atoms and molecules.

Standards and Assessments “Students know...”	Task Analysis “Students are able to...”	Adopted Textbook Correlation(s)	Connections	App. Time (per 180 days)
<p>(2b) chemical bonds between atoms in molecules such as H₂,CH₄, NH₃, H₂CCH₂, N₂, Cl₂ and many large biological molecules are covalent</p> <p>(2e) how to draw Lewis dot structures</p> <div style="border: 1px solid black; padding: 5px; margin-top: 20px; width: fit-content;">ASSESSMENT</div> <p>[CST] CTR: Chapter 8</p> <p>Computer Test Bank: Chapter 8</p> <p>Standardized Test Prep: Topic 1</p>	<p>8.1.2 Describe the information a molecular formula provides</p> <p>8.2.1 describe how electrons are shared to form covalent bonds</p> <p>8.2.2 demonstrate how electron dot structures represent shared electrons</p> <p>8.2.3 describe how atoms form double or triple bonds</p>	<p>Prentice Hall: Chapter 8.1 and Chapter8.2</p> <div style="border: 1px solid black; padding: 5px; margin-top: 20px; width: fit-content;">LABS/DEMOS/ ACTIVITIES & RESOURCES:</div> <p>LM # 11: Molecular Models</p> <p>TE Class Activity: Representing Molecules,p.218</p> <p>TE Class Activity: Bonding for the second Row, p. 220</p> <p>TE Teacher Demo: Molecular structures and Formulas, p. 215</p> <p>CTR 8.1 and 8.2</p> <p>GRSW 8.1 and 8.2</p> <p>Chapter assessments pgs. 247-251</p> <p>Transparencies #84-97</p>	<div style="border: 1px solid black; padding: 5px; margin-bottom: 10px;">KEY VOCABULARY:</div> <p>Covalent bond Molecule Diatomic molecule Molecular compound Molecular formula Single covalent bond Structural formula Unshared pair Double covalent bond Triple covalent bond</p> <div style="border: 1px solid black; padding: 5px; margin-top: 20px; width: fit-content;">SKILLS FOCUS:</div> <p>Distinguish Describe Demonstrate</p> <div style="border: 1px solid black; padding: 5px; margin-top: 20px; width: fit-content;">LITERACY CONNECTIONS</div> <p>Vocabulary/word parts Relating text and visuals Identifying main ideas/details Directed reading/thinking activity</p> <div style="border: 1px solid black; padding: 5px; margin-top: 20px; width: fit-content;">EL STRATEGIES</div>	<p>3-5 class periods</p>

**Fresno Unified School District
Chemistry Course of Study**

Organic Chemistry and Biochemistry – Standard 10. The bonding characteristics of carbon allow the formation of many different organic molecules of varied sizes, shapes, and chemical properties and provide the biochemical basis of life.

Standards and Assessments “Students know...”	Task Analysis “Students are able to...”	Adopted Textbook Correlation(s)	Connections	App. Time (per 180 days)
<p>(10a) large molecules (polymers), such as proteins, nucleic acids, and starch, are formed by repetitive combinations of simple subunits.</p> <p>(10b) the bonding characteristics of carbon that result in the formation of a large variety of structures ranging from simple hydrocarbons to complex polymers and biological molecules.</p> <p>(10c) amino acids are the building blocks of</p> <div style="border: 1px solid black; padding: 2px; width: fit-content;">ASSESSMENT</div> <p>[CST]</p> <p>CTR Ch. 22,23,24</p> <p>Computer Test Bank Chapters 22,23,24</p> <p>STP Topic 10</p>	<p>23.4.1 describe how addition polymers are formed.</p> <p>23.4.2 describe how condensation polymers are formed.</p> <p>22.1 describe the relationship between the number of valence electrons and bonding in carbon.</p> <p>24.3.1 diagram the structure of an amino acid.</p>	<p>Prentice Hall: Ch. 22.1, Ch. 23.4, Ch. 24.3, Ch. 24.5</p> <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 5px auto;">LABS/DEMOS/ACTIVITIES & RESOURCES:</div> <p>SE Inquiry Activity: Making the Slimiest Polymer, p. 724</p> <p>SE SSL: Polymers, p. 753</p> <p>TE Teacher Demo: Building a Polymer Model, p. 748</p> <p>TE Teacher Demo: Making Nylon, p.751</p> <p>GRSW Ch. 22.1, Ch. 23.4, Ch. 24.3 Ch. 24.5</p> <p>Transparencies 253-255, 270, 275-278</p> <p>CTR Ch. 22.1 Ch. 23.4 Ch. 24.3 Ch. 24.5</p> <p>Chapter Assessment p. 719-723 757-761 793-797</p>	<div style="border: 1px solid black; padding: 5px; width: fit-content; margin-bottom: 10px;">KEY VOCABULARY:</div> <p>Polymer Monomers Hydrocarbons Amino acid Protein Nucleic acid Nucleotides Starch</p> <div style="border: 1px solid black; padding: 5px; width: fit-content; margin-bottom: 10px;">SKILLS FOCUS:</div> <p>Describe Define Relate Diagram Identify</p> <div style="border: 1px solid black; padding: 5px; width: fit-content; margin-bottom: 10px;">LITERACY CONNECTIONS</div> <p>Predicting Word parts Relate text and Visuals Paraphrase Sequence Graphic organizers Outlining Identifying the Main Idea</p> <div style="border: 1px solid black; padding: 5px; width: fit-content;">EL STRATEGIES</div>	<p>5 class periods</p>

**Fresno Unified School District
Chemistry Course of Study**

Conservation of Matter and Stoichiometry – Standard 3 - The conservation of atoms in chemical reactions leads to the principle of conservation of matter and the ability to calculate the mass of products and reactants.

Standards and Assessments “Students know...”	Task Analysis “Students are able to...”	Adopted Textbook Correlation(s)	Connections	App. Time (per 180 days)
<p>(3b) the quantity <i>one mole</i> is set by defining one mole of carbon 12 atoms to have a mass of exactly 12 grams</p> <p>(3c) one mole equal 6.02×10^{23} particles (atoms or molecules)</p> <p>(3d) how to determine the molar mass of a molecule from its chemical formula and a table of atomic masses and how to convert the mass of a molecular substance to moles, number of particles, or volume of gas at standard temperature and pressure</p> <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 10px auto;">ASSESSMENT</div> <p>[CST] CTR: Chapter 10</p> <p>Computer Test Bank: Chapter 10</p> <p>Standardized Test Prep: Topic 3</p>	<p>10.1.1 Describe the methods of measuring the amount of something</p> <p>10.1.2 Avogadro’s number as it relates to a mole of a substance</p> <p>10.1.3 Distinguish between the atomic mass of an element and its molar mass</p> <p>10.1.4 Describe how the mass of a mole of a compound is calculated</p> <p>10.2 Describe how to convert the mass of a substance to the number of moles of a substance, and moles to mass</p> <p>10.2.2 Identify the volume of a quantity of a gas a STP</p>	<p>Prentice Hall: Chapter 10.1 Chapter 10.2</p> <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 10px auto;">LABS/DEMOS/ ACTIVITIES & RESOURCES:</div> <p>TE Teacher Demo: Moles and Mass, p. 294</p> <p>TE Class Activity: Calculating Molar Mass, p. 295</p> <p>SSLM # 13 (same as above)</p> <p>CTR 10.1 and 10.2</p> <p>GRSW 10.1 and 10.2</p> <p>Chapter assessment pgs. 315-319</p> <p>Transparencies #104-109</p> <p>Chem Alive Lab (DVD): “Carbide Canon”</p>	<div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 10px auto;">KEY VOCABULARY:</div> <p>Mole Avogadro’s number Representative particle Molar mass Standard temperature and pressure (STP) Molar volume</p> <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 10px auto;">SKILLS FOCUS:</div> <p>Describe Define Distinguish Identify</p> <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 10px auto;">LITERACY CONNECTIONS</div> <p>Vocabulary- connect terms Relate text and visuals Graphic organizer Outline Reading strategy—monitor your understanding</p> <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 10px auto;">EL STRATEGIES</div>	<p>5-7 class periods</p>

**Fresno Unified School District
Chemistry Course of Study**

Conservation of Matter and Stoichiometry – Standard 3 - The conservation of atoms in chemical reactions leads to the principle of conservation of matter and the ability to calculate the mass of products and reactants.

Standards and Assessments “Students know...”	Task Analysis “Students are able to...”	Adopted Textbook Correlation(s)	Connections	App. Time (per 180 days)
<p>(3a) how to describe chemical reactions by writing balanced equations</p> <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 10px auto;">ASSESSMENT</div> <p>[CST] CTR: Chapter 11</p> <p>Computer Test Bank: Chapter 11</p> <p>Standardized Test Prep: Topic 3</p>	<p>11.1.1 Describe how to write a word equation</p> <p>11.1.2 Describe how to write a skeleton equation</p> <p>11.1.3 Describe the steps for writing a balanced chemical equation</p>	<p>Prentice Hall: Chapter 11.1</p> <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 10px auto;">LABS/DEMOS/ ACTIVITIES & RESOURCES:</div> <p>SE Quick Lab: Removing Silver Tarnish, p. 326</p> <p>TE Teacher Demo: Example of a Chemical Change, p.325</p> <p>TE Teacher Demo: Single Replacement Reaction, p. 333</p> <p>TE Teacher Demo: Double Replacement Reactions, p. 334</p> <p>TE Teacher Demo (do as a student lab): A Combination Reaction, p. 338</p> <p>TE Teacher Demo: Class Activity Model of a Fire Extinguisher, p. 341</p> <p>LM # 15 Reactivity of Metals CTR 11.1 and 11.2 GRSW 11.1 and 11.2 Chapter assessments pgs.347—351 Transparencies #113-117 Chem Alive Lab (DVD): “Burning Magnesium” and “Fountain of Light”</p>	<div style="border: 1px solid black; padding: 5px; width: fit-content; margin-bottom: 10px;">KEY VOCABULARY:</div> <p>Chemical equation Skeleton equation Catalyst Coefficients Balanced equations Combination reactions Decompositions reactions Single-replacement reactions Activity series Double-replacement reactions Combustion reactions</p> <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 10px auto;">SKILLS FOCUS:</div> <p>Describe predict</p> <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 10px auto;">LITERACY CONNECTIONS</div> <p>Vocabulary-paraphrase Reading strategy sequence Relating text and visuals Outlining Graphic organizers</p> <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 10px auto;">EL STRATEGIES</div>	<p>3-5 class periods</p>

**Fresno Unified School District
Chemistry Course of Study**

Conservation of Matter and Stoichiometry – Standard 3 - The conservation of atoms in chemical reactions leads to the principle of conservation of matter and the ability to calculate the mass of products and reactants.

Standards and Assessments "Students know..."	Task Analysis "Students are able to..."	Adopted Textbook Correlation(s)	Connections	App. Time (per 180 days)
<p>(3e) how to calculate the masses of reactants and products in a chemical reaction from the mass of one of the reactants or products and the relevant atomic masses...</p> <p style="text-align: center;">(Std 3)</p> <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 10px auto;">ASSESSMENT</div> <p>[CST] Computer test bank: Ch 12.1 &12.2 STD TEST Prep p.383 STP Topic 3</p>	<p>12.1.1 explain how balanced equations apply to both chemistry and everyday life</p> <p>12.1.2 interpret balanced chemical equations in terms of moles, representative particles, mass, and gas volume at STP</p> <p>12.1.3 identify the quantities that are always conserved in chemical reactions</p> <p>12.2.1 construct mole ratios from balanced chemical equations and apply these ratios in stoichiometric calculations</p> <p>12.2.2 calculate stoichiometric quantities from balance chemical equations using units of moles, mass, representative particles, and volume of gases at STP</p>	<p>Prentice Hall: Ch 12.1 and 12.2 p.352-357</p> <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 10px auto;">LABS/DEMOS/ ACTIVITIES & RESOURCES:</div> <p>Teacher Demo- Interpreting a chemical reaction p.357 LM 19-Quantitative analysis Teacher Demo- Interpreting chemical equation p.362</p> <p>Grsw 12.1, 12.2 CTR Ch. Assessment p.379-383 TR 122-132</p>	<div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 10px auto;">KEY VOCABULARY:</div> <p>Stoichiometry Mole ratio</p> <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 10px auto;">SKILLS FOCUS:</div> <p>Interpret Construct Calculate</p> <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 10px auto;">LITERACY CONNECTIONS</div> <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 10px auto;">EL STRATEGIES</div>	<p>10 class days</p>

**Fresno Unified School District
Chemistry Course of Study**

Reaction Rates – Standard 8. Chemical reaction rates depend on factors that influence the frequency of collision of reactant molecules.

Standards and Assessments “Students know…”	Task Analysis “Students are able to…”	Adopted Textbook Correlation(s)	Connections	App. Time (per 180 days)
<p>(8a) the rate of reaction is the decrease in concentration of reactants or the increase in concentration of products with time.</p> <p>(8b) how reaction rates depend on such factors as concentration, temperature, and pressure.</p> <p>(8c) the role a catalyst plays in increasing the reaction rate.</p> <div style="border: 1px solid black; padding: 2px; width: fit-content; margin-top: 10px;">ASSESSMENT</div> <p>[CST]</p> <p>CTR Chapter 18</p> <p>Computer Test Bank: Chapter 18</p> <p>Lab Practical 18-1: Reaction Rate</p> <p>STP Topic 7</p>	<p>18.1.1 Describe how to express the rate of a chemical reaction.</p> <p>18.1.2 Identify the four factors that influence the rate of a chemical reaction.</p>	<p>Prentice Hall: Chapter 18.1</p> <div style="border: 1px solid black; padding: 5px; margin: 10px 0;">LABS/DEMOS/ ACTIVITIES & RESOURCES:</div> <p>SE Inquiry Activity: Temperature and Reaction Rates, p 540</p> <p>LM 36 Factors Affecting Reaction Rates</p> <p>LM 37 The Clock Reaction</p> <p>SSLM 28 Factors Affecting the Rate of a Chemical Reaction</p> <p>GRSW Ch. 18.1 Transparencies 196-198 CTR Ch. 18.1 Chapter Assessment P581-585</p> <p>Chem Alive Lab (DVD): “Elephant Toothpaste”</p> <p>Chem Alive Lab (DVD): “Grain Elevator Explosion”</p> <p>Chem Alive Lab (DVD): “Oscillating Clock”</p>	<div style="border: 1px solid black; padding: 2px; margin-bottom: 10px;">KEY VOCABULARY:</div> <p>Rate Collision Theory Activation energy Activated complex Transition state Inhibitor</p> <div style="border: 1px solid black; padding: 2px; margin: 10px 0;">SKILLS FOCUS:</div> <p>Describe Identify</p> <div style="border: 1px solid black; padding: 2px; margin: 10px 0;">LITERACY CONNECTIONS</div> <p>Graphic Organizer Relate Cause and Effect</p> <div style="border: 1px solid black; padding: 2px; margin: 10px 0;">EL STRATEGIES</div>	<p>5 class periods</p>

**Fresno Unified School District
Chemistry Course of Study**

Chemical Equilibrium – Standard 9. Chemical Equilibrium is a dynamic process at the molecular level.

Standards and Assessments “Students know...”	Task Analysis “Students are able to...”	Adopted Textbook Correlation(s)	Connections	App. Time (per 180 days)
<p>(9a) how to use LeChatelier’s principle to predict the effect of changes in concentration, temperature, and pressure.</p> <p>(9b) equilibrium is established when forward and reverse reaction rates are equal.</p> <div style="border: 1px solid black; padding: 2px; width: fit-content; margin: 10px 0;">ASSESSMENT</div> <p>[CST]</p> <p>CTR Ch. 18</p> <p>Computer Test Bank: Chapter 18</p> <p>STP Topic 7</p>	<p>18.2.1 describe how the amounts of reactants and products change in a chemical system at equilibrium.</p> <p>18.2.2 identify three stresses that can change the equilibrium position of a chemical system.</p>	<p>Prentice Hall: Chapter 18.2</p> <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 10px 0;">LABS/DEMOS/ ACTIVITIES & RESOURCES:</div> <p>LM 38: Disturbing Principle and Chemical Equilibrium</p> <p>SSLM 29: Le Chatelier’s Principle and Chemical Equilibrium</p> <p>GRSW Ch. 18.2 Transparencies 199-202 CTR Ch. 18.2 Chapter Assessments p. 581-585</p>	<div style="border: 1px solid black; padding: 2px; width: fit-content; margin-bottom: 10px;">KEY VOCABULARY:</div> <p>Reversible reaction Chemical equilibrium Equilibrium position Le Chatelier’s Principle</p> <div style="border: 1px solid black; padding: 2px; width: fit-content; margin: 10px 0;">SKILLS FOCUS:</div> <p>Describe Identify Explain</p> <div style="border: 1px solid black; padding: 2px; width: fit-content; margin: 10px 0;">LITERACY CONNECTIONS</div> <p>Preview LINCS strategy Monitor understanding</p> <div style="border: 1px solid black; padding: 2px; width: fit-content; margin: 10px 0;">EL STRATEGIES</div>	<p>5 class periods</p>

**Fresno Unified School District
Chemistry Course of Study**

Chemical Thermodynamics – Standard 7 - Energy is exchanged or transformed in all chemical reactions and physical changes of matter.

Standards and Assessments “Students know...”	Task Analysis “Students are able to...”	Adopted Textbook Correlation(s)	Connections	App. Time (per 180 days)
<p>(7a) how to describe temperature and heat flow in terms of the motion of molecules (or atoms).</p> <p>(7b) chemical processes can either release (exothermic) or absorb (endothermic) thermal energy.</p> <div style="border: 1px solid black; padding: 2px; width: fit-content; margin: 10px auto;">ASSESSMENT</div> <p>[CST]</p> <p>CTR Chapter 17</p> <p>Computer Test Bank: Chapter 17</p> <p>STP Topic 5</p>	<p>17.1.1 explain how energy, heat, and work are related.</p> <p>17.1.2 classify processes as either exothermic or endothermic.</p>	<p>Prentice Hall: Chapter 17.1.1 17.1.2</p> <div style="border: 1px solid black; padding: 5px; text-align: center; margin: 10px auto;">LABS/DEMOS/ ACTIVITIES & RESOURCES:</div> <p>SE Inquiry Activity: Observing Heat Flow, p. 504</p> <p>GRSW 17.1 Transparencies 180,181 CTR Ch. 17.1 Chapter Assessment p. 535-539</p> <p>Chem Alive Lab (DVD): Exploding Balloons</p> <p>Chem Alive Lab (DVD): “Superheated Steam”</p> <p>Chem Alive Lab (DVD): “Thermite Reaction”</p>	<div style="border: 1px solid black; padding: 2px; width: fit-content; margin-bottom: 10px;">KEY VOCABULARY:</div> <p>Thermo chemistry Chemical potential energy Heat System Surroundings Law of Conservation of Energy Endothermic process Exothermic process</p> <div style="border: 1px solid black; padding: 2px; width: fit-content; margin: 10px auto;">SKILLS FOCUS:</div> <p>Explain Classify Identify Distinguish</p> <div style="border: 1px solid black; padding: 5px; text-align: center; margin: 10px auto;">LITERACY CONNECTIONS</div> <p>Paraphrase Use Prior Knowledge Build Vocabulary</p> <div style="border: 1px solid black; padding: 2px; width: fit-content; margin: 10px auto;">EL STRATEGIES</div>	<p>3 class periods</p>

**Fresno Unified School District
Chemistry Course of Study**

Chemical Thermodynamics – Standard 7 - Energy is exchanged or transformed in all chemical reactions and physical changes of matter.

Standards and Assessments “Students know...”	Task Analysis “Students are able to...”	Adopted Textbook Correlation(s)	Connections	App. Time (per 180 days)
<p>(7c) energy is released when a material condenses or freezes and is absorbed when a material evaporates or melts</p> <p>(7d) how to solve problems involving heat flow and temperature changes, using known values of specific heat and latent heat of phase change.</p> <div style="border: 1px solid black; padding: 2px; width: fit-content; margin: 10px 0;">ASSESSMENT</div> <p>[CST]</p> <p>CTR Chapter 17</p> <p>Computer Test Bank: Chapter 17</p> <p>Lab Practical 17.2: Heat of Reaction</p> <p>STP Topic 5</p>	<p>17.3.1 Classify the enthalpy change that occurs when a substance melts, freezes, boils, condenses, or dissolves.</p> <p>17.2.3 Solve for enthalpy changes in chemical reactions.</p> <p>17.1.2 Identify the units used to measure heat transfer.</p>	<p>Prentice Hall: Chapter 17.2 17.1.3 17.1.4 17.3.1</p> <div style="border: 1px solid black; padding: 5px; text-align: center; margin: 10px 0;">LABS/DEMOS/ ACTIVITIES & RESOURCES:</div> <p>TE Class Activity: Calorimetry Measurements, p. 512</p> <p>SE Quick Lab: Heat of Fusion of Ice, p. 522</p> <p>SSLM 27: Heat of Fusion of Ice</p> <p>LM 22: Changes of Physical State</p> <p>GRSW 17.1,17.2,17.3 Transparencies 182-191 CTR Ch. 17.1, Chapter Assessment p. 535-539</p>	<div style="border: 1px solid black; padding: 2px; width: fit-content; margin-bottom: 10px;">KEY VOCABULARY:</div> <p>Enthalpy Condensation Freezing Evaporation Melting Molar heat of fusion Molar heat of solidification Molar heat of vaporization Molar heat of condensation Molar heat of solution Heat capacity Specific heat Calorimetry Calorimeter Thermo chemical equation Heat of reaction Heat of combustion</p> <div style="border: 1px solid black; padding: 2px; width: fit-content; margin: 10px 0;">SKILLS FOCUS:</div> <p>Identify Distinguish Describe Construct Solve</p> <div style="border: 1px solid black; padding: 2px; width: fit-content; margin: 10px 0;">LITERACY CONNECTIONS</div> <p>Concept Directed Reading Paraphrase Relate Text and Visuals Summarizing</p> <div style="border: 1px solid black; padding: 2px; width: fit-content; margin: 10px 0;">EL STRATEGIES</div>	<p>8 class periods</p>

**Fresno Unified School District
Chemistry Course of Study**

Chemical Bonds – Standard 2 - Biological, chemical, and physical properties of matter result from the ability of atoms to form bonds from electrostatic forces between electrons and protons and between atoms and molecules.

Standards and Assessments “Students know...”	Task Analysis “Students are able to...”	Adopted Textbook Correlation(s)	Connections	App. Time (per 180 days)
<p>(2d) atoms and molecules in liquids move in a random pattern relative to one another because the intermolecular forces are too weak to hold the atoms or molecules in a solid form</p> <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 10px auto;">ASSESSMENT</div> <p>[CST] CTR: Chapter 13</p> <p>Computer Test Bank Chapter 13</p> <p>Standardized Test Prep: Topic 4</p>	<p>13.2.1 Identify factors that determine the physical properties of a liquid</p>	<p>Prentice Hall: Chapter 13.2.1</p> <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 10px auto;">LABS/DEMOS/ ACTIVITIES & RESOURCES:</div> <p>CTR 13.2</p> <p>GRSW 13.2</p> <p>Chapter Assessment, p. 395</p> <p>TE Class Activity: Water versus Alcohol, p. 393</p>	<div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 10px auto;">KEY VOCABULARY:</div> <p>Vaporization Evaporation Vapor pressure Boiling point</p> <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 10px auto;">SKILLS FOCUS:</div> <p>Identify Define Describe</p> <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 10px auto;">LITERACY CONNECTIONS</div> <p>Using prior knowledge Concept map Compare and contrast</p> <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 10px auto;">EL STRATEGIES</div>	<p>1-2 class periods</p>

**Fresno Unified School District
Chemistry Course of Study**

Gas and Their Properties – Standard 4 - The kinetic molecular theory describes the motion of atoms and molecules and explains the properties of gases.

Standards and Assessments “Students know...”	Task Analysis “Students are able to...”	Adopted Textbook Correlation(s)	Connections	App. Time (per 180 days)
<p>(4a) the random motion of molecules and their collisions with surface create the observable pressure on that surface.</p> <p>(4b) the random motion of molecules explain the diffusion of gases</p> <p style="text-align: center;">()</p> <div style="border: 1px solid black; padding: 5px; width: fit-content; margin-top: 10px;">ASSESSMENT</div> <p>CTR Chapter #13 Computer Test Bank: Chapter 13</p>	<p>13.1.1 Describe the assumption s of the kinetic theory as it applies to gases.</p> <p>13.1.2 Interpret gas pressure in terms of kinetic theory</p>	<p>Prentice Hall: Ch. 13.1& 13.2 P. 385-395</p> <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 10px auto;">LABS/DEMOS/ ACTIVITIES & RESOURCES:</div> <p>Inquiry activity P. 384 Teacher Demo P. 386 Elastic Collisions Teacher Demo-air pressure P.387 Class activity-water v/s alcohol P. 393 Class activity Temp v/s Boiling p. 394</p> <p>Grsw 13.1 & 13.2 Ch. Assessment P.407-411</p> <p>Core Teaching resources</p> <p>TR 139-144</p> <p>Chem. alive lab (DVD) “Crushing Cans”</p>	<div style="border: 1px solid black; padding: 5px; width: fit-content; margin-bottom: 10px;">KEY VOCABULARY:</div> <p>Kinetic theory Kinetic energy Gas pressure Atmospheric pressure Pascal Std. atmosphere</p> <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 10px auto;">SKILLS FOCUS:</div> <p>Describe Interpret Define</p> <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 10px auto;">LITERACY CONNECTIONS</div> <p>Using prior knowledge</p> <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 10px auto;">EL STRATEGIES</div>	<p>5 class periods</p>

**Fresno Unified School District
Chemistry Course of Study**

Gas and Their Properties – Standard 4 - The kinetic molecular theory describes the motion of atoms and molecules and explains the properties of gases.

Standards and Assessments “Students know...”	Task Analysis “Students are able to...”	Adopted Textbook Correlation(s)	Connections	App. Time (per 180 days)
<p>...</p> <p>(4c) apply gas law to relations between the pressure, temp. & volume of any amount of Ideal gas or any mixture of ideal gases</p> <p>(4d)—see (3) (4e)&(4f)—see (12)</p> <p style="text-align: center;">()</p> <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 10px auto;">ASSESSMENT</div> <p>[CST] CTR Chapter # 14 STP SE p. 443 Computer Test Bank: Chapter 14</p>	<p>14.2.1 describe the relationships among the temp., pressure and volume of gas.</p> <p>14.2.2 use combined gas law to solve problems</p> <p>14.3.1 Compute the value of an unknown using the ideal gas law.</p> <p>14.3.2 Compare and contrast real and ideal gas</p>	<p>Prentice Hall: Ch. 14.1,14.2&14.3 P.413-429</p> <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 10px auto;">LABS/DEMOS/ ACTIVITIES & RESOURCES:</div> <p>Inquiry activity- Observing volume change. P.412 Teacher demo-pressure & volume P.419 T.E. class activity-P. 422 Substitute balloons Quick lab- SE.p.428 Carbon dioxide from antacid tablets</p> <p>Grsw 14.1,14.2 & 14.3 Ch. Assessment 439-443 TR 150-157</p> <p>Chem. alive Lab (DVD) “Easter Bunnies”</p> <p>“Wok and b</p>	<div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 10px auto;">KEY VOCABULARY:</div> <p>Compressibility Boyle’s law Charle’s law Gay Lusac’s law Combined gas law Ideal gas law Ideal gas constant</p> <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 10px auto;">SKILLS FOCUS:</div> <p>Describe Compute Compare & contrast</p> <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 10px auto;">LITERACY CONNECTIONS</div> <p>Relating cause and effect</p> <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 10px auto;">EL STRATEGIES</div>	<p>8 class periods</p>

**Fresno Unified School District
Chemistry Course of Study**

Solutions - Standard 6 - Solutions are homogenous mixtures of two or more substances.

Standards and Assessments "Students know..."	Task Analysis "Students are able to..."	Adopted Textbook Correlation(s)	Connections	App. Time (per 180 days)
<p>...</p> <p>(6a) the definitions of solute and solvent</p> <p>(6b) how to describe the dissolving process at the molecular level by using the concept of random molecular motion</p> <p style="text-align: right;">()</p> <div style="border: 1px solid black; padding: 2px; width: fit-content; margin: 10px auto;">ASSESSMENT</div> <p>[CST]</p> <p>CTR: chapter 15 Computer Test Bank: chapter 15</p>	<p>15.2.1 distinguish between a solvent and a solute</p> <p>15.2.2 describe what happens in the solution process.</p> <p>15.2.3 explain why all ionic compounds are electrolytes.</p>	<p>Prentice Hall: Ch 15.2</p> <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 10px auto;">LABS/DEMOS/ ACTIVITIES & RESOURCES:</div> <p>SSL P.458-Electrolytes Teacher Demo- Electrolytes and non electrolytes p.453 Teacher Demo-Magic writing p.454 LM 29-Electrolytes and non electrolytes</p> <p>Grsw-Ch 15.2 Core Teaching Resources Ch. Assessment p. 465- 469 TR-162-165</p>	<div style="border: 1px solid black; padding: 2px; width: fit-content; margin: 10px auto;">KEY VOCABULARY:</div> <p>Aqueous solution Solvent Solute Solvating Electrolyte Non electrolyte Strong electrolyte Weak electrolyte hydrate</p> <div style="border: 1px solid black; padding: 2px; width: fit-content; margin: 10px auto;">SKILLS FOCUS:</div> <p>Distinguish Describe Explain</p> <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 10px auto;">LITERACY CONNECTIONS</div> <div style="border: 1px solid black; padding: 2px; width: fit-content; margin: 10px auto;">EL STRATEGIES</div>	<p>3 class days</p>

Solutions – Standard 6 - Solutions are homogenous mixtures of two or more substances.

**Fresno Unified School District
Chemistry Course of Study**

Standards and Assessments "Students know..."	Task Analysis "Students are able to..."	Adopted Textbook Correlation(s)	Connections	App. Time (per 180 days)
<p>... (6c) temperature, pressure and surface area affect the dissolving process.</p> <p>(6d) how to calculate the concentration of a solute in terms of grams per liter, Molarity, parts per million and percent composition</p> <p style="text-align: center;">()</p> <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 10px auto;">ASSESSMENT</div> <p>[CST] CTR: Chapter 16.1 and 16.2 Standard Test Prep. SE p.503 Computer Test bank: chapter 16 STP: Topic 6</p>	<p>16.1.1 identify the factors that determine the rate at which a solute dissolves.</p> <p>16.2.1 solve problems involving the molarity of solution</p> <p>16.2.2 describe the effect of dilution on the total moles of solute in solution</p> <p>16.2.3 define percent by volume and percent by mass solutions</p>	<p>Prentice Hall: Ch 16.1, 16.2</p> <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 10px auto;">LABS/DEMOS/ ACTIVITIES & RESOURCES:</div> <p>Inquiry activity-salt and freezing point of water p.470 Teacher Demo-solubility of gases p.475 LM-30-factors affecting solution</p> <p>Grsw-16.1, 16.2 CTR TR 171-174</p> <p>Chem alive Lab(DVD)</p> <p>"Molarity"</p>	<div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 10px auto;">KEY VOCABULARY:</div> <p>Saturated solution Solubility Unsaturated solution Miscible Immiscible Supersaturate solution Molarity(M) Percent composition</p> <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 10px auto;">SKILLS FOCUS:</div> <p>Identify Solve describe</p> <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 10px auto;">LITERACY CONNECTIONS</div> <p>Outlining Summarizing</p> <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 10px auto;">EL STRATEGIES</div>	<p>5 class periods</p>

**Fresno Unified School District
Chemistry Course of Study**

Acids and Bases – Standard 5 - Acids, bases, and salts are three classes of compounds that form ions in water solutions.

Standards and Assessments “Students know...”	Task Analysis “Students are able to...”	Adopted Textbook Correlation(s)	Connections	App. Time (per 180 days)
<p>(5a) the observable properties of acids, bases and salt solutions</p> <p>(5b) acids are hydrogen ion donating and bases are hydrogen ion accepting substances...</p> <p style="text-align: center;">()</p> <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 10px auto;">ASSESSMENT</div> <p>[CST] CTR chapter 19 Computer Test bank: Chapter 19 Standardized Test prep. SE Ch 19 p.629 STP: Topic 8</p>	<p>19.1.1 define the properties of acids and bases</p> <p>19.1.2 compare and contrast acids and bases as defined by the theories of Arrhenius.</p> <p>19.2.1 describe how Hydrogen ion and hydroxide ion are related in aqueous solution</p> <p>19.2.2 classify a solution as neutral, acidic or basic given the hydrogen ion r hydroxide ion concentration</p> <p>19.2.3 convert hydrogen ion concentration into pH values and hydroxide ion concentration into pH values.</p>	<p>Prentice Hall: Ch 19.1, p.587-589 Ch 19.2 p.594-604</p> <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 10px auto;">LABS/DEMOS/ ACTIVITIES & RESOURCES:</div> <p>Inquiry activity-affect of food on Baking soda p. 586 Teacher Demo-reactive acids p. 588 Quick lab-Indicators from natural sources LM-40-Estimation of pH SSLM-30-Calorimetric pH Meter</p> <p>Grsw- 19.1, 19.2 TR 215,216,217-219</p> <p>Chem. Alive Lab (DVD) “Milk of Magnesia”</p> <p>“Titration”</p>	<div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 10px auto;">KEY VOCABULARY:</div> <p>Monoprotic acid Diprotic acids Triprotic acids Hydronium ion amphoteric</p> <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 10px auto;">SKILLS FOCUS:</div> <p>Define Compare and contrast Describe Classify</p> <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 10px auto;">LITERACY CONNECTIONS</div> <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 10px auto;">EL STRATEGIES</div>	<p>5 class periods</p>

**Fresno Unified School District
Chemistry Course of Study**

Acids and Bases – Standard 5 - Acids, bases, and salts are three classes of compounds that form ions in water solutions.

Standards and Assessments “Students know...”	Task Analysis “Students are able to...”	Adopted Textbook Correlation(s)	Connections	App. Time (per 180 days)
<p>(5c) strong acids and bases fully dissociate and weak acids and bases partially dissociate</p> <p>(5d) how to use the pH scale to characterize acids and bases solutions</p> <p style="text-align: center;">()</p> <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 10px auto;">ASSESSMENT</div> <p>[CST] CTR: Chapter 19 STP SE p.629</p>	<p>19.3.1 define strong acid and weak acids</p> <p>19.3.2 describe how and acid’s strength is related to the value of its acid dissociation constant (Ka) from concentration and pH measurement.</p> <p>19.3.4 order acids by strength according to their acid dissociation constant.</p> <p>19.3.5 order base by strength according to their base dissociation constant</p> <p>19.4.1 define product of acid base reaction</p> <p>19.4.2 explain how acid-base titration is used to calculate the concentration of an acid or base.</p> <p>19.4.3 explain the concept of equivalence in neutralization reactions</p>	<p>Prentice Hall: Ch 19.3 p.605-609 Ch 19.4 p. 613-617</p> <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 10px auto;">LABS/DEMOS/ ACTIVITIES & RESOURCES:</div> <p>Class activity-shampoo survey p. 608 LP-19-3 titration</p> <p>Grsw 19.3, 19.4</p> <p>Ch. Assessment p.635-629 TR 223-226</p>	<div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 10px auto;">KEY VOCABULARY:</div> <p>Strong acids Weak acids Acid dissociation constant (Ka) Strong bases Weak bases base dissociation constant (Kb) Neutralization reaction Equivalence point Standard solution Titration End point</p> <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 10px auto;">SKILLS FOCUS:</div> <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 10px auto;">LITERACY CONNECTIONS</div> <p>Compare and contrasting Identifying a sequence</p> <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 10px auto;">EL STRATEGIES</div>	<p>8 class periods</p>