8th Physical Science MS Units of Study

San Diego Unified School District
Science Department

Introduction

The San Diego Unified School District Science Curriculum Department is in the process of developing standards-aligned comprehensive Units of Study for each of the major content areas in science. This document will grow over time as feedback is accumulated through the professional community institutions implemented at the site and district level. The Units of Study are designed to offer teachers a focused context of student performance outcomes, instructional experiences defined by the adopted curriculum, support resources to meet those objectives, and sample Unit of Study assessments designed to measure student understanding relative to those performance objectives.

The format of these Units of Study is designed to use the California Science Content Standards as the sequential backbone for the topics. Given that adopted curricular materials and site resources may not precisely match the sequence of topics outlined by the California Science Content Standards, the timeline of the Units of Study are stated in terms of blocks of time rather than a mandatory sequence. The expectation is that students master the content defined by the standards and performance objectives in all of the Units of Study by the completion of the course.

Each unit includes a Timeline, the Content Topic, the Core Concept addressed by the unit, specific California Science Content Standards addressed, specific student performance objectives, Activities found in the adopted curriculum (this will be expanded as supplementary resources are identified), Assessment, Supports and Literacy Strategies for scaffolding and special education accommodations, a list of Enrichment Activities for differentiation purposes.

Timeline	Topic	The Big Idea/Core Concept	CA State Standard
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District Student Performance Objectives with subconcepts	Activities	Assessment
Supports	**Differentiation Activities**	

Sample Assessments

In some cases the adopted curriculum does not include publisher-provided Supports – Literacy Strategies and Enrichment Activities. There are a number of generic Supports and Enrichment Activities that may be applied to all course content areas. The limited lists below outline some of the well-known strategies in these areas.

Supports – Literacy Strategies	Enrichment Activities
KWL, KWL+, BKWL Carr, E. and D. Ogle. 1987. "K-W-L Plus: A Strategy for Comprehension and Summarization." *Journal of Reading* 30:626-631 Ogle, D. 1986. "K-W-L: A Teaching Model That Develops Active Reading of Expository Text." *reading Teacher* 39: 563-570 Skimming and Scanning Ausuble, D. 1968. Education Psychology: A Cognitive View, New York: Holt Rinehart and Winston Winograd, P. 1984. "Strategic Difficulties in Summarizing Texts." Reading Research Quarterly 19:404-425 List-Group-Label Taba, H 1967. *teacher's Handbook for Elementary Social Studies*. Reading, MA: Addison Wesley Developing Questions for Reading: Concept Ladder Gillet, J.W., and C.Temple 1982. *Understanding Reading Problems: Assessment and Instruction*. Boston: Little, Brown Word Study: Developing Content Vocabulary Nagy, W. 1988 *Teaching Vocabulary to Improve Reading Comprehension*. Newark DE: International Reading Association Nagy W., and P. Herman. 1987 "Breadth and Depth of Vocabulary Knowledge: Implications for Acquisition and Instruction." In M. McKeown and M. Curtis eds., *The Nature of Vocabulary Acquisition*. Hillsdale, NJ: Erlbaum. Word Study: How to Learn Content Vocabulary Through Context Baumann, J.F., and E. J. Kameenui, 1991. "Research on Vocabulary Instruction: Ode to Voltaire." In J. Flood, J.M. Jensen, D. Lapp, and J.R. Squire, eds., *Handbook on Teaching English Language Arts*. New York: MacMillan Nagy, W. 1997. "On the Role of Context in First-and Second-Language Vocabulary Learning." In Schmitt and M.McCarthy, eds., *Vocabulary: Description, Acquisistion, and Pedagogy*, pp. 64-83. Cambridge, UK: Cambridge University Press. Directed Reading Thinking Activity Haggard, M. 1985. "An interactive Strategies Approach to Content Reading." *Journal of Reading* 29:204-210 Strauffer, R. 1969. *Directing Reading Maturity as a Cognitive Process*. New York: Harper & Row. Questions Game McTeague, F. 1996. "The Questions Game." In A. Chambers, *Tell Me: Children, Reading and Talk*. Portaland ME: Stenhouse Textbook Activity Guide Davey, B. 1986. "Using Textbook Activity Guides to Help Students Learn from Textbooks." *Journal of Reading* 29: 489-494 ReQuest Manzo, A. 1969. "The ReQuest Procedure." *Journal of Reading* 13:23-26. Cornell Note-Taking Pauk, W. 1974. *How To Study in College*. Boston : Houghton Mifflin Academic Notebooks: Writing to Learn Langer, J.A., and A. Applebee. 1987. *How Writing Shapes Thinking*. Urbana, IL: National Council of Teachers of English Inquiry and Research: I-Charts Hoffman, J. 1992. "Critical Reading/Thinking Across the Curriculum: Using I-Charts to Support Learning." *Language Arts* 69:121-127	Acceleration Brody, L. E., & Benbow, C. P. 1987.Accelerative strategies: How effective are they for the gifted? Gifted Child Quarterly, 31, 105–109. Curriculum Compaction Reis, S. M., Burns, D. E., & Renzulli, J. S. 1992. Curriculum compacting: The complete guide to modifying the regular curriculum for high ability students. Mansfield Center, CT: Creative Learning Press. Independent Study Karnes, F. & Stephans Kozak, K. 2005 *Independent Study for Gifted Learners (The Practical Strategies Series in Gifted Education)* Waco, TX: Prufrock Press Inc. Treffinger Self-Directed Learning Treffinger, D. 1975. "Teaching for Self-Directed Learning: a Priority for the Gifted and Talented" *Gifted Child Quarterly*, Vol. 19, No. 1, 46-59 Sternberg Triarchic Theory of Intelligence-based Instruction Sternberg, R. J. 1988. *The triarchic mind: A new theory of human intelligence*. New York: Viking. Problem-Based Learning Checkly, K. 1997. Problem-based learning. *ASCD Curriculum Update*, summer, 3. Harkness Discussion Model / Teaching Still Looking for Research... *References for following items to be identified.* Future Problem Solving Model Kaplan's Grid for Curriculum Unit Design Accessing Multiple Intelligences Learning Style Evaluation Mihaly Csikszentmihalyi Flow inducing activities Renzulli Enrichment Triad Model Renzulli's Schoolwide Enrichment Model Academies of Inquiry and Talent Development Model Structure of Intellect Instruction Model Kohlberg's Moral Dilemma Discussion The Purdue Three Stage Model for Gifted Instruction Learning Enrichment Service Taba Discovery Approach

Timeline	Topic	The Big Idea/Core Concept	CA State Standard
Week 1 Unit 1 Ch 1 Act 1-3	<u>UNIT 1: BUILDING A FOUNDATION</u> Ch 1 Science Experiments	Chapter 1 Scientific progress is made by asking meaningful questions and conducting careful investigations.	• 9a Plan and conduct a scientific investigation to test • 9b Evaluate the accuracy and reproducibility of data. • 9c Distinguish between variable and controlled parameters in a test. • 9e Construct appropriate graphs from data and develop quantitative statements about the relationships between variables.

District Student Performance Objectives with subconcepts	Activities	Assessment
Act 1: When you measure something, can you obtain an exact value? • something, you can never obtain an exact value. • Scientists gather data by controlling the experimental environment in order to make meaningful hypotheses. • Scientists evaluate anomolous data to determine if it was caused by an error or if it tells us something significant. Act 2: What is the relationship between the length of a pendulum and how long it takes to swing back and forth 10 times? • A graph can help to make a relationship between two variables apparent. • Scientists indicate the best value for a variable by showing a range using the mean and uncertainty (e.g. 35 +/- 1 cm) Act 3:What makes the design of an experiment good or poor? • An experiment is a "fair" test when all the variables, other than the manipulating and responding variables, are kept the same.	**Use CAL. TEACHER"S GUIDE VOL. 2** <u>U1C1</u> • Act 1: Measurements in Science pp. 12-20 • Act 2 Relationships in Science pp. 22-29 • Act 3: Good and Poor Experiment Designs pp.30-43	
Supports	**Differentiation Activities**	
• Act 1 Practice • Act 2 Practice • Act 3 Practice	• Short Story: **Landing on the Snack Tr**ay from *Chronicles of the Wandering.*	

Timeline	Topic	The Big Idea/Core Concept	CA State Standard
Week 2 Unit 1 Ch 1 Act 4- 5 U1C1 Quiz U1C2 Act 1	U1C1 Ch 1 Science Experiments U1C2 Ch 2: Introduction Interactions	U1C1 Ch 1: Scientific progress is made by asking meaningful questions and conducting careful investigations. U1C2 Ch 2: Scientist assume all events are caused by the interaction of objects.	• 9a Plan and conduct a scientific investigation to test • 9c Distinguish between variable and controlled parameters in a test.

District Student Performance Objectives with subconcepts	Activities	Assessment
U1C1 Act 4: What are the criteria for evaluating an experiment design for a fair test? • An experiment is a "fair" test when all the variables, other than the manipulating and responding variables, are kept the same. Act 5: How can you tell when a supporting reason for a conclusion is good or poor? • An experimental conclusion is valid if it is supported by evidence collected during a "fair" test. U1C2 Act 1: What is the evidence that an interaction has occurred? • During an interaction, there is almost always an observed change.	U1C1 • Act 4: Evaluating Experiment Designs pp 44-49 • Act 5: Evaluating Experiments Conclusions pp. 50-52 U1C2 • Act 1: Evidence of Interactions pp. 74-82	• U1C1 Quiz (online)

Supports	Differentiation Activities
• Act 4 Practice • Act 5 Practice • U1C2 Act 1 Practice	• Short Story: **What is a game?** from *Chronicles of the Wandering.*

Timeline	Topic	The Big Idea/Core Concept	CA State Standard
Week 3 <u>Unit 1 Ch 2</u> Act 2-4	Ch 2: Introduction Interactions	Chapter 2 Scientist assume all events are caused by the interaction of objects.	• 9a Plan and conduct a scientific investigation to test.

District Student Performance Objectives with subconcepts	Activities	Assessment
<u>U1C2</u> Act 2: What are the defining characteristics of a magnetic interaction? • A magnetic interaction occurs when a magnet is near another magnet or a magnetic metal. • When a magnet and magnetic metal are near, a change in motion occurs. Act 3: What are some defining characteristics of the electric-charge interaction? What are some of the similarities and differences between the magnetic-charge interactions? • An electric charge interaction occurs when an object with an electric charge is near another object. • When an electrically charged object and an uncharged object are near, a change in motion occurs. Act 4: What are some defining characteristics of the electric-circuit interaction? What are some variables that influence the electric-circuit interaction? • An electric circuit interaction occurs when a source of electric current (like a battery) is connected in a complete loop with conducting wires to an electrical device (like a bulb).	<u>U1C2</u> • Act 2: The Magnetic Interaction pp. 84-94 • Act 3: The Electric-Charge Interaction pp. 96-107 ****to shorten activity, use video to demo • Act 4: The Electric-Circuit Interaction pp. 108-120	
Supports	**Differentiation Activities**	
• Act 2 Practice • Act 3 Practice • Act 4 Practice	• Short Story: **What is a game?** from *Chronicles of the Wandering.*	

Timeline	Topic	The Big Idea/Core Concept	CA State Standard
Week 4 Unit 1 Ch 2 Act 4-6 U1C2 Quiz	Ch 2: Introduction Interactions	Chapter 2 Scientist assume all events are caused by the interaction of objects.	• 9a Plan and conduct a scientific investigation to test.

District Student Performance Objectives with subconcepts	Activities	Assessment
U1C2 Act 5: How do electromagnetic buzzers work? • An electromagnetic interaction occurs when a coil of wire with electric current flowing through it and a magnet are placed near each other. • An electromagnet consists of a coil of wire with electric current flowing in it, and behaves like a magnet. • The strength of the electromagnet interaction increases when: the number of coils increases; the electric current increases; the distance between the magnet and coil decreases. Act 6: How does the electromagnetic interaction help explain how motors and meters work?	U1C2 • Act 5: Electromagnets and Buzzers pp. 122-133 • Act 6: (LA*) Interaction between a Magnet and an Electric Current pp. 134-143 LA-Learning About Of Ideas	• U1C2 Quiz (online)
Supports	**Differentiation Activities**	
• Act 5 Practice	• Short Story: **What is a game?** from *Chronicles of the Wandering.*	

Timeline	Topic	The Big Idea/Core Concept	CA State Standard
Week 5 <u>Unit 1 Ch 3</u> Act 1-4	Ch 3: Introduction Interactions	Chapter 3 Scientist can use the properties of objects to help them decide what kind of material they are made of.	• 8b Students know how to calculate the density of substances (regular and irregular solids and liquids) from measurements of mass and volume.

District Student Performance Objectives with subconcepts	Activities	Assessment
<u>U1C3</u> Act 1: How do scientists measure the amount of stuff in an object? What are some properties of objects that help you decide what kind of material they are made of? Act 2: How are the volumes of cubes and rectangular solids measured? • Volume is one way to describe the amount of stuff in a substance. Volume is the amount of space occupied by a substance. Volume can be computed from measurements, or can be measured directly. Act 3: How is volume of liquids measured? Act 4: How is mass measured? How is mass different from volume? Do gases have mass? • Mass is one way to describe the amount of stuff in a substance. The more mass an object has, the more material it has and the heavier it is. Mass is measured using a mass balance. • Gases, solids, and liquids have mass.	<u>U1C2</u> • Act 1: Measuring "Stuff" pp. 162-168 • Act 2: Volume of Solids pp. 170-176 • Act 3: Volume of Liquids pp. 178-186 • Act 4: Measuring Mass pp. 188-198	
Supports	**Differentiation Activities**	
• Act 1 Practice • Act 2 Practice • Act 2 Pre Practice for Act 3-How to Read a Graduated Cylinder • Act 3 Practice • Act 3 Pre Practice for Act 4-How to Read a Balance • Act 4 Practice		

Timeline	Topic	The Big Idea/Core Concept	CA State Standard
Week 6 <u>Unit 1 Ch 3</u> Act 5-7 U1C3 EXAM	<u>U1C3</u> Ch 3: Introduction Interactions	<u>U1C3</u> Ch 3 Scientist can use the properties of objects to help them decide what kind of material they are made of.	• 8a Students know density is mass per unit volume. • 8b Students know how to calculate the density of substances (regular and irregular solids and liquids) from measurements of mass and volume. • 7c Students know substance can be classified by their properties, including their melting temperature, density, hardness, and thermal and electrical conductivity. • 9f Applying simple mathematic relationships to determine a missing quantity in a mathematic expression, given the two remaining terms (including speed, density, force, and volume).

District Student Performance Objectives with subconcepts	Activities	Assessment
<u>U1C3</u> Act 5: What property can help you decide what kind of material on object is made of? • Density is the property of mass per unit volume of a substance. Act 6: What is a characteristic property of wires? • Electrical conductivity is the characteristic property of a describing the electric current per unit length of a conducting material in a closed circuit. Act 7: How can you determine the density of an object? • You can apply the simple mathematical relationship of density = mass/volume to determine a missing quantity.	<u>U1C2</u> • Act 5: Density pp. 200-206 • Act 6: Characteristic Properties pp. 208-217 • Act 7: (LA) Calculating Density pp. 218-224	• U1C3 EXAM (online)
Supports	**Differentiation Activities**	
• Act 5 Practice • Act 6 Practice • Act 7 Practice		

Timeline	Topic	The Big Idea/Core Concept	CA State Standard
Week 7 Unit 2 Ch 1 Act 1-4	UNIT 2: INTERACTIONS AND ENERGY U2C1 Ch 1: Energy Description of Interactions	U2C1 Ch 1 Interactions can be described in terms of energy transfer.	• 9a Plan and conduct a scientific investigation to test. • 1a Students know position is defined in relation to some choice of a standard reference point and a set of reference directions. • 1b Students know that average speed is the total distance traveled divided by the total time elapsed and that the speed of an object along the path traveled can vary. • 1c Students know how to solve problems involving distance, time, and average speed. • 1d Students know the velocity of an object must be described by specifying both the direction and the speed pf the object. • 1e Students know changes in velocity may be due to changes in speed, direction, or both. • 1f Students know how to interpret graphs of position versus time and graphs of speed versus time for motion in a single direction. • 9e Construct appropriate graphs from data and develop quantitative statements about the relationships between variables. • 9f Applying simple mathematic relationships to determine a missing quantity in a mathematic expression, given the two remaining terms (including speed, density, force, and volume). • 9g Distinguish between linear and nonlinear relationships on a graph of data.

District Student Performance Objectives with subconcepts	Activities	Assessment
U2C1 Act 1: How do scientists describe interactions in terms of energy? • Many changes that occur during interactions require a transfer of energy from one object or system (energy source) to another object or system (energy receiver). • This process (energy transfer) can be represented with an energy diagram. Act 2: How can you describe interactions in terms of energy? Act 3: Discuss energy transfers and the interactions they correspond to. Act 4: How can you determine the speed of an object that has constant motion? • The speed of an object with constant motion is calculated by dividing the distance traveled by the time elapsed.	U2C1 • Act 1: Interactions and Energy pp. 248-251 • Act 2: Energy Description of Interactions pp. 252-263 • Act 3: Interaction Chains, Energy Transfers, and the Fabulous Wake-up machine. pp.264-271 • Act 4: Describing the Motion of an Object with Constant Speed pp. 272-281	

Supports	Differentiation Activities
• Act 2 Practice • Act 3 Practice • Act 4 Practice	

Timeline	Topic	The Big Idea/Core Concept	CA State Standard
Week 8 U2C1 Act 5 U2C1 Quiz U2C2 Act 1-2	U2C1 Ch 1: Energy Description of Interactions U2C2 Ch 2: Mechanical Interactions and Energy	U2C1 Ch 1 Interactions can be described in terms of energy transfer. U2C2 Ch 2: Energy transfers and transformations occur during interactions.	• 9a Plan and conduct a scientific investigation to test.

District Student Performance Objectives with subconcepts	Activities	Assessment
U2C1 Act 5: How do you determine a speed for an object or a wave whose speed changes with time? • **T**he average speed of an object with changing motion is calculated by dividing the total distance traveled by the total time elapsed. U2C2 Act 1: Motion Energy: Where does it come from? Where does it go? Why does it change? Act 2: How can you change the motion energy of an object? • In a mechanical interaction objects touch each other while pushing or pulling on each other over a distance. • An applied mechanical interaction occurs when two non-elastic (i.e. rigid or stiff) objects push or pull on each other. • A friction mechanical interaction occurs when two surfaces rub against each other. • An elastic mechanical interaction occurs when two objects push or pull on each other and at least one of them is stretchy. • A drag mechanical interaction occurs when an object moves through fluid like a	U2C1 • Act 5: Objects with Changing Speed pp. 282-290 U2C2 • Act 1: Notions About Motion Energy pp. 302-308 • Act 2: Mechanical Interactions and Motion Energy pp. 310-317 •	• U2C1 Quiz (online)

gas or a liquid, and the fluid resists the object's motion.		
Supports	**Differentiation Activities**	
U2C1 • Act 5 Practice U2C2 • Act 2 Practice • Act 2 Fun Sheet Interaction Scramble (Fun & Useful Stuff-online)	• Short Story: **When Push Comes to Shove** from *Chronicles of the Wandering.*	

Timeline	Topic	The Big Idea/Core Concept	CA State Standard
Week 9 U2C2 Act 3-5	Ch 2: Mechanical Interactions and Energy	Chapter 2: Energy transfers and transformations occur during interactions.	• 9a Plan and conduct a scientific investigation to test.

District Student Performance Objectives with subconcepts	Activities	Assessment
U2C2 Act 3: What happens to the energy in applied, friction, and drag interaction? • During a mechanical interaction, mechanical energy is transferred from the source to the receiver. The source must decrease in energy and the receiver increases. • Motion energy is a form of energy. The faster an object is moving, the greater its motion energy. • Stored chemical energy is a form of energy that depends on the chemistry of substances. • Thermal energy is a form of energy. When objects warm up, they increase their thermal energy. Act 4: What happens to energy in an elastic interaction? • When stretchy objects are compressed or stretched, there is an increase in stored elastic energy. Act 5: Students use evidence to answer chapter question Motion Energy: Where does it come from? Where does it go? Why does it change?	U2C2 • Act 3: Following the Energy Changes pp. 318-328 • Act 4: Elastic Interactions. Energy pp. 330-339 • Act 5: Mechanical I pp. 340-342	

Supports	Differentiation Activities
U2C2 • Act 3 Practice • Act 4 Practice 1- assign the first day • Act 4 Practice 2-assign the second day • Act 5 Practice	• Short Story: **A Sticky Business** from *Chronicles of the Wandering.* • Enrichment section of Teacher

Timeline	Topic	The Big Idea/Core Concept	CA State Standard
Week 10 U2C2 Act 6-7 U2C2 EXAM U3C1 Act 1	Ch 2: Mechanical Interactions and Energy UNIT 3: INTERACTIONS AND FORCES U3C1: Mechanical Interactions and Forces	Chapter 2: Energy transfers and transformations occur during interactions. U3C1 A Force is a push or pull when objects interact.	• 9a Plan and conduct a scientific investigation to test. • 2a Students know a force has both direction and magnitude. • 2e Students know that when the forces on an object are unbalanced, the object will change its velocity (that is, it will speed up, slow down, or change direction).

District Student Performance Objectives with subconcepts	Activities	Assessment
U2C2 Act 6: Students practice analyzing and explaining problems dealing with energy transfers. • Scientists construct explanations of phenomena by analyzing a situation, applying ideas and evaluating an explanation. • The analysis is good when the interaction is correctly described and the energy diagram (or force diagram) is correct. • The application of ideas is good when the explanation includes all of the correct ideas needed. Act 7: How do I design and conduct a scientific investigation? U3C1 Act 1: How do forces affect motion? • A force is a push or a pull. • Forces affect motion. Act 2: How does a constant forward force affect motion? How can an arrow be used to represent a force? • Force arrows represent the magnitude and direction of pushes and pulls.	U2C2 • Act 6: Analyze, Explain, and Evaluate pp. 344-350 • Act 7: Designing Investigations-Part 1 pp. 352-359 (**Optional) **Use CAL. TEACHER'S GUIDE VOL. 2** U3C1 Act 1: Forever Away? pp. 18-23 Act 2: Pushes, Pull, and Motion pp. 24-30	• U2C2 EXAM (online)

Supports	Differentiation Activities
U2C2 • Act 6 Practice • Act 7 Practice U3C1 • Act 2 Practice	• Short Story: **A Night for Newton** from *Chronicles of the Wandering.*

Timeline	Topic	The Big Idea/Core Concept	CA State Standard
Week 11 U3C1 Act 3-5	Ch 1: Mechanical Interactions and Forces	Chapter 1: A Force is a push or pull when objects interact.	• 2c Students know when the forces on an object are balance, the motion of the object does not change. • 2e Students know that when the forces on an object are unbalanced, the object will change its velocity (that is, it will speed up, slow down, or change direction).

District Student Performance Objectives with subconcepts	Activities	Assessment
U3C1 Act 3: What kind of motion does an object have if there are no interactions affecting the object's motion? • If an object is not interacting (no forces acting on it), it will have a constant speed. Act 4: How does a backward force affect motion? What is friction? • When there is a backward force on an object, the object slows down. • Friction is a backward force. Act 5: What is given to an object during an interaction and stays with the object after the interaction is over? • During an interaction, energy, NOT FORCE, is transferred from one object to another.	**Use CAL. TEACHER'S GUIDE VOL. 2** U3C1 Act 3: A Frictionless World? pp. 32-37 Act 4: Friction and Backward Forces pp. 38-45 Act 5: What is Transferred? pp. 46-54	
Supports	**Differentiation Activities**	
U3C1 • Act 3 Practice • Act 4 Practice • Act 5 Simulator Practice-can use at school and/or home • Act 5 Practice	• Short Story: **A Night for Newton** from *Chronicles of the Wandering.* • Unit 3 Project Assignments 1-4	

Timeline	Topic	The Big Idea/Core Concept	CA State Standard
Week 12 <u>U3C1</u> Act 6-9	Ch1: Mechanical Interactions and Forces	Chapter 1: A Force is a push or pull when objects interact.	• 2b Students know a force has both direction and magnitude. • 2c Students know when the forces on an object are balance, the motion of the object does not change. • 2e Students know that when the forces on an object are unbalanced, the object will change its velocity (that is, it will speed up, slow down, or change direction). • 9a Plan and conduct a scientific investigation to test.

District Student Performance Objectives with subconcepts	Activities	Assessment
<u>U3C1</u> Act 6: How can force ideas be used to account for changes in motion? • Forces affect motion. Act 7: How do multiple forces affect motion? • If the forward forces exerted on an object are the same size as the backward forces exerted on the object, then the forces on the object are balanced. • If the total forces exerted on an object in one direction are greater than the total forces exerted on the object in the opposite direction, then the forces on the object are unbalanced. Act 8: What effect does a force have on a moving object when the force is not along the object's path? • Scientists construct explanations of phenomena by analyzing a situation, applying ideas and evaluating an explanation. • If there is not overall force acting on an object it has a constant speed. Act 9: Students use evidence to answer chapter question How do forces affect motion?	**Use CAL. TEACHER'S GUIDE VOL. 2** <u>U3C1</u> Act 6: A Frictionless World? pp. 56-62 Act 7: Friction and Backward Forces pp. 64-71 Act 8: What is Transferred? pp. 72-79 Act 9: Mechanical Forces and Motion pp. 80-83	

Supports	Differentiation Activities
U3C1 • Act 6 Practice • Act 7 Practice • Act 8 Practice • Act 9 Practice	

Timeline	Topic	The Big Idea/Core Concept	CA State Standard
Week 13 U3C1 Act 10-11 U3C2 Act 1-2	U3C1 Ch 1:Mechanical Interactions and Forces U3C2 Ch 2: Gravitational Interactions	U3C1 Chapter 1: A Force is a push or pull when objects interact. U3C2 Chapter 2: Gravity is the attraction between two object's masses.	• 2a Students know a force has both direction and magnitude. • 2b Students know when an object is subject to two or more forces at once the result is the cumulative effect of all the forces. • 2c Students know when the forces on an object are balanced, the motion of the object does not change. • 2e Students know that when the forces on an object are unbalanced, the object will change its velocity (that is, it will speed up, slow down, or change direction). • 2f Students know the greater the mass of an object, the more force is needed to achieve the same rate of change in motion • 9a Plan and conduct a scientific investigation to test. • 2g Students know the role of gravity in forming ad maintaining the shapes of planets, starts, and the solar system.

District Student Performance Objectives with subconcepts	Activities	Assessment
U3C1 Act 10: Students practice analyzing and explaining problems dealing with force and motion. Act 11: If a force acts on an object, how does its change in motion depend on the strength of the force? How does its change in motion depend on the amount of mass? U3C2 Act 1: How can you describe gravitational interactions? Act 2: What are the possible causes for gravity?	**Use CAL. TEACHER'S GUIDE VOL. 2** U3C1 Act 10: Applying Force and Energy Ideas? pp. 84-88 Act 11: Changing Force and Mass pp. 90-98 U3C2 Act 1: What Causes Gravity? pp. 124-129 Act 2: Testing Ideas About Gravity pp. 130-137	• U3C1 Quiz (online)

Supports	Differentiation Activities
U3C1 • Act 10 Practice • Act 11 Practice U3C2 • Act 2 Practice	

Timeline	Topic	The Big Idea/Core Concept	CA State Standard
Week 14 U3C2 Act 3-7	Ch 2: Gravitational Interactions	Chapter 2: Gravity is the attraction between two object's masses.	• 2a Students know a force has both direction and magnitude. • 2b Students know when an object is subject to two or more forces at once the result is the cumulative effect of all the forces. • 2c Students know when the forces on an object are balanced, the motion of the object does not change. • 2d Students know how to identify separately the two or more forces that are acting on a single static object, including gravity, elastic forces due to tension or compression in matter and friction. • 2e Students know that when the forces on an object are unbalanced, the object will change its velocity (that is, it will speed up, slow down, or change direction). • 9a Plan and conduct a scientific investigation to test. • 2g Students know the role of gravity in forming ad maintaining the shapes of planets, starts, and the solar system.

District Student Performance Objectives with subconcepts	Activities	Assessment
U3C2 Act 3: What is interacting in a gravitational interaction? • During a gravitational interaction two masses attract each other. • As the mass of either object increases, the gravitational attraction increases. • As the distance between the objects increases, the gravitational attraction decreases. Act 4: How do scientist define weight? What is the direction of the force associated with the weight of an object? • Weight is the gravitational force exerted on an object by a larger object, like a planet. Act 5: Students use evidence to answer chapter question How can you describe gravitational interactions? • Orbital motion requires an inward unbalanced force. • Planetary orbital motion is due to the inward gravitational force from the sun. Act 6: Students practice analyzing and explaining problems dealing with gravitational interactions. • Scientists construct explanations of phenomena by analyzing a situation, applying ideas and evaluating an explanation. Act 7: Students practice analyzing and explaining problems dealing with terminal speed. • Terminal speed is reached when the gravitational force exerted by the Earth is equal to the drag exerted by the air.	**Use CAL. TEACHER'S GUIDE VOL. 2** U3C2 Act 3: More on Gravitational Interactions pp. 138-147 Act 4: Weight pp. 148-155 Act 5: Putting Together Gravitational Interaction Ideas pp. 156-159 Act 6: Orbital Motion pp.160-166 Act 7: Terminal Speed pp. 168-173	
Supports	**Differentiation Activities**	
U3C2 • Act 3 Practice • Act 4 Practice • Act 5 Practice • Act 6 Practice • Act 7 Practice	• Short Story: **Not That Newton** from *Chronicles of the Wandering.* • Students complete Assignment 5 from the Unit 3 project	

Timeline	Topic	The Big Idea/Core Concept	CA State Standard
Week 14 <u>U3C2</u> Act 8-12	Ch 2: Gravitational Interactions	Chapter 2: Gravity is the attraction between two object's masses.	• 2a Students know a force has both direction and magnitude. • 2b Students know when an object is subject to two or more forces at once the result is the cumulative effect of all the forces. • 2c Students know when the forces on an object are balanced, the motion of the object does not change. • 2d Students know how to identify separately the two or more forces that are acting on a single static object, including gravity, elastic forces due to tension or compression in matter and friction. • 2e Students know that when the forces on an object are unbalanced, the object will change its velocity (that is, it will speed up, slow down, or change direction). • 9a Plan and conduct a scientific investigation to test. • 2g Students know the role of gravity in forming ad maintaining the shapes of planets, starts, and the solar system. • 8b Students know how to calculate the density of substances from measurements of mass and volume. • 8c Students know the buoyant force on an object in a fluid is an upward force equal to the weight of the fluid the object has placed. • 8d Students know how to predict whether an object will float or sink. • 4b The sun is one of many stars in the Milky Way galaxy and that stars differ in size, temperature, and color. • 4c Students know how to use astronomical units and light-years as measures of distance between the Sun, stars and Earth. • 4d Students know that stars are the source of light for all bright objects in outer space and that the Moon and planets shine by reflected sunlight, not by their own light. • 4e Students know the appearance, general composition, relative position and size, and motion of objects in the Solar System, including planets, planetary satellites, comets, and asteroids.

District Student Performance Objectives with subconcepts	Activities	Assessment
U3C2 Act 8: How do you combine multiple forces to determine their total effect on an object? How do you determine the force necessary to balance other forces? • When an object has more that one force acting on it, the result is the sum of all the forces acting on it. Act 9: Why do things float or sink? • The buoyant force on an object in a fluid is an upward force equal to the weight of the fluid the object has displaced. Act 10: What is Potential Energy? How does it relate to motion energy? • An object can have potential energy due to its position and can have kinetic (motion) energy due to its motion. Act 11: What kinds of astronomical bodies are found in our Solar System? What are the two major types of planets? Act 12: What the units used to measure distances within the Solar System and between stars? • Distances are measured in Astronomical Units (AU). One AU is the distance between Earth and the Sun, and is approximately 150,000,000 kilometers.	**Use CAL. TEACHER'S GUIDE VOL. 2** U3C2 Act 8: Unbalanced and Balanced Forces pp. 174-182 Act 9: Buoyancy pp. 184-192 Act 10: Potential Energy pp. 194-202 Act 11: The Solar System pp. 204-217 Act 12: Distances in Space pp. 218-226	
Supports	**Differentiation Activities**	
U3C2 • Act 8 Practice • Act 9 Practice • Act 10 Practice • Act 11 Practice • No Act 12 Practice		

Timeline	Topic	The Big Idea/Core Concept	CA State Standard
Week 15 U3C2 Act 13 U3C2 EXAM U4C1 Act 1-2	U3C2 Ch 2: Gravitational Interactions UNIT 4: INTERACTIONS AND CONSERVATION U4C1 Ch 1: Mass Conservation	U3C2 Chapter 2: Gravity is the attraction between two object's masses. U4C1 Ch 1: No matter how substances within a closed system interact with one another, or how they combine or break apart, the total mass of the system remains the same.	• 2g Students know the role of gravity in forming ad maintaining the shapes of planets, starts, and the solar system. • 4e Students know the appearance, general composition, relative position and size, and motion of objects in the Solar System, including planets, planetary satellites, comets, and asteroids. • 5b Students know the idea of atoms explains the conservation of matter: In chemical reactions the number of atoms stays the same no matter how they are arranged, so their total mass stays the same.

District Student Performance Objectives with subconcepts	Activities	Assessment
U3C2 Act: 13 How does gravity help form stars, planets, and Solar Systems? How does gravity determine and maintain their shapes? • Gravity plays the central role in the formation and shape of stars, planets, and Solar Systems and maintaining their shapes. U4C1 Act 1: Can an interaction cause the amount of stuff (material) to change? Act 2: In a closed system, can interactions cause the amount of mass to change? • In a closed mass system, the mass of the system does not change during interactions.	**Use CAL. TEACHER'S GUIDE VOL. 2** U3C2 Act 13: Gravity, Stars, and Planets pp.228-238 U4C1 Act 1: What Happens to the Amount of Stuff? pp. 266-271 Act 2: Keeping Track of Stuff in a Closed System pp.272-280	• U3U2 EXAM (online)
Supports	**Differentiation Activities**	
U3C2 • Act 13 Practice U4C1 • Act 2 Practice		

Timeline	Topic	The Big Idea/Core Concept	CA State Standard
Week 16 U4C1 Act 3-6 U4C1 Quiz	U4C1 Ch 1: Mass Conservation	U4C1 Ch 1: No matter how substances within a closed system interact with one another, or how they combine or break apart, the total mass of the system remains the same.	• 5b Students know the idea of atoms explains the conservation of matter: In chemical reactions the number of atoms stays the same no matter how they are arranged, so their total mass stays the same. • 8b Students know how to calculate the density of substances from measurements of mass and volume. • 9a Plan and conduct a scientific investigation to test.

District Student Performance Objectives with subconcepts	Activities	Assessment
U4C1 Act 3: What can happen to the amount of mass in an open system during an interaction? • In an open mass system, the mass of the system may change during interactions. Act 4: In a closed system, can interaction cause the volume to change? • Volume is not conserved. Act 5: Students review evidence to answer chapter question Can interactions cause the amount of stuff (material) to change? • Scientists construct explanations of phenomena by analyzing a situation, applying ideas and evaluating an explanation. Act 6: Students practice analyzing and explaining problems dealing with mass conservation.	**Use CAL. TEACHER'S GUIDE VOL. 2** U4C1 Act 3: Mass and Open Systems pp. 282-289 Act 4: Keeping Track of Volume in a Closed System pp. 290-297 Act 5: Interactions and Mass pp. 298-302 Act 6: Mass Conservation Problems pp.304-308	• U4C1 Quiz (online)

Supports	Differentiation Activities
U4C1 • Act 3 Practice • Act 4 Practice • Act 5 Practice • Act 6 Practice	• Short Story: **The Sinking Feeling** from *Chronicles of the Wandering.*

Timeline	Topic	The Big Idea/Core Concept	CA State Standard
Week 17 U4C2 Act 1-3	U4C2 Ch 2: Energy Conservation	U4C2 Ch 2: Energy is not created or destroyed.	• 9a Plan and conduct a scientific investigation to test.

District Student Performance Objectives with subconcepts	Activities	Assessment
U4C2 Act 1: Can energy be created form nothing? Can energy be destroyed into nothing? Act 2: Does an interaction occur when warm and cold objects touch each other? • Heat energy is usually one of the products of an energy transformation. • Temperature energy is a form of energy. When objects warm up, they increase their temperature energy. • A thermal interaction occurs when a warmer body is in contact with a cooler body. • During a thermal interaction heat energy is transferred from the source. Act 3: What happens when a warmer object is near (but not touching) a cooler object? • An infrared radiation interaction may occur when two objects have different temperatures. • An infrared radiation interaction occurs when a warmer body is near a cooler body. • During an IR interaction, heat energy is transferred from the source. • During an infrared radiation interaction, the objects do not need to be touching. • During an infrared radiation interaction, heat energy is transferred from the warmer object to the cooler object.	**Use CAL. TEACHER'S GUIDE VOL. 2** U4C2 Act 1: Energy and Interactions pp.324-329 Act 2: Energy and Heat-Conduction Interactions pp. 330-339 Act 3: Energy and Infrared-Radiation Interactions pp. 340-350	

Supports	Differentiation Activities
U4C1 • Act 1 Practice –How to read a Thermometer • Act 2 Practice • Act 3 Practice	• Short Story: **Stranded** and **Signal Strength** from *Chronicles of the Wandering.*

Timeline	Topic	The Big Idea/Core Concept	CA State Standard
Week 18 U4C2 Act 4-6	U4C2 Ch 2: Energy Conservation	U4C2 Ch 2: Energy is not created or destroyed.	• 9a Plan and conduct a scientific investigation to test. • 3d Students know the states of matter (solid, liquid, gas) depend on molecular motion. • 5d Students know physical processes include freezing and boiling, in which a material changes form with no chemical reaction. • 9f Apply simple mathematic relationships to determine a missing quantity in a mathematic expression, given the two remaining terms (including speed=distance/time, density=mass/volume, force=pressure x area, volume= area x height).

District Student Performance Objectives with subconcepts	Activities	Assessment
U4C2 Act 4: What happens to energy that is input during a phase change? • During phase changes, the temperature, temperature energy, and stored volume energy of a substance neither increase nor decrease. • During a thermal interaction heat energy is transferred from the source. • Stored phase energy is a form of energy that depends on the phase (solid, liquid, or gas) of substances. Act 5: Can energy be created from nothing? Can energy be destroyed into nothing? • Heat energy is always transferred to the surroundings Act 6: Student used evidence to answer chapter questions Can energy by created form nothing? Can energy be destroyed into nothing?	**Use CAL. TEACHER'S GUIDE VOL. 2** U4C2 Act 4: Thermal Energy and Phase Change pp. 352-362 Act 5: Conservation of Energy pp. 364-371 Act 6: Wrapping Up Energy and Interactions pp. 372-377	
Supports	**Differentiation Activities**	
U4C1 • Act 4 Practice • Act 5 Practice • Act 6 Practice		

Timeline	Topic	The Big Idea/Core Concept	CA State Standard
Week 19 U4C2 Act 7-10 U4C2 EXAM	U4C2 Ch 2: Energy Conservation	U4C2 Ch 2: Energy is not created or destroyed.	• 9a Plan and conduct a scientific investigation to test. • 4a Students know galaxies are clusters of billions of stars and may have different shapes. • 4b Students know that the Sun is one of many stars in the Milky Way galaxy and that starts may differ in size, temperature, and color. • 4d Students know that stars are the source of light for all bright objects in outer space and that the Moon and Planets shine by reflecting sunlight, not by their own light.

District Student Performance Objectives with subconcepts	Activities	Assessment
U4C2 Act 7: Students practice analyzing and explaining problems dealing with energy conservation. • Scientists construct explanations of phenomena by analyzing a situation, applying ideas and evaluating an explanation. Act 8: Which energy resources used in our society are renewable, and which are nonrenewable? • Nonrenewable resources could be fossil fuels and uranium. These are in limited supply. • Renewable resources are wind, water, biomass, geothermal resources, and sunlight. These are available indefinitely. Act 9: What determines the luminosity (brightness) of a star? What are the different types of galaxies? • Galaxies are clusters of billions of stars and may have different shapes. • Distance of the stars affect the amount of light seen on Earth. • White light is a mixture of all the color wavelengths. Different colors correspond to different wavelengths of light. Act 10: What are some variables that affect the average speed of a dropped object? • Average speed is the total distance traveled divided by the total time it took object to travel. • Some variable are the mass of the object, the size, and the fluid the object falls through.	**Use CAL. TEACHER'S GUIDE VOL. 2** U4C2 Act 7: Analyzing and Explaining Energy Interactions pp.378-381 Act 8: Energy Resources pp.382-394 Act 9: Stars and Galaxies pp. 396-404 Act 10: Designing Investigation-Part 2 pp.406-412	• U4C2 EXAM (online)

Supports	Differentiation Activities
U4C1 • Act 7 Practice • Act 8 Practice • Act 9 Practice • No Act 10 Practice	

Timeline	Topic	The Big Idea/Core Concept	CA State Standard
Week 20 U5C1 ACT 1-3	UNIT 5: MATERIALS AND THEIR INTERACTIONS U5C1 Ch 1: Chemical Interaction	U5C1: Ch 1 Chemists describe and classify materials according to their properties. A property of a material is a description of how the material interacts with other things.	• 5a Students know reactant atoms and molecules interact to form products with different chemical properties. • 5d Students know physical processes include freezing and boiling, in which a material changes form with no chemical reaction. • 7c Students know substances can be classified by their properties, including their melting temperature, density, and electrical conductivity.

District Student Performance Objectives with subconcepts	Activities	Assessment
U5C1 Act 1: How can you identify and describe different substances and their chemical interactions? Act 2: Are there different kinds of gases, or are all gases some form of air? How do chemists identify unknown materials when they have the same sense properties? • Different substances can have some properties that are the same. So a substance is identified by a unique set of properties. Act 3: What observations can provide evidence for a chemical interaction? What are chemical properties of materials? • The evidence of a chemical reaction is that the materials at the end of the interaction have a different set of chemical and physical properties than the original materials.	**Use CAL. TEACHER'S GUIDE VOL. 3** U5C1 Act 1: Interaction Story pp. 16-21 Act 2: What is it? pp. 22-34 ***use syringes Act 3: What's the Evidence? pp. 36-46	

Supports	Differentiation Activities
U5C1 • Act 2 Practice • Act 3 Practice	

Timeline	Topic	The Big Idea/Core Concept	CA State Standard
Week 21 U5C1 ACT 4-5	U5C1 Ch 1: Chemical Interaction	U5C1: Ch 1 Chemists describe and classify materials according to their properties. A property of a material is a description of how the material interacts with other things.	• 5a Students know reactant atoms and molecules interact to form products with different chemical properties. • 5d Students know physical processes include freezing and boiling, in which a material changes form with no chemical reaction. • 7c Students know substances can be classified by their properties, including their melting temperature, density, and electrical conductivity.

District Student Performance Objectives with subconcepts	Activities	Assessment
U5C1 Act 4: What are the reactants and products in the burning reaction? What is the evidence for the reaction? • Acid taste sour and react with certain indicators to produce a new substance with a different color. • Bases taste bitter and feel slippery. They do not react with metals • Neutral substance are neither and do not change color like acids or bases. Act 5: What are the reactants and products in the burning reaction? What is the evidence for the reaction? • Air is reactant and the water, carbon dioxide, and a solid (soot) • A chemical reaction is exothermic when energy is transferred out of the system. A reaction is endothermic when energy is transferred into the system.	**Use CAL. TEACHER'S GUIDE VOL. 3** U5C1 Act 4: Acid, Base, or Neutral pp. 48-60 Act 5: Chemical Reactions and Mass pp. 62-71	
Supports	**Differentiation Activities**	
U5C1 • Act 5 Practice • Act 6 Practice		

Timeline	Topic	The Big Idea/Core Concept	CA State Standard
Week 22 U5C1 ACT 5-9	U5C1 Ch 1: Chemical Interaction	U5C1: Ch 1 Chemists describe and classify materials according to their properties. A property of a material is a description of how the material interacts with other things.	• 5a Students know reactant atoms and molecules interact to form products with different chemical properties. • 5b Students know the idea of atoms explains the conservation of matter: In chemical reactions the number of atoms stays the same no matter how they are arranged, so their total mass stays the same. • 5c Students know chemical reactions usually liberated heat or absorb heat. • 5e Students know how to determine whether a solution is acidic, basic, or neutral. • 7c Students know substances can be classified by their properties, including their melting temperature, density, and electrical conductivity.

District Student Performance Objectives with subconcepts	Activities	Assessment
U5C1 Act 6: What are the reactants and products in the rusting reaction? What is the evidence for the reaction? How do chemists describe the Law of Conservation of Mass for chemical reactions? • Evidence of a chemical reaction is the disappearance of one of the reactants, the appearance of new material, and changes in other properties. • Mass stays the same in a closed system. Act 7: What is the relationship between the transfer of energy into or out of a chemical reaction and the stored chemical energy of the reactants and products? • A chemical reaction is exothermic when energy is transferred out of the system. A reaction is endothermic when energy is transferred into the system. Act 8: Students used evidence to answer chapter question How can you identify and describe different substances and their chemical interactions? Act 9: Students practice analyzing and explaining problems dealing with unknown liquids based upon some characteristic properties.	**Use CAL. TEACHER'S GUIDE VOL. 3** U5C1 Act 6: Chemical Reactions and Mass pp. 72-78 Act 7: Energy and Reactions pp. 80-89 Act 8: Describing Substances and Chemical Interactions pp. 90-95 Act 9: Analyze and Explain pp 96-100	
Supports	**Differentiation Activities**	
U5C1 • Act 6 Practice • Act 7 Practice • Act 8 Practice • Act 9 Practice		

Timeline	Topic	The Big Idea/Core Concept	CA State Standard
Week 23 U5C1 U5C1 Quiz U5C2 Act. 1-3	U5C1 Ch 1: Chemical Interaction U5C2 Ch 2:Interaction and Classifying Materials	U5C1: Ch 1 Chemists describe and classify materials according to their properties. A property of a material is a description of how the material interacts with other things. Ch 2: Chemists describe and classify materials according to their properties. A property of a material is a description of how the material interacts with other things.	• 5a Students know reactant atoms and molecules interact to form products with different chemical properties. • 5d Students know physical processes include freezing and boiling, in which a material changes form with no chemical reaction. • 9a Plan and conduct a scientific investigation to test • 9c Distinguish between variable and controlled parameters in a test. • 9e Construct appropriate graphs from data and develop quantitative statements about the relationships between variables. • 9g Distinguish between linear and nonlinear relationships on a graph of data.

District Student Performance Objectives with subconcepts	Activities	Assessment
U5C2 Act 1: How can we use chemical and physical properties to classify materials? Act 2: What observations can provide evidence for a physical interaction? • Physical interactions are any mechanical or thermal interactions that result in a change in the size, shape or phase of at least one of the interacting substances, but no change in the kind of substance(s). Act 3: What are some variables that affect how fast water evaporates? • Variables such as heat, volume, surface area, and whether a container is closed can affect the amount of evaporation. • •	**Use CAL. TEACHER'S GUIDE VOL. 3** U5C2 Act 1: Interaction Story pp. 122-126 Act 2: What's the Evidence? pp. 128 -135 Act 3: Designing Investigations Part 3 pp. 136-143	• U5C1 Quiz (online)

Supports	Differentiation Activities
U5C2 • Act 2 Practice • Act 3 Practice	

Timeline	Topic	The Big Idea/Core Concept	CA State Standard
Week 24 U5C2 Act. 4-6	U5C2 Ch 2:Interaction and Classifying Materials	Ch 2: Chemists describe and classify materials according to their properties. A property of a material is a description of how the material interacts with other things.	• 3b Students know that compounds are formed by combining two or more different elements and that compounds have properties that are different from their constituent elements. • 7a Students know how to identity regions corresponding to metals, nonmetals, and inert gases.

District Student Performance Objectives with subconcepts	Activities	Assessment
U5C2 Act 4: How can you tell whether a material is a mixture or a single substance? • Mixtures can be separated into different substances during physical interactions. • Single substances cannot be separated into different substances during physical interactions. Act 5: How can you determine whether a single substance is an element or compound? What are some common properties of metal and nonmetal elements? • Compounds are single substances that break down into elements during chemical reactions. • Elements do not break down into simpler substances during chemical reactions. Act 6: What is the Periodic Table of the Elements? How are metals and nonmetals organized on the Periodic Table? • The elements in the Periodic Table are organized by their characteristic properties. Nonmetals are found on the right of the zig-zag line and Metals are to the left.	**Use CAL. TEACHER'S GUIDE VOL. 3** U5C2 Act 4: Mixture or Single Substance? pp.144-152 Act 5: Element or Compound? pp. 154-166 Act 6: The Periodic Table of the Elements pp.168-178	
Supports	**Differentiation Activities**	
U5C2 • Act 4 Practice • Act 5 Practice • Act 6 Practice		

Timeline	Topic	The Big Idea/Core Concept	CA State Standard
Week 25 <u>U5C2</u> Act. 7-9 U5C2 EXAM	<u>U5C2</u> Ch 2:Interaction and Classifying Materials	Ch 2: Chemists describe and classify materials according to their properties. A property of a material is a description of how the material interacts with other things.	• 3b Students know that compounds are formed by combining two or more different elements and that compounds have properties that are different from their constituent elements. • 5a Students know reactant atoms and molecules interact to form products with different chemical properties. • 7a Students know how to identity regions corresponding to metals, nonmetals, and inert gases. • 7c Students know substances can be classified by their properties, including their melting temperature, density, hardness, and thermal and electrical conductivity.

District Student Performance Objectives with subconcepts	Activities	Assessment
U5C2 Act 7: Students use evidence to answer chapter question How can you use chemical and physical properties to classify materials? Act 8: Students practice analyzing and explaining problems dealing properties of materials. • Scientists construct explanations of phenomena by analyzing a situation, applying ideas and evaluating an explanation. • The analysis is good when the interaction is correctly described and the energy diagram (or force diagram) is correct. • The application of ideas is good when the explanation includes all of the correct ideas needed. Act 9: What is the repeating pattern in the Periodic Table of the Elements? What are some common groups of metal and nonmetal elements? • The elements with similar properties are organized into columns, called groups. So as you read across the table the chemical properties (and some physical) repeat.	**Use CAL. TEACHER'S GUIDE VOL. 3** U5C2 Act 7: Interactions and Classifying Materials pp. 180-183 Act 8: Analyze and Explain pp. 184-187 Act 9: Groups and the Periodic Table pp.188-194	• U5C2 EXAM (online)
Supports	**Differentiation Activities**	
U5C2 • Act 7 Practice • Act 8 Practice • Act 9 Practice		

Timeline	Topic	The Big Idea/Core Concept	CA State Standard
Week 26 U6C1 Act 1-3	UNIT 6: INTERACTIONS AND THE STRUCTURE OF MATERIALS U6C1 Ch 1: Physical Interactions and the Structure of Matter	U6C1 Ch 1: All things are made up of particles called atoms.	• 3b Students know that compounds are formed by combining two or more different elements and that compounds have properties that are different from their constituent elements. • 7c Students know substances can be classified by their properties, including their melting temperature, density, hardness, and thermal and electrical conductivity. • 3f Students know how to use the periodic table to identify elements in simple compounds.

District Student Performance Objectives with subconcepts	Activities	Assessment
U6C1 Act 1: What is the scientists' theory of what gases, liquids, and solids are like on a scale too small to be seen? Act 2: What are the similarities and differences in the shape, volume, compression strength, diffusion, and density properties of gases, liquids, and solids? • The particles of a substance move continually in different directions, and with different speeds. Act 3: What are the first four ideas in the Small Particle Theory of materials? • All single substances - solid, liquids and gases - are made up of tiny particles. A particle is the smallest piece of a substance. • The particles of substances are too small to be seen through light microscopes. • There is nothing between the particles of matter (the space between the particles is empty of stuff). • The particles of matter move continuously (all the time) in different directions.	**Use CAL. TEACHER'S GUIDE VOL. 3** U6C1 Act 1: What's Inside Materials? pp. 224-232 Act 2: Some Properties of Gases, Liquids, and Solids pp. 234-245 Act 3: Scientists' Theory pp. 246249	
Supports	**Differentiation Activities**	
U6C1 • Act 2 Practice • Act 3 Practice		

Timeline	Topic	The Big Idea/Core Concept	CA State Standard
Week 27 U6C1 Act 4-6	UNIT 6: INTERACTIONS AND THE STRUCTURE OF MATERIALS U6C1 Ch 1: Physical Interactions and the Structure of Matter	U6C1 Ch 1: All things are made up of particles called atoms.	• 3d Students know the states of matter (solid, liquid, gas) depend on molecular motion. • 3e Students know that in solids the atoms are closely locked in position and can only vibrate; in liquids the atoms and molecules are more loosely connected and can move past one another; and in gases the atoms and molecules are free to move independently, colliding frequently. • 3b Students know that compounds are formed by combining two or more different elements and that compounds have properties that are different from their constituent elements. • 3c Students know atoms and molecules form solids by building up repeating patterns, such as the crystal structure of NaCl or long-chain polymers. • 7c Students know substances can be classified by their properties, including their melting temperature, density, hardness, and thermal and electrical conductivity.

District Student Performance Objectives with subconcepts	Activities	Assessment
U6C1 Act 4: What are the SPT ideas of the average spacing, motion, and between-particle interaction of the particles of a gas? What is the relationship between the temperature of a gas and the average motion energy of the gas particles? • The thermal energy of a substance is related to the average motion energy of the particles of the substance. The higher the temperature and temperature energy of a substance, the greater the average motion energy of the particles of the substance. Act 5: How is the cohesion interaction different for substances that are gases, liquids, and solids at room temperature? Act 6: How does the strength of the cohesion interaction influence the average spacing and motion of the particles of room-temperature gases, liquids, and solids? What two atomic variables determine the density of a solid? • For substances that are liquids near room temperatures, the attraction between the molecules is weak, so the particles are loosely connected. • For substances that are solids at room temperature, the attraction between the molecules is medium to medium strong, so the particles are locked in place.	**Use CAL. TEACHER'S GUIDE VOL. 3** U6C1 Act 4: Scientists' Theory of Gases pp. 260-269 Act 5: Another Interaction pp.270-278 Act 6: Scientists' Theory of Liquids and Solids pp. 280-294	
Supports	**Differentiation Activities**	
U6C1 • Act 4 Practice • Act 5 Practice • Act 6 Practice		

Timeline	Topic	The Big Idea/Core Concept	CA State Standard
Week 28 U6C1 Act 7-10	UNIT 6: INTERACTIONS AND THE STRUCTURE OF MATERIALS U6C1 Ch 1: Physical Interactions and the Structure of Matter	U6C1 Ch 1: All things are made up of particles called atoms.	• 3d Students know the states of matter (solid, liquid, gas) depend on molecular motion. • 7c Students know substances can be classified by their properties, including their melting temperature, density, hardness, and thermal and electrical conductivity. • 3b Students know that compounds are formed by combining two or more different elements and that compounds have properties that are different from their constituent elements. • 3e Students know that in solids the atoms are closely locked in position and can only vibrate; in liquids the atoms and molecules are more loosely connected and can move past one another; and in gases the atoms and molecules are free to move independently, colliding frequently. • 9f Applying simple mathematic relationships to determine a missing quantity in a mathematic expression, given the two remaining terms (including speed, density, force, and volume). • 3a Students know that compounds are formed by combining two or more different elements and that compounds have properties that are different from their constituent elements.

District Student Performance Objectives with subconcepts	Activities	Assessment
U6C1 Act 7: What is the relationship between the cohesion strength of attraction between the particles of a substance and the type of particles of the substance (atom, ion or molecule)? What happens to the particles of a substance during melting, boiling, and sublimation? • The between-particle attraction of the particles of a substance accounts for the characteristics of gases, liquids, and solids. Act 8: Students use evidence to answer chapter question What is the scientists' theory of what gases, liquids, and solids are like on a scale too small to be seen? Act 9: Students practice analyzing and explaining problems involving the SPT • Scientists construct explanations of phenomena by analyzing a situation, applying ideas and evaluating an explanation. • The analysis is good when the interaction is correctly described and the energy diagram (or force diagram) is correct. • The application of ideas is good when the explanation includes all of the correct ideas needed. Act 10 What is the structure of the atom? • Atoms are composed of protons, neutrons, and electrons.	**Use CAL. TEACHER'S GUIDE VOL. 3** U6C1 Act 7: Explaining Phases and Phase Changes pp. 296-309 Act 8: Scientists' Theory of Materials pp. 310-313 Act 9: Analyze and Explain pp. 314-322 Act 10: Atomic Structure pp. 324-331	
Supports	**Differentiation Activities**	
U6C1 • Act 7 Practice • Act 8 Practice • Act 9 Practice • Act 10 Practice		

Timeline	Topic	The Big Idea/Core Concept	CA State Standard
Week 29 U6C1 11-12 U6C1 Quiz U6C2 Act 1	UNIT 6: INTERACTIONS AND THE STRUCTURE OF MATERIALS U6C1 Ch 1: Physical Interactions and the Structure of Matter U6C2 Ch 2: Chemical Reactions and the Structure of Materials.	U6C1 Ch 1: All things are made up of particles called atoms. U6C2 Ch 2: There are interactions between atoms and different kinds of chemical bonds can be formed and energy is stored in chemical bonds.	• 3f Students know how to use the periodic table to identify elements in simple compounds. • 7b Students know each element has a specific number of protons in the nucleus (the atomic munber) and each isotope of the element has a different bt specific number of neutrons in the nucleus. • 7c Students know substances can be classified by their properties, including their melting temperature, density, hardness, and thermal and electrical conductivity. • 5a Students know reactant atoms and molecules interact to form products with different chemical properties. • 3b Students know that compounds are formed by combining two or more different elements and that compounds have properties that are different from their constituent elements.

District Student Performance Objectives with subconcepts	Activities	Assessment
U6C1 Act 11: How does atomic structure help you make sense of the Periodic Table? Act 12: What are isotopes of an element? What are nuclear reactions and radioactivity? U6C2 Act 1: What is the scientists' theory of chemical reactions on a scale too small to see? How do chemist use their theory to describe the Conservation of Mass during chemical reactions?	**Use CAL. TEACHER'S GUIDE VOL. 3** U6C1 Act 11: Atomic Structure and the Periodic Table pp.332- 339 Act 12: Isotopes and Radioactivity pp.340-348 U6C2 Act 1: What's Happening? pp. 374-381	• U6C1 Quiz (online)
Supports	**Differentiation Activities**	
U6C1 • Act11 Practice • Act 12 Practice U6C2 • no Act 1 Practice		

Timeline	Topic	The Big Idea/Core Concept	CA State Standard
Week 30 U6C2 Act 2-5	U6C2 Ch 2: Chemical Reactions and the Structure of Materials.	U6C2 Ch 2: There are interactions between atoms and different kinds of chemical bonds can be formed and energy is stored in chemical bonds.	• 5a Students know reactant atoms and molecules interact to form products with different chemical properties. • 3b Students know that compounds are formed by combining two or more different elements and that compounds have properties that are different from their constituent elements.

District Student Performance Objectives with subconcepts	Activities	Assessment
U6C2 Act 2: How do the atoms in a molecule interact with each other? What are the three types of chemical bonds? • During a chemical reaction, the bonds of the reactants break, the atoms recombine, and new bonds between the atoms form the products. Act 3: What happens to the particles (atoms or molecules) of the reactant(s) during a chemical interaction? What are the SPT ideas about the stored chemical energy of a substance? • Atoms are not created or destroyed during a chemical reaction. So for mass to be conserved, the number of atoms of each element in the reactant particles must be the same as the number of atoms of each element in the product particles. Act 4: What is the Small-Particle Theory (SPT) representation of the Conservation of Mass Law for chemical reactions? • Chemists represent the Conservation of Mass Law at the small particle level with balanced equations. Act 5: What is the balanced chemical equation for the rusting reaction?	**Use CAL. TEACHER'S GUIDE VOL. 3** U6C2 Act 2: Chemical Bonds pp. 382-389 Act 3: Particle Interactions pp. 390-398 Act 4: The Balancing Act pp. 400-412 Act 5: Balancing the Rusting Reaction pp. 414-420	
Supports	**Differentiation Activities**	
U6C2 • Act 2 Practice • Act 3 Practice • Act 4 Practice • Act 5 Practice		

Timeline	Topic	The Big Idea/Core Concept	CA State Standard
Week 31 U6C2 Act 6-9	U6C2 Ch 2: Chemical Reactions and the Structure of Materials.	U6C2 Ch 2: There are interactions between atoms and different kinds of chemical bonds can be formed and energy is stored in chemical bonds.	• 3c Students know atoms and molecules form solids by building up repeating patterns, such as the crystal structure of NaCl or long-chain polymers. • 3d Students know the states of matter (solid, liquid, gas) on molecular. • 6a Students know that carbon, because of it's ability to combine in many ways with itself and other elements, has a central role in the chemistry of living organisms. • 7c Students know substances can be classified by their properties, including their melting temperature, density, hardness, and thermal and electrical conductivity. • 3b Students know that compounds are formed by combining two or more different elements and that compounds have properties that are different from their constituent elements. • 5a Students know reactant atoms and molecules interact to form products with different chemical properties. • 5b Students know the idea of atoms explains the conservation of matter: In chemical reactions the number of atoms stays the same no matter how they are arranged, so their total mass stays the same. • 7c Students know substances can be classified by their properties, including their melting temperature, density, hardness, and thermal and electrical conductivity.

District Student Performance Objectives with subconcepts	Activities	Assessment
U6C2 Act 6: Why can carbon form so many different compounds? How are the properties of carbon and carbon-based substances related to their molecular structure? • Carbon can form millions of compounds because (1) carbon atoms can form 1 to 4 covalent bonds with it's self or other elements, and (2) carbon atoms can bond with itself in straight chains, branched chains, and ring-shaped groups to form the "backbone" for different molecules. Act 7: Students use evidence to answer chapter questions What is the scientists' theory of chemical reactions on a scale too small to see? How do chemist use their theory to describe the Conservation of Mass during chemical reactions? Act 8: Students practice analyzing and explaining problems describing specific chemical reactions in terms of breaking and making bonds. • Scientists construct explanations of phenomena by analyzing a situation, applying ideas and evaluating an explanation. • The analysis is good when the interaction is correctly described and the energy diagram (or force diagram) is correct. • The application of ideas is good when the explanation includes all of the correct ideas needed. Act 9: What elements make up most of the mass of living organisms on Earth? What are the major molecules, small and large, that make up organisms and control chemical reaction in the organisms? • All living organisms are made of a great variety of different molecules, but most of the mass of all living organisms on Earth is made up of only six elements: oxygen, carbon, hydrogen, nitrogen, calcium, and phosphorus. • Living organisms have many different kinds of molecules including water, salt, carbohydrates, fats, proteins, and DNA. •	**Use CAL. TEACHER'S GUIDE VOL. 3** U6C2 Act 6: Carbon and Carbon Compounds pp. 422-431 Act 7: Scientists' Theory and Chemical Reactions pp. 432- 437 Act 8: Analyze and Explain pp. 438-443 Act 9: The Chemistry of Life-Part 1 pp. 444-451	

Supports	Differentiation Activities
U6C2 • Act 6 Practice • Act 7 Practice • Act 8 Practice • Act 9: Practice	

Timeline	Topic	The Big Idea/Core Concept	CA State Standard
Week 31 <u>U6C2</u> Act 6-10 U6C2 EXAM	<u>U6C2</u> Ch 2: Chemical Reactions and the Structure of Materials.	<u>U6C2</u> Ch 2: There are interactions between atoms and different kinds of chemical bonds can be formed and energy is stored in chemical bonds.	• 6c Students know that living how to interpret graphs of speed versus time for motion in a single direction.

District Student Performance Objectives with subconcepts	Activities	Assessment
<u>U6C2</u> Act 10: What are two major groups of polymers that make up organisms and control chemical reactions in the organisms? • Polymers are giant molecules built of smaller carbon molecules bonded together. Proteins and DNA are the two major groups.	**Use CAL. TEACHER'S GUIDE VOL. 3** <u>U6C2</u> Act 10: The Chemistry of Life-Part 2 pp. 452-461	• U6C2 Exam (online)
Supports	**Differentiation Activities**	
<u>U6C2</u> • Act 10		