

Newport-Mesa Unified School District
Office of Secondary Curriculum and Instruction
Middle School Course of Study

Course Title		Honors Physical Science (8 th grade)			Course Code		[Office use only]	
Content Area:	Science		Grade Range:	8	Board Adoption Date:			
Transcript Title:	Honors Physical Science (8 th grade)			Area of High School Subject Fulfillment?			None	
Prerequisites (list all):		Grade 7 CST Advanced/Proficient score on Math Grade 7 CST Advanced/Proficient score on ELA Grade 7 Science (Grade 7 Honors Biology preferred) teacher recommendation				Length of Course:		1 yr
Course Sequence?	No	List Other Courses in the Sequence:			-			

COURSE DESCRIPTION *(catalog summary):*

The 8th grade Honors Physical Science course is an extensive introduction to chemistry and physics including California high school science standards. Topics include Structure of Matter, Reactions, The Periodic Table of Elements, Chemistry of Living Systems, Motion, Forces, Earth in the Solar System, and Density and Buoyancy. The year long course will emphasize laboratory activities including Investigation and Experimentation standards with a culminating scientific research project.

GOALS *(expected performance outcomes for students):*

Mastery of California Grade 8 Science Standards with Advanced Proficiency Level on Grade 8 Science CST. Students will be introduced to high school Chemistry and Physics standards and scientific methods to prepare students for Advanced Placement themes. Students will be prepared to enter Honors Chemistry or Honors Biology when they enter high school as freshmen.

CALIFORNIA CONTENT STANDARDS *(how the course aligns with California and/or national curriculum standards):*

Students will take the Grade 8 Science CST. Historically, >90% of these students score Advanced/Proficient on the Grade 8 Science CST and recent data indicates over 75% of these students achieve Advanced/Proficient on the Chemistry CST.

EVALUATION *(how students will be assessed and graded):*

Student achievement will be measured using multiple assessment tools including district benchmarks, unit tests, research projects, science fair project and scientific laboratory journals.

Unit 1	Length of Unit ... (Days / weeks / class sessions) ... 2 weeks			
	Key Vocabulary	Standards (referenced)	Model Tasks	Tools / Texts
<i>Scientific Inquiry Measurement</i>	Question Purpose/Objective	Grade 8 9a-g	Collecting data using senses and calibrated measuring tools Qualitative and Quantitative Measurements	<i>Textbook(s)</i> <i>Metric ruler</i>

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Graphing Analyzing data Writing a Scientific Report Laboratory safety	Hypothesis Variable (independent, dependent) Trial Measurement Mathematical relationships Data Data Table Analysis Graph (linear/non-linear) Matter Energy		Determining the mass and volume of solids, liquids, and gases Calculate density of solids, liquids, and gases Cat-a-pult lab (accuracy and reproducibility of results) Graphing lab using Excel Laboratory write-ups (draft and final) Safety lab (aprons, goggles, heat sources, chemicals, etc.)	<i>Caliper</i> <i>Graduated cylinders</i> <i>Triple beam balance</i> <i>Celsius thermometer</i> <i>Hands-on labs</i> <i>Computer lab</i> <i>Labware</i>
Differentiation	Support -- for students who are struggling with the content	Content: <i>Key Terms</i> Process: <i>Written/diagramed terms</i> Product: <i>Concept maps/models</i>		
	Extension – for high achieving students.	Content: <i>Introduction to long term experiment</i> Process: <i>Investigation and research</i> Product: <i>Science Fair Project</i>		
Evaluation	Formative Assessments (ongoing & mid-lesson): <i>Checks for understanding, quizzes and homework review, lab reports and class activities</i>			
	Summative Assessments (unit final evaluation): <i>Unit Tests, Lab practicals, Final Exam, Benchmarks, Lab write-ups</i>			

Unit 2	Length of Unit ... (Days / weeks / class sessions) ... 3 weeks			
	Key Vocabulary	Standards (referenced)	Model Tasks	Tools / Texts
Structure of Matter Properties of Matter States of Matter	Atom Element Compound Pure substance Mixture States of matter Molecular motion Solid Liquid	Grade 8 3a, 3b, 3d, 3e, 5d High School Chemistry 1e	States of Matter Pyramid Project Rock candy lab Making Cotton Candy	Textbook Lab journals Lab Computer Biotechnology Equipment

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	Gas Pressure Physical property Physical change Endothermic change Exothermic change Change of State Freezing/Melting Vaporization/Condensation Sublimation/Deposition Chemical property Chemical change			
Differentiation	Support -- for students who are struggling with the content	Content: Key Terms Process: Written/diagramed terms Product: Concept Maps/Models		
	Extension – for high achieving students.	Content: Intra-molecular and Inter-Molecular bonding Process: Hands-on model Product: Power Point Presentation to class with three dimensional models		
Evaluation	Formative Assessments (ongoing & mid-lesson): Checks for understanding, quizzes and homework review, lab reports and class activities			
	Summative Assessments (unit final evaluation): Unit Tests, Lab practicals, Final Exam, Benchmarks, Lab write-ups			

Unit 3	Length of Unit ... (Days / weeks / class sessions) 3 Weeks			
	Key Vocabulary	Standards (referenced)	Model Tasks	Tools / Texts
Atomic Structure Periodic Table of Elements Chemical Bonding	Atom Element Subatomic particle Proton/Neutron/Electron Strong/Nuclear Force Electromagnetic force Orbital/Valence electrons Metals Nonmetals Semimetals (Metalloids) Inert/Noble gases Chemical symbol	Grade 8 3a, 3c, 7a, 7b, 7c High School Chemistry 1a, 1b, 1d, 1e 2a – 2e 11a, 11c	<i>Atomic Structure/Isotopes Lab: Mini-marshmallows/Nerds</i> <i>Rutherford nucleus activity – Flinn Scientific</i> <i>Physical and Chemical Properties of Metals and Nonmetals</i> <i>Calculating Atomic Mass</i> <i>Excel Graphing: Atomic Number and Atomic Mass</i> <i>Bohr Atom Models and Lewis Dot Diagrams</i> <i>Mendeleev Playing Card Activity</i>	Textbooks Computer lab Lab Labware

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	Atomic Number Isotope Atomic Mass Ion (Cation, Anion) Polyatomic ion Ionic, covalent, and metallic bonding Crystal lattice Crystalline/Amorphous solids Molecule			
Differentiation	Support -- for students who are struggling with the content	Content: Key Terms Process: Written/diagramed terms Product: Flashcards/Concept Maps/Models		
	Extension – for high achieving students.	Content: Electron orbitals Process: Research Product: Power Point Presentation and/or three dimensional models		
Evaluation	Formative Assessments (<i>ongoing & mid-lesson</i>): Checks for understanding, quizzes and homework review, lab reports and class activities			
	Summative Assessments (<i>unit final evaluation</i>): Unit Tests, Lab practicals, Final Exam, Benchmarks, Lab write-ups			
Unit 4	Length of Unit ... (Days / weeks / class sessions) ... 3 weeks			
	Key Vocabulary	Standards (referenced)	Model Tasks	Tools / Texts
Chemical Reactions Chemistry of Living Systems	Atom Diatomic element Diatomic molecule Atomic Mass Chemical symbol Chemical formula Chemical reaction Reactant(s) Product(s) Endothermic reaction Exothermic reaction Single-replacement reaction Double-replacement reaction	Grade 8 5a, 5b, 5c, 5d, 5e High School Chemistry 3a 5a, 5d, 6a 7b, 7c 10a – 10f	Identifying chemical change Balancing Chemical Equations Endothermic and exothermic reactions Molecular Models Lab: Photosynthesis/Respiration Molecular Models Lab: Building Proteins Molecular Models Lab: Hot Sauce and Sweeteners Polymer labs Sodium Polyacrylate Hydrophilic Instant Snow Polymer Making Nylon Magic sand pH Lab Specificity and Sensitivity of pH indicators/meters	Textbooks Computer lab Lab Labware

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	Synthesis reaction Decomposition reaction Precipitate pH pH scale Acids Bases			
Differentiation	Support -- for students who are struggling with the content	Content: Key Terms Process: Written/diagramed terms Product: Flashcards/ Word Wall		
	Extension – for high achieving students.	Content: Structure of Matter, Periodic Table, Reactions, and Chemistry of Living Systems Standards Process: Research Product: Poster/three dimensional project		
Evaluation	Formative Assessments (<i>ongoing & mid-lesson</i>): Checks for understanding, quizzes and homework review, lab reports and class activities			
	Summative Assessments (<i>unit final evaluation</i>): Unit Tests, Lab practicals, Final Exam, Benchmarks, Lab write-ups			
Unit 5	Length of Unit ... (Days / weeks / class sessions) ... 4 weeks			
	Key Vocabulary	Standards (referenced)	Model Tasks	Tools / Texts
Motion/Forces	Position Reference point/directions Instantaneous/Average speed Total distance Total Time Velocity Acceleration Slope Force Magnitude Balanced Unbalanced Static Elastic Tension Compression Momentum	Grade 8 1a-1f 2a-2g High School Physics 1a – 1d, 2d	CPO Investigations Gravity Drop Photogate experiments for velocity and acceleration Graphing activities Force of Friction Domino Derby Lab and Graphing Activity Egg drop and Parachute Design Projectile motion and Variables Rocketry Stomp Rockets Estes Solid Fuel Rockets Law of Conservation of Mome ntum Equipment and supplies provided by Future Scientists and Engineers of America (Discovery Science Center) Planetary motion	Textbooks Computer lab Lab Labware

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	Vectors Friction Gravity Inertia Centripetal force			
Differentiation	Support -- for students who are struggling with the content	Content: Key Terms Process: Written/diagramed terms Product: Flashcards/Word Wall		
	Extension – for high achieving students.	Content: Graphs for Position vs. Time and Speed vs. Time Process: On-line tutorial and experience with Excel program Product: Excel generated graphs		
Evaluation	Formative Assessments (ongoing & mid-lesson): Checks for understanding, quizzes and homework review, lab reports and class activities			
	Summative Assessments (unit final evaluation): Unit Tests, Lab practicals, Final Exam, Benchmarks, Lab write-ups			

Unit 6	Length of Unit ... (Days / weeks / class sessions) ... 3weeks			
	Key Vocabulary	Standards (referenced)	Model Tasks	Tools / Texts
Density and Buoyancy	Physical property Quantitative measurement Density Mass Volume Pressure Fluid (sink/float) Force Displacement Buoyant force Regular shaped solid Irregular shaped solid	Grade 8 8a-8d	Densities of Solids, Liquids, and Gases Archimedes Blocks Aluminum Foil Boat and Marble Competition Irregular shaped object displacement lab Solar powered boats competition Plimsoll markings of ships/water density Galileo Thermometer	Textbooks Computer lab Lab Labware
Differentiation	Support -- for students who are struggling with the content	Content: Key Terms Process: Written/diagramed terms Product: Flashcards/Word Wall		
	Extension – for high achieving students.	Content: Density column of Liquids and Solids Process: Research and experimentation Product: Classroom presentation with model and mathematical calculations		

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Evaluation	Formative Assessments (ongoing & mid-lesson): Checks for understanding, quizzes and homework review, lab reports and class activities
	Summative Assessments (unit final evaluation): Unit Tests, Lab practicals, Final Exam, Benchmarks, Lab write-ups

Unit 7	Length of Unit ... (Days / weeks / class sessions) ...			
	Key Vocabulary	Standards (referenced)	Model Tasks	Tools / Texts
Earth in the Solar System	<i>Stars</i> <i>Galaxy (galaxies)</i> <i>Light source</i> <i>Reflected light</i> <i>Astronomical unit</i> <i>Light-year</i> <i>Planet(s)</i> <i>Terrestrial planet</i> <i>Gas giant planet</i> <i>Dwarf planet</i> <i>Planetary satellite(s)</i> <i>Comet(s)</i> <i>Asteroid(s)/Meteor(s)</i>	<i>Grade 8</i> <i>4a-4e</i> <i>High School</i> <i>Earth Science</i> <i>1e, 1f, 2a, 2b</i>	<i>Flame tests and color spectrum of common elements found in stars</i> <i>Properties of light (reflection, refraction, absorption)</i> <i>Modeling: Relative sizes of planets and distance from Sun</i> <i>Forces and Motion in outer space</i> <i>Phases of the Moon</i> <i>Solar System CD Project</i>	<i>Textbooks</i> <i>Computer lab</i> <i>Lab</i> <i>Labware</i>
Differentiation	Support -- for students who are struggling with the content	Content: <i>Key Terms</i> Process: <i>Written/diagramed terms</i> Product: <i>Flashcards/Concept Maps/Three dimensional models</i>		
	Extension – for high achieving students.	Content: <i>Excel graphing activities</i> Process: <i>Excel computer program</i> Product: <i>Temperature of the Planets, Distance of Planets from the Sun, Densities of the Planets</i>		
Evaluation	Formative Assessments (ongoing & mid-lesson): <i>Checks for understanding, quizzes and homework review, lab reports and class activities</i>			
	Summative Assessments (unit final evaluation): <i>Unit Tests, Lab practicals, Final Exam, Benchmarks, Lab write-ups</i>			