

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

Course Title	Integrated Physics and Chemistry				Course Code	R0407-408	
Transcript Title:	Integrated Physics and Chemistry			Grades Levels:	10-12	Board Adoption Date:	
Content Area:	Science			GPA Scale:	0.0 – 4.0	Date Course Submitted:	04/14/2014
Credential(s) Required:	Physical Science/Chemistry/Physics			Graduation Subject Areas:	Science		
UC/CSU “A-G” Area Approvals:		To be submitted for “D” (Laboratory Science)		School Site that wrote and submitted the course:		Newport Harbor High School	
Recommend Skills:	2.5 Grade Point Average (GPA) and passing grades in Biology and Math						
Next course(s):	Chemistry, Physics, or Marine Science						

COURSE DESCRIPTION (catalog summary):

This integrated physical science course will focus on the principles and laws of physics and chemistry. Curriculum and laboratory exercises will strengthen critical thinking, problem-solving, and laboratory skills and techniques. Topics will include kinematics, dynamics, energy, momentum, waves, fluid mechanics, thermodynamics, electricity, magnetism, sound, and light, structure of matter, matter (including atoms, elements, and compounds), and different types of physical and chemical processes. Additional chemistry topics covered in this class include molecular formulas, molar relationships, chemical bonding, the geometry of molecules, and types and properties of solutions. Laboratory and classroom activities objectives are mastery of California State Science Standards (Grades 9-12) and Next Generation Science Standards (NGSS) incorporating International Baccalaureate (IB) experimental methods and assessments.

GOALS (expected performance outcomes for students):

Mastery of California State Science Standards (Grades 9-12) and Next Generation Science Standards (NGSS) including experimental design, scientific writing, and statistical analysis of data with application of Common Core Literacy and Math standards.

CALIFORNIA CONTENT STANDARDS AND NEXT GENERATION SCIENCE STANDARDS (NGSS) (how the course aligns with curriculum standards):

California State Science Standards: see each section below.

The NGSS are in the adoption phase for California and NMUSD. The Disciplinary Core Ideas and Science and Engineering Practices methodologies will be incorporated into curriculum and laboratory activities.

EVALUATION (how the effectiveness of the course will be monitored and assessed):

Formal assessments will include multiple assessment tools including homework worksheets, laboratory reports, end-of-units tests and quizzes, and district benchmarks. In addition, NGSS Performance Expectations and NGSS Testing Benchmarks will be used to assess student progress. Students will pursue additional college preparatory science coursework and science related careers.

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Unit 1	Length of Unit: Four weeks			
	Key Vocabulary	Standards (referenced)	Model / Tasks	Tools / Texts
Science and Measurement Lab Safety Science Skills The Scientific Process Scientific Writing Statistical Analysis	Unit SI Units Distance Length Meter (m) Conversion factor Dimensional analysis Significant figures Accuracy Precision Qualitative observations Quantitative observations Mass (m) Volume (V) Weight Newton (N) Density (D) Line of best fit Slope (m) Extrapolate Independent variable Dependent variable Direct relationship Inverse relationship Natural laws Scientific theory Deduce Scientific method Abstract Hypothesis Trial Procedure Data Analysis	Investigation & Experimentation - Grades 9 To 12 1. Scientific progress is made by asking meaningful questions and conducting careful investigations. As a basis for understanding this concept and addressing the content in the other four strands, students should develop their own questions and perform investigations. Students will: a. Select and use appropriate tools and technology (such as computer-linked probes, spreadsheets, and graphing calculators) to perform tests, collect data, analyze relationships, and display data. b. Identify and communicate sources of unavoidable experimental error. c. Identify possible reasons for inconsistent results, such as sources of error or uncontrolled conditions. d. Formulate explanations by using logic and evidence. e. Distinguish between hypothesis and theory as scientific terms. f. Recognize the usefulness and limitations of models and theories as scientific representations of reality. g. Recognize the issues of statistical variability and the need	1. Measurement a. Students will measure an assortment of solids and fluids to demonstrate an understanding and use of SI and derived units. 2. Unit Dimensional Analysis a. Students will practice and master unit dimensional analysis and the application in stoichiometry. 3. Solving for Unknowns in Mathematical Expressions a. Students will perform experiments and use a variety of scientific formulas (i.e. $D=m/v$, $F=ma$, $P=F/A$) to rearrange and solve for an unknown variable. 4. Density of solids and fluids a. Students will measure mass and volume of solids and fluids and calculate density. 5. Experimental design a. Students will design an experiment, identify the relationship of the controlled and manipulated variables, and graph results. b. Students will evaluate the importance of performing multiple trials and use statistical analysis to identify experimental error. 6. Students will write a comprehensive scientific report a. Report will include an abstract,	CPO Textbook Metric Rulers Density of Unknown Liquids and Solids Kits Analytical Balance Cat-A-Pult Launchers Bill Nye Videos Modern Marvels Science Videos Crash Course Video Series Khan Academy Videos

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	Conclusion	h. for controlled tests. Analyze situations and solve problems that require combining and applying concepts from more than one area of science.	materials list, procedure, data collection, organization of data tables and graphs, analysis, and conclusion.		
Differentiation	Support -- for students who are struggling with the content	Process: Strategies for Struggling Students: see attached (www.minisink.com)			
	Extension – for high achieving students.	Process: GATE Strategies: see attached			
Evaluation	Formative Assessments (ongoing & mid-lesson): WebAssign and CPO Investigations Workbook Student Developed/Guided Lecture and Discussions including Power Point Presentations Data Tables and Graphing in Excel Scientific Writing: Laboratory Report(s)				
	Summative Assessments (unit final evaluation): Comprehensive Unit Exam Multiple Choice, Short Answer, and Constructed Response Power Point or Scientific Poster Presentation				

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Unit 2	Length of Unit: Six weeks			
	Key Vocabulary	Standards (referenced)	Model / Tasks	Tools / Texts
Motion and Forces Motion Forces Laws of Motion Buoyant Force	Position Origin Speed Average speed Instantaneous speed Vector Axis Coordinates Constant speed Velocity (v) Acceleration (a) Free fall Projectile Force (F) Pound (lb.) Newton (N) Compression Tension Friction Equilibrium Normal force Free-body diagram Net Force Newton's Laws of Motion	Motion and Forces 2. Newton's laws predict the motion of most objects. As a basis for understanding this concept: a. Students know how to solve problems that involve constant speed and average speed. b. Students know that when forces are balanced, no acceleration occurs; therefore, an object continues to move at a constant speed or stays at rest (Newton's first law). c. Students know how to apply the law $F=ma$ to solve one-dimensional motion problems that involve constant forces (Newton's second law). d. Students know that when one object exerts a force on a second object, the second object always exerts a force of equal magnitude and in the opposite direction (Newton's third law). e. Students know the relationship between the universal law of gravitation and the effect of gravity on an object at the surface of Earth. f. Students know applying a force to an object perpendicular to the direction of its motion causes the object to change direction but not speed.	1. Speed/Velocity/Acceleration a. Students will perform experiments to calculate and graph position vs. time (speed graph) and velocity vs. time (acceleration graph). 2. Gravity Drop a. Students will perform experiments to calculate the acceleration of Earth's gravitational force and the effect of air resistance. 3. Measuring newtons (N) a. Students will use spring scales to measure directional forces and determine net force with vector diagrams. 4. Cat-A-Pult a. Students will determine force and graph the projectile motion using a spring platform and foam cats. 5. Friction a. Students will determine the coefficient of friction using a variety of different textured surfaces. 6. Water Balloon Launchers a. Students will apply Newton's Laws of Motion and calculate forces and spring constant of water balloon launchers.	CPO Textbook Energy Car Kits Electronic Timers Probe ware Spring scales Water Balloon Launchers Bill Nye Videos Modern Marvels Science Videos Crash Course Video Series Khan Academy Videos

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		g. Students know circular motion requires the application of a constant force directed toward the center of the circle.			
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Unit 3	Length of Unit: Five weeks			
	Key Vocabulary	Standards (referenced)	Model / Tasks	Tools / Texts
Work and Energy Energy Work and Power Simple Machines	Potential energy Kinetic energy Joule Chemical energy Mechanical energy Radiant energy Nuclear energy Law of Conservation of Energy Calorie Power Work Watt Efficiency Work output Work input Lever Gear Simple machine	Conservation of Energy and Momentum 3. The laws of conservation of energy and momentum provide a way to predict and describe the movement of objects. As a basis for understanding this concept: a. Students know how to calculate kinetic energy by using the formula $E = (\frac{1}{2}) mv^2$. b. Students know how to calculate changes in gravitational potential energy near Earth by using the formula (change in potential energy) = mgh (h is the change in the elevation). c. Students know how to solve problems involving conservation of energy in simple systems, such as falling objects. d. Students know how to calculate momentum as the product: $mv = \text{mass} \cdot \text{velocity}$. e. Students know momentum is a separately conserved quantity different from energy. f. Students know an unbalanced force on an object produces a change in its momentum. g. Students know how to solve problems involving elastic and inelastic collisions in one dimension by using the principles of conservation of momentum and energy.	1. Energy in a System a. Students will use CPO Energy Car and ramps to measure the energy in a system. 2. Potential energy/Kinetic energy a. Students will use CPO Energy Car to measure the potential and kinetic energy in a system. 3. Law of Conservation of Energy a. Students will use CPO Energy Car to calculate the potential and kinetic energy in a system. 4. Manipulating Forces a. Students will use spring scales, pulleys, and block and tackle to determine mechanical advantage of simple machines. 5. Work/Ropes and Pulleys a. Students will measure input and output forces using simple machines. 6. Levers a. Students will use mathematical relationships to determine the mechanical advantage of levers. 7. Levers and the Human Body a. Students will calculate the input and output of the human arm.	CPO Textbook CPO Equipment NHHS Science Department Lab Kits Bill Nye Videos Modern Marvels Science Videos Crash Course Video Series Khan Academy Videos

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Unit 4	Length of Unit: Five Weeks			
	Key Vocabulary	Standards (referenced)	Model / Tasks	Tools / Texts
Matter and Energy Matter and Temperature Heat Properties of Matter The Behavior of Gases	Element Atom Compound Molecule Pure substance Mixture Homogeneous mixture Heterogeneous mixture Celsius/Fahrenheit/Kelvin Thermal energy Absolute zero Solid/Liquid/Gas/Plasma Intermolecular forces Melting Point Freezing Point Boiling Point Condensation Point Sublimation Deposition Heat/Specific heat Conduction Convection Thermal equilibrium Thermal radiation Physical properties Chemical properties Amorphous/Crystalline Ductility Elasticity Malleability Tensile strength Viscosity Pressure Buoyancy	Chemical Thermodynamics 7. Energy is exchanged or transformed in all chemical reactions and physical changes of matter. As a basis for understanding this concept: a. Students know how to describe temperature and heat flow in terms of the motion of molecules (or atoms). b. Students know chemical processes can either release (exothermic) or absorb (endothermic) thermal energy. c. Students know energy is released when a material condenses or freezes and is absorbed when a material evaporates or melts.	1. Pure substance or Mixture a. Students will run diagnostic physical and chemical property tests to determine if unknowns are a pure substance or mixture. 2. Determining Freezing/Boiling Point a. Students will use temperature probes and equipment to determine the freezing and boiling point of known and unknown liquids 3. Temperature and Heat a. Students will use temperature probe and equipment to determine the difference between temperature and thermal energy. 4. The Specific Heat of a Metal a. Students will use temperature probe and equipment to determine the specific heat of known and unknown metals. 5. Mystery Material a. Students will identify the physical and chemical properties of a mystery material. Diagnostic tests will be used to ultimately determine the identity of the mystery material. 6. Archimedes Block a. Students will identify and calculate buoyant force.	CPO Textbook CPO Equipment NHHS Science Department Lab Kits Molecule Model Kits PASCO and CPO Temperature Probes Bill Nye Videos Modern Marvels Science Videos Crash Course Video Series Khan Academy Videos Archimedes Block Buoyancy Kits Plasma Globe

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			7. Buoyancy a. Students will use a displacement chamber to calculate buoyant forces using Archimedes Principle. 8. Boyle's Law/Charles' Law a. Students will use gases and syringes to identify the relationship of temperature, pressure, and volume. 9. Graphing and Calculating Absolute Zero a. Students will graph and calculate Absolute Zero using the data from an Absolute Zero Device.	
Differentiation	Support -- for students who are struggling with the content	Process: Strategies for Struggling Students: see attached (www.minisink.com)		
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Unit 5	Length of Unit: Six weeks			
	Key Vocabulary	Standards (referenced)	Model / Tasks	Tools / Texts
Atoms, Elements, and Compounds Atoms Elements and The Periodic Table of Elements Compounds	Mass number Elementary charge Nucleus Electron Neutron Proton Quark Atomic number Radioactive Isotopes Energy level Quantum theory Spectral line Spectroscope Periodicity Period Group Atomic Mass Metals Nonmetals Metalloids Conductivity Insulator Physical change Chemical change Lewis-Dot diagrams Chemical formula Ion Covalent bond Ionic bond Valence electrons Oxidation number Electronegativity Binary compound	Atomic and Molecular Structure 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. As a basis for understanding this concept: a. Students know how to relate the position of an element in the periodic table to its atomic number and atomic mass. b. Students know how to use the periodic table to identify metals, semimetals, nonmetals, and halogens. c. Students know how to use the periodic table to identify alkali metals, alkaline earth metals and transition metals, trends in ionization energy, electronegativity, and the relative sizes of ions and atoms. d. Students know how to use the periodic table to determine the number of electrons available for bonding. e. Students know the nucleus of the atom is much smaller than the atom yet contains most of its mass.	1. Atomic Structure a. Students will build models of atoms identifying the location and role of subatomic particles. 2. Electron Orbitals Battleship a. Students will use the Periodic Table of Elements to identify the electron configuration of s, p, d, and f block elements. 3. Rutherford's Atomic Target a. Students will use Flinn Scientific kit (Atomic Target Practice) to determine the shape of an unknown geometric shape representing the nucleus of an atom. 4. Building Isotopes a. Students will build isotopes of elements and calculate the Atomic Mass of 23 elements. 5. Atomic Challenge a. Students will use CPO Atom Building Kit to identify the bonding characteristics of metals, metalloids, and nonmetals. 6. The Periodic Table Tile Kits a. Students will use CPO Periodic Table Tile Kits to identify the groups, periods, and chemical and physical properties of elements. 7. Chemical Bonds a. Students will perform synthesis, decomposition, single-replacement, and double-replacement reactions to demonstrate the Law of	CPO Textbook CPO Equipment Atom Building Kits Periodic Table Tile Kits Molecule Model Kits Element Playing Cards Electrical Conductivity Testers Cathode Ray and Crookes Tube NHHS Science Department Lab Kits Bill Nye Videos Modern Marvels Science Videos Crash Course Video Series Khan Academy Videos

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	Polyatomic ion Lipids Polymer Carbohydrates Amino acids Organic chemistry Unsaturated fat Saturated fat Proteins Enzyme Nucleic acids DNA/RNA	Chemical Bonds 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. As a basis for understanding this concept: a. Students know atoms combine to form molecules by sharing electrons to form covalent or metallic bonds or by exchanging electrons to form ionic bonds. b. Students know chemical bonds between atoms in molecules such as H ₂ , CH ₄ , NH ₃ , H ₂ , N ₂ , Cl ₂ , and many large biological molecules are covalent. c. Students know salt crystals, such as NaCl, are repeating patterns of positive and negative ions held together by electrostatic attraction. d. Students know how to draw Lewis dot structures.	Conservation of Mass and Law of Conservation of Energy 8. Alloy lab: Zinc plating of copper and making brass a. Students will plate a copper coin with zinc and covert the zinc-plated coin to brass to observe metallic bonding and formation of an alloy. 9. VSERP/Geometry of Molecules a. Students will use molecule model kits to understand the electron and molecule geometry of binary compounds. 10. Determining the Formula of a Hydrate a. Students will perform experiments to calculate the molar ratio of water to an anhydrous salt. 11. Melting Point of Ionic and Covalent Compounds a. Students will use a variety of ionic and covalent compounds to determine melting points and solubility. 12. Students will produce a Chemistry of Living System Poster or Power Point Presentation demonstrating the role of Carbon in Organic Compounds.	
Differentiation	Support -- for students who are struggling with the content	Process: Strategies for Struggling Students: see attached (www.minisink.com)		
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Unit 6	Length of Unit: Four weeks			
	Key Vocabulary	Standards (referenced)	Model / Tasks	Tools / Texts
Changes in Matter Physical Change Chemical Change Energy and Reactions Solutions	Chemical reaction Reactant Product Precipitate Chemical equation Formula mass Law of Conservation of Mass Coefficient Mole/Avogadro's number Molecular mass Polymerization Single-replacement reaction Double-replacement reaction Synthesis reaction Decomposition reaction Combustion Activation energy Exothermic/Endothermic Percent yield Inhibitor/catalyst Chemical equilibrium Limiting reactant Reaction rate Fusion/Fission Half-life Nuclear reaction Acid/Base pH/pH scale Solute/solvent Solubility Polar/Nonpolar molecules	Reaction Rates 8. Chemical reaction rates depend on factors that influence the frequency of collision of reactant molecules. As a basis for understanding this concept: a. Students know the rate of reaction is the decrease in concentration of reactants or the increase in concentration of products with time. b. Students know how reaction rates depend on such factors as concentration, temperature, and pressure. c. Students know the role a catalyst plays in increasing the reaction rate. d. Students know the 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.	1. Conservation of Mass a. Students will measure and analyze the reactants and products of known chemicals to demonstrate understanding of the Law of Conservation of Mass. 2. Energy and Chemical changes a. Students will perform experiments and measure temperature change to determine endothermic and exothermic reactions. 3. Thermodynamics of Hot Packs/Cold Packs a. Student will use Hot Packs and Cold Packs to determine the heat gained or lost during the respective chemical reactions. 4. Electrolysis of Water a. Students will use electrical energy to separate water into Hydrogen Gas and Oxygen Gas. Students will calculate the moles of gas produced from the electrolysis reaction. 5. Solubility Curve of Salts a. Students will use a variety of water soluble salts to graph and determine solubility curves. 6. Acid, Bases, and pH of Unknown Solutions a. Students will use red cabbage	CPO Textbook CPO Equipment Flinn Ion Kits NHHS Science Department Lab Kits Bill Nye Videos Modern Marvels Science Videos Crash Course Video Series Khan Academy Videos

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			juice, litmus paper, and pH probes to determine and calculate the potential Hydrogen in unknown solutions. Students will also identify the difference between sensitivity and specificity of analytical data.		
Differentiation	Support -- for students who are struggling with the content	Process: Strategies for Struggling Students: see attached (www.minisink.com)			
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Unit 7	Length of Unit: Six weeks			
	Key Vocabulary	Standards (referenced)	Model / Tasks	Tools / Texts
Electricity and Magnetism Electric Circuits Electrical Systems Electricity and Magnetism	Coulomb Electrically neutral Positive/Negative Static electricity Charged Electric current Switch Closed circuit Resistor Electric circuit Electricity Open circuit Ampere Battery Volt/Voltage Multimeter Ohm/Ohm's Law Conductor Resistance Insulator Semiconductor Potentiometer Series circuit Parallel circuit Kirchhoff's voltage law Voltage drop Kirchhoff's current law Circuit breaker Short Circuit Fuse Transformer Direct current Alternating current	<i>Electric and Magnetic Phenomena</i> 5. Electric and magnetic phenomena are related and have many practical applications. As a basis for understanding this concept: a. Students know how to predict the voltage or current in simple direct current (DC) electric circuits constructed from batteries, wires, resistors, and capacitors. b. Students know how to solve problems involving Ohm's law. c. Students know any resistive element in a DC circuit dissipates energy, which heats the resistor. Students can calculate the power (rate of energy dissipation) in any resistive circuit element by using the formula $\text{Power} = IR$ (potential difference) $\times I$ (current) $= I^2R$. d. Students know the properties of transistors and the role of transistors in electric circuits. e. Students know charged particles are sources of electric fields and are	1. Electricity a. Students will measure voltage and current in electric circuits. 2. Building a Motor a. Students will build a simple motor using a battery, magnets, and copper wire. 3. Maglev a. Students will build, test, and improve design of a magnetic levitating sled. 4. Resistance and Ohm's Law a. Students will design electric circuits to test and calculate Ohm's Law, the law that relates voltage, current, and resistance. 5. Electric Circuits a. Students will design, build, and calculate voltage in series circuits, short circuits, and parallel circuits. 6. Electrical Energy and Power a. Students will design different systems to explore and understand the relationship between voltage, current, and power. 7. Magnetism/Electromagnets a. Students will design and build electromagnets to understand the use and application of electrical and mechanical energy.	CPO Textbook CPO Equipment Flinn Ion Kits NHHS Science Department Lab Kits Bill Nye Videos Modern Marvels Science Videos Crash Course Video Series Khan Academy Videos

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		subject to the forces of the electric fields from other charges. f. Students know magnetic materials and electric currents (moving electric charges) are sources of magnetic fields and are subject to forces arising from the magnetic fields of other sources. g. Students know how to determine the direction of a magnetic field produced by a current flowing in a straight wire or in a coil. h. Students know changing magnetic fields produce electric fields, thereby inducing currents in nearby conductors. i. Students know plasmas, the fourth state of matter, contain ions or free electrons or both and conduct electricity.			
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Unit 8	Length of Unit: Four Weeks			
	Key Vocabulary	Standards (referenced)	Model / Tasks	Tools / Texts
Waves, Sound, and Light Waves Sound Light	Restoring force Pendulum Oscillator Frequency Cycle Linear motion Harmonic motion Period Hertz Resonance Amplitude Periodic force Natural frequency Wave/Wavelength Reflection Absorption Wave front Plane waves Refraction/Diffraction Circular waves Destructive interference Constructive interference Longitudinal wave Transverse wave	Not applicable	1. Harmonic motion a. Students will use a pendulum to measure amplitude, oscillation, and period. 2. Natural Frequency and Resonance a. Students will measure the amplitude, frequency, resonance, and energy of waves. 3. Properties of Sound a. Students will use a sound generator to measure beats, consonance, and dissonance, interference, and resonance. 4. Resonance in Other Systems a. Students will use a variety of containers (glasses, bottles, etc.) and observe the resonance associated with different levels of water. 5. Reflection and Refraction a. Students will measure the angles of incidence and angles of reflection using different mediums (air, glass, water, etc.).	CPO Textbook CPO Equipment NHHS Science Department Lab Kits Bill Nye Videos Modern Marvels Science Videos Crash Course Video Series Khan Academy Videos
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STRATEGIES FOR STRUGGLING STUDENTS

ACADEMIC

• **Instructional Strategies:**

- List objectives and goals for lesson and/or day at a glance
- Differentiate instruction into tiers or by learning style / multiple intelligence
- Use of formative, summative, formal, and informal assessments
- Data: Use data from classroom tests and assignments to inform instruction and re-teach where necessary
- Provide rubrics with expectations before assigning a task or project
- Present information in multiple formats (visual, graphic organizer, auditory, etc.)
- Mnemonics and memory aides
- Cooperative learning strategies with clearly defined roles (ex. Think-Pair-Share)
- Flexible grouping for ability based instruction
- Use review games to make learning fun
- Use of flashcards to aid in study and recall
- Cross-content integration
- Repetition and repeated practice
- Instructional model: Introduction → Guided practice → Independent practice
- Instruction in test-taking strategies
- Peer tutoring: same age or cross age
- Allow students to recycle assignments and tests
- Have students write their own study questions or tests.
- Prioritize tasks with stars or by highlighting
- Pre-teach content vocabulary across content areas

• **Modifications and Accommodations:**

- **Time:** *extended time on classroom assignments, tasks, tests, and quizzes*
- **Directions:** *read directions aloud, restate and clarify directions, highlight key words, have students repeat directions back to teacher or class*
- Grade content area work on content, not mechanics, grammar, and punctuation
- Use of timer to cue student as to timeline / deadline
- Line guide or index card to keep place when reading
- Use of graphic organizers
- Use of manipulatives and hands-on materials
- Modify assignments and homework to be on student's instructional level
- Use of Alpha-Smart or computer to complete tasks

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- Provide a copy of class notes or an outline on which student can take notes
- Provide work samples as a model (examples and non-examples)
- Limit number of items on a page
- Use of word bank

• **Communication:**

- Frequent communication between home and school
- AIS (Academic Intervention Services)
- AIS Services on a consult basis
- AIS services on a regular basis
- Consistency and communication between AIS and classroom instruction

• **Reading**

- Use of intervention components in reading series
- Use of online resources in reading series
- Vocabulary development
- Pre-read in small groups
- Books on tape / auditory recordings of stories
- High interest/low level reading materials

• **Math**

- Vocabulary development
- Pre-teach concepts in small groups
- Use of online resources of math series
- Use of manipulatives

• **Speech / Language**

- Model correct speech
- Encourage eye contact with speaker
- Extra time to process
- Prompts to expand use of language
- Prompts to slow down for sake of articulation
- Prompts to remain on topic
- Verbal cues to encourage verbal communication
- Teach signal words and key words

BEHAVIORAL AND SOCIAL

• **Classroom-based strategies:**

- Structure and consistency in classroom environment
- Establish classroom rules and expectations

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- Provide options and choices (i.e. where to complete work in the room)
- Use of timer
- Preferential seating; sit next to peer-model
- Incorporate opportunities for movement within the classroom
- Integration of character education into curriculum
- Logical consequences
- Opportunities for breaks and “time-outs”

- **Cueing, Prompting, and Praising systems:**
- Catch them doing right!
- Positive attention and specific praise
- Make a “connection” with student through 1:1 attention or interest in his/her interests
- Visual prompts and signals
- Physical prompts and signals, including the use of teacher proximity
- Advance warning of transitions and changes in schedule

- **Reinforcements:**
- Reward system: *daily, weekly behavior charts*
- Self-monitoring behavior charts
- Behavior contracts
- Behavior plan or chart
- Give student a “job” or classroom responsibility
- Involve student in a greater cause -- community service (K-Kids)
- Communication between home and school (email, phone, communication journal, planner, etc.)
- Support from the office or administration

- **Social Skills:**
- Social role-play activities in class
- Non-mandated social skills group

ORGANIZATION

- Structure and consistency in classroom environment
- To-do list - break down into small increments if necessary
- List objectives for lesson
- Provide schedule of daily activities or post in a visible location
- Study-buddy / Pack-up buddy
- Back-pack check before dismissal
- Copy of class notes or outline on which to take notes

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- After note taking, allow students time to compare their notes
- Separate / Color coded folders
- Extended time on classroom tests, quizzes, and assignments
- Repetition and consistency
- Homework chart tied to incentives
- Advance warning of transitions / changes in schedule
- Provide examples and non-examples

• **Desk:**

- Neat desk awards
- Photos / examples of neat desk
- Store textbooks in an alternate location

• **Communication:**

- Frequent communication between home and school via planner, email, phone, communication journal
- Use of teacher web page with relevant resources
- Use of online components of reading / math series to be able to access the textbook from home
- Keep extra planner pages in the classroom in case student forgets planner at home.
- Parent/Teacher conference

ATTENTION

- **Directions:** *read directions aloud, restate and clarify directions, highlight key words, have students repeat directions back to teacher or class*
- To-do list - break down into small increments of time if necessary
- Incorporate opportunities for movement within the classroom
- Breaks between papers / assignments
- Provide alternate workspace (two desks)
- Redirect to task
- Use of timer
- Provide options and choices (i.e. where to complete work in the room)
- Preferential seating
- Study-buddy
- Cooperative learning with clearly defined roles in-group work
- Use of manipulatives and hands-on materials
- Use of a “fidget” item like a squeeze ball, Velcro strip, or carpet under chair
- Target area of strength to boost area of weakness/concern

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- Parent/teacher conference

MISCELLANEOUS

- Teacher to teacher assistance (ex. use of mentor, peer observation, etc.)
- Make small, manageable, and achievable goals. Do not set up for failure!
- Set reasonable goals and expectations
- Recommend / model good health and nutrition habits
- Enrichment centers and assignments for students who finish early.

Source: www.minisink.com

GIFTED STUDENTS: RECOMMENDATIONS FOR TEACHERS

It is estimated that students who are gifted and highly talented encompass 5 to 15% of the school age population. These advances students can have increased capabilities in academics, creativity, music, dance, art, and/or leadership. The following strategies are recommended:

1. **Compact the curriculum and provide enrichment activities.** Provide environments that are stimulating, and address cognitive, physical, emotional, and social needs of gifted children in the curriculum. Let the students move quickly through the required curriculum content and onto more advanced material. Allow for academic rigor.
2. **Implement a multi-level and multi-dimensional curriculum.** Differentiate the curriculum in order to address differences in the rate, depth, and pace of learning. This will enable all students in the class to learn about a specific area by creating projects at their own ability level. For example, if students are learning about the modern atomic theory, students of different ability levels can be assigned to different types of tasks. At the conclusion of the class, all of the students can present what they have learned to the entire group.
3. **Be flexible with the curriculum.** Take advantage of real-life experiences that can be translated into problem-solving academics for all students. For example, an impending snowstorm can be used to instruct students. Students of different ability levels are given different tasks, such as figuring out the hydrogen bonding in ice and snow and determining the biological importance of ice being less dense than water.
4. **Make the curriculum student-centered.** Engage gifted students in the curriculum decision-making process, giving them an opportunity to learn how to take responsibility for their own learning. Draw the curriculum from the students' interests and educational needs.
5. **Allow students to pursue independent projects based on their own individual interests.** Independent projects can be assigned on the basis of ability level. Encourage creativity and original thinking among gifted students. Allow them to explore ways of connecting unrelated issues in creative ways.
6. **Allow gifted children to assume ownership of their own learning through curriculum acceleration.** Instruct them to work ahead to problems of skills that they do not know. To help children learn the value of attaining knowledge in their lives, encourage learning for its own sake, rather than emphasizing the end results or accomplishments. Teach research skills for accessing information; higher level thinking skills for processing it; creative thinking and problem-solving skills for flexibility in approach and generation of information; and communication skills for sharing it.

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7. **Try to maximize your students' potential by expecting them to do their best.** Encourage them to advance as quickly as they can. Assist in developing projects that allow them to achieve success one step at a time.
8. **Teach interactively.** Have students work together, teach one another, and actively participate in their own and their classmates' education. Note: This does not advocate gifted children being peer tutors in the classroom; the gifted student should be challenged as well. Emphasis should be on working together in the classroom. Cluster gifted children together as a table within the regular classroom and utilize advanced materials, as well as other suggested resources and modification, to meet their exceptional needs.
9. **Explore many points of view about contemporary topics and allow opportunity to analyze and evaluate material.** Allow open forums and debates in the classroom about controversial issues. As a teacher of gifted children, take an active stance. Be an advocate for gifted students. Utilize specialized training to ensure the ability to meet the needs of gifted students. Share personal interests with all students, to enrich and expand their world.
10. **Consider team teaching, collaboration, and consultation with other teachers.** Use the knowledge, skills, and support of other educators or professionals in the schools.
11. **Provide opportunities for gifted children to interact with other gifted children across grade levels and schools through competitions or collaborative projects.**
12. **Encourage gifted students to participate in extracurricular activities that involve academic skills.** Examples include math and debate teams. Because gifted children are often natural leaders, it is important to invite them to use their talents and abilities in beneficial, rather than disruptive, manners. For example, encourage the gifted student to run for office in student council, or another extracurricular activity in which he/she is involved.
13. **Involve students in academic contests.** Gifted students tend to be competitive by nature. Therefore, participating in regional and national competitions such as spelling bees, science fairs, and essay competitions will be fun challenges.
14. **Allow gifted children to create and publish a class newspaper to distribute.** This consists of assisting students in understanding their special capabilities and the training necessary for them to reach their full potential.
15. **Set individual goals.** Help guide students in creating their own goals and set goals that are specific, measurable, aggressive, realistic, and within a reasonable time frame. Be sure not to place expectations that are too high or too low.
16. **Consider parental input about the education of their gifted children.**
17. **Always remember that gifted children are similar in many ways to the average child in the classroom.** Do not place unrealistic expectations and pressures on gifted children.
18. **Address the counseling needs of each student to support emotional growth, as needed.** Some gifted students have issues regarding anger, boredom, bullying, delinquency, isolation, depression, peer relations, perfectionism, dropping out of school, stress, frustration, and underachievement. About 20-25% of gifted students have emotional difficulties.
19. **Remember that gifted children may not excel in all areas.** They may be ahead of other students in some areas and behind in some areas. Become aware of the strengths and weaknesses of the children in your class.
20. **Do not assign extra work to gifted children who finish assignments early.** This is unfair and frustrating to them. Simply offering more of the same only restricts further learning. Instead, allow those children to work on independent projects or other unfinished work when they finish an assignment early.
21. **If a child attends resource rooms, communicate with the specialist for suggestions on how to enrich daily classwork.** Avoid penalizing the child for special class attendance. Have another child in the regular classroom take notes and assignments for him/her.
22. **Provide plenty of opportunities for gifted children and average children to engage in social activities.** Some gifted children may need help in developing social skills.
23. **Try to find the joy and uniqueness in each child.** Children may exhibit their gifts on non-typical levels, rather than in general intellectual aptitude of specific academic abilities. Keep in mind that every child will have different needs.

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- 24. Organize resources in order to free yourself to work with individual children and give the children greater control of the learning situation.** Supplementary books and learning tools, community resources, and the use of community members with specific skills as mentors can be helpful.
- 25. Establish and maintain a warm, accepting classroom.** Teach your classroom community to embrace diversity and honor differences. Provide an environment in which the child can demonstrate his or her potential or aptitude to learn and perform. Teachers should strive to establish a noncompetitive, individualized, and open classroom, which allows all students to advance at their own rate of learning.
- 26. Remember that implementing some of these strategies will benefit all of the children in the classroom, not just the gifted ones.**

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www.canteach.ca/links/linkgifted.html: Challenging Gifted Students in Regular Classrooms.

www.nagc.org: National Association for Gifted Students: Supporting the needs of high potential learners.

www.nwrel.org/msec/just_good/9/ch4.html: Strategies for Teaching Gifted Students in the Inclusion Classroom.

www.teachersfirst.com/gifted.shtml: Working with Gifted and Talented Students.

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