

## 2011 -12 Pacing Guide

### 9\_12 Science / Physical Science 1st Term

Term	Standard
1	<b>GPS.9_12.SC.PS.CS.HM.SCSH1</b> - Students will evaluate the importance of curiosity, honesty, openness, and skepticism in science.
1	<b>GPS.9_12.SC.PS.CS.HM.SCSH1.a</b> - Exhibit the above traits in their own scientific activities.
1	<b>GPS.9_12.SC.PS.CS.HM.SCSH1.b</b> - Recognize that different explanations often can be given for the same evidence.
1	<b>GPS.9_12.SC.PS.CS.HM.SCSH1.c</b> - Explain that further understanding of scientific problems relies on the design and execution of new experiments which may reinforce or weaken opposing explanations.
1	<b>GPS.9_12.SC.PS.C.SPS8.a</b> - Calculate velocity and acceleration.
1	<b>GPS.9_12.SC.PS.C.SPS8.b</b> - Apply Newton's three laws to everyday situations by explaining the following:
1	<b>GPS.9_12.SC.PS.C.SPS8.b.i</b> - Inertia
1	<b>GPS.9_12.SC.PS.C.SPS8.b.ii</b> - Relationship between force, mass and acceleration
1	<b>GPS.9_12.SC.PS.C.SPS8.b.iii</b> - Equal and opposite forces
1	<b>GPS.9_12.SC.PS.C.SPS9.b</b> - Relate frequency and wavelength to the energy of different types of electromagnetic waves and mechanical waves.
1	<b>GPS.9_12.SC.PS.C.SPS9.c</b> - Compare and contrast the characteristics of electromagnetic and mechanical (sound) waves.
1	<b>GPS.9_12.SC.PS.C.SPS9.d</b> - Investigate the phenomena of reflection, refraction, interference, and diffraction.
1	<b>GPS.9_12.SC.PS.C.SPS9.f</b> - Explain the Doppler Effect in terms of everyday interactions.
1	<b>GPS.9_12.SC.PS.C.SPS3.b</b> - Differentiate between fission and fusion.
1	<b>GPS.9_12.SC.PS.C.SPS3.c</b> - Explain the process half-life as related to radioactive decay.
1	<b>GPS.9_12.SC.PS.C.SPS8.c</b> - Relate falling objects to gravitational force.
1	<b>GPS.9_12.SC.PS.C.SPS8.d</b> - Explain the difference in mass and weight.
1	<b>GPS.9_12.SC.PS.C.SPS8.e</b> - Calculate amounts of work and mechanical advantage using simple machines.
1	<b>GPS.9_12.SC.PS.C.SPS10.a</b> - Investigate static electricity in terms of:
1	<b>GPS.9_12.SC.PS.C.SPS10.a.i</b> - friction
1	<b>GPS.9_12.SC.PS.C.SPS10.a.ii</b> - induction
1	<b>GPS.9_12.SC.PS.C.SPS10.a.iii</b> - conduction
1	<b>GPS.9_12.SC.PS.C.SPS10.b</b> - Explain the flow of electrons in terms of:
1	<b>GPS.9_12.SC.PS.C.SPS10.b.i</b> - alternating and direct current.
1	<b>GPS.9_12.SC.PS.C.SPS10.b.ii</b> - the relationship among voltage, resistance and current.
1	<b>GPS.9_12.SC.PS.C.SPS10.b.iii</b> - simple series and parallel circuits.
1	<b>GPS.9_12.SC.PS.C.SPS10.c</b> - Investigate applications of magnetism and/or its relationship to the movement of electrical charge as it relates to:
1	<b>GPS.9_12.SC.PS.C.SPS10.c.i</b> - electromagnets
1	<b>GPS.9_12.SC.PS.C.SPS10.c.ii</b> - simple motors
1	<b>GPS.9_12.SC.PS.C.SPS10.c.iii</b> - permanent magnets

1	<b>GPS.9_12.SC.PS.C.SPS7.a</b> - Identify energy transformations within a system (e.g. lighting of a match).
1	<b>GPS.9_12.SC.PS.C.SPS7.b</b> - Investigate molecular motion as it relates to thermal energy changes in terms of conduction, convection, and radiation.
1	<b>GPS.9_12.SC.PS.C.SPS7.c</b> - Determine the heat capacity of a substance using mass, specific heat, and temperature.
1	<b>GPS.9_12.SC.PS.C.SPS7.d</b> - Explain the flow of energy in phase changes through the use of a phase diagram.
1	<b>GPS.9_12.SC.PS.CS.HM.SCSH3.a</b> - Suggest reasonable hypotheses for identified problems.
1	<b>GPS.9_12.SC.PS.CS.HM.SCSH3.b</b> - Develop procedures for solving scientific problems.
1	<b>GPS.9_12.SC.PS.CS.HM.SCSH3.e</b> - Develop reasonable conclusions based on data collected.
1	<b>GPS.9_12.SC.PS.CS.HM.SCSH3.f</b> - Evaluate whether conclusions are reasonable by reviewing the process and checking against other available information.
1	<b>GPS.9_12.SC.PS.CS.HM.SCSH4.a</b> - Develop and use systematic procedures for recording and organizing information.
1	<b>GPS.9_12.SC.PS.CS.HM.SCSH4.b</b> - Use technology to produce tables and graphs.
1	<b>GPS.9_12.SC.PS.CS.HM.SCSH4.c</b> - Use technology to develop, test, and revise experimental or mathematical models.
1	<b>GPS.9_12.SC.PS.CS.HM.SCSH5.a</b> - Trace the source on any large disparity between estimated and calculated answers to problems.
1	<b>GPS.9_12.SC.PS.CS.HM.SCSH5.b</b> - Consider possible effects of measurement errors on calculations.
1	<b>GPS.9_12.SC.PS.CS.HM.SCSH5.c</b> - Recognize the relationship between accuracy and precision.
1	<b>GPS.9_12.SC.PS.CS.HM.SCSH5.d</b> - Express appropriate numbers of significant figures for calculated data, using scientific notation where appropriate.
1	<b>GPS.9_12.SC.PS.CS.HM.SCSH5.e</b> - Solve scientific problems by substituting quantitative values, using dimensional analysis and/or simple algebraic formulas as appropriate.
1	<b>GPS.9_12.SC.PS.CS.HM.SCSH6.a</b> - Write clear, coherent laboratory reports related to scientific investigations.
1	<b>GPS.9_12.SC.PS.C.SPS9.a</b> - Recognize that all waves transfer energy.
1	<b>GPS.9_12.SC.PS.C.SPS9.e</b> - Relate the speed of sound to different mediums.
1	<b>GPS.9_12.SC.PS.CS.HM.SCSH2.a</b> - Follow correct procedures for use of scientific apparatus.
1	<b>GPS.9_12.SC.PS.CS.HM.SCSH2.b</b> - Demonstrate appropriate technique in all laboratory situations.
1	<b>GPS.9_12.SC.PS.CS.HM.SCSH2.c</b> - Follow correct protocol for identifying and reporting safety problems and violations.
1	<b>GPS.9_12.SC.PS.CS.HM.SCSH3.c</b> - Collect, organize and record appropriate data.
1	<b>GPS.9_12.SC.PS.CS.HM.SCSH3.d</b> - Graphically compare and analyze data points and/or summary statistics.
1	<b>GPS.9_12.SC.PS.CS.HM.SCSH6.b</b> - Write clear, coherent accounts of current scientific issues, including possible alternative interpretations of the data.
1	<b>GPS.9_12.SC.PS.CS.HM.SCSH6.c</b> - Use data as evidence to support scientific arguments and claims in written or oral presentations.
1	<b>GPS.9_12.SC.PS.CS.HM.SCSH6.d</b> - Participate in group discussions of scientific investigation and current scientific issues.
1	<b>GPS.9_12.SC.PS.CS.NS.SCSH7.a</b> - The universe is a vast single system in which the

	basic principles are the same everywhere.
1	<b>GPS.9_12.SC.PS.CS.NS.SCSH7.b</b> - Universal principles are discovered through observation and experimental verification.
1	<b>GPS.9_12.SC.PS.CS.NS.SCSH7.c</b> - From time to time, major shifts occur in the scientific view of how the world works. More often, however, the changes that take place in the body of scientific knowledge are small modifications of prior knowledge. Major shifts in scientific views typically occur after the observation of a new phenomenon or an insightful interpretation of existing data by an individual or research group.
1	<b>GPS.9_12.SC.PS.CS.NS.SCSH7.d</b> - Hypotheses often cause scientists to develop new experiments that produce additional data.
1	<b>GPS.9_12.SC.PS.CS.NS.SCSH7.e</b> - Testing, revising, and occasionally rejecting new and old theories never ends.
1	<b>GPS.9_12.SC.PS.CS.NS.SCSH8.a</b> - Scientific investigators control the conditions of their experiments in order to produce valuable data.
1	<b>GPS.9_12.SC.PS.CS.NS.SCSH8.b</b> - Scientific researchers are expected to critically assess the quality of data including possible sources of bias in their investigations □ hypotheses, observations, data analyses, and interpretations.
1	<b>GPS.9_12.SC.PS.CS.NS.SCSH8.c</b> - Scientists use practices such as peer review and publication to reinforce the integrity of scientific activity and reporting.
1	<b>GPS.9_12.SC.PS.CS.NS.SCSH8.d</b> - The merit of a new theory is judged by how well scientific data are explained by the new theory.
1	<b>GPS.9_12.SC.PS.CS.NS.SCSH8.e</b> - The ultimate goal of science is to develop an understanding of the natural universe which is free of biases.
1	<b>GPS.9_12.SC.PS.CS.NS.SCSH8.f</b> - Science disciplines and traditions differ from one another in what is studied, techniques used, and outcomes sought.
1	<b>GPS.9_12.SC.PS.CS.NS.SCSH9.a</b> - Reading in All Curriculum Areas
1	<b>GPS.9_12.SC.PS.CS.NS.SCSH9.a.i</b> - Read a minimum of 25 grade-level appropriate books per year from a variety of subject disciplines and participate in discussions related to curricular learning in all areas.
1	<b>GPS.9_12.SC.PS.CS.NS.SCSH9.a.ii</b> - Read both informational and fictional texts in a variety of genres and modes of discourse.
1	<b>GPS.9_12.SC.PS.CS.NS.SCSH9.a.iii</b> - Read technical texts related to various subject areas.
1	<b>GPS.9_12.SC.PS.CS.NS.SCSH9.b</b> - Discussing books
1	<b>GPS.9_12.SC.PS.CS.NS.SCSH9.b.i</b> - Discuss messages and themes from books in all subject areas.
1	<b>GPS.9_12.SC.PS.CS.NS.SCSH9.b.ii</b> - Respond to a variety of texts in multiple modes of discourse.
1	<b>GPS.9_12.SC.PS.CS.NS.SCSH9.b.iii</b> - Relate messages and themes from one subject area to messages and themes in another area.
1	<b>GPS.9_12.SC.PS.CS.NS.SCSH9.b.iv</b> - Evaluate the merit of texts in every subject discipline.
1	<b>GPS.9_12.SC.PS.CS.NS.SCSH9.b.v</b> - Examine author□s purpose in writing.
1	<b>GPS.9_12.SC.PS.CS.NS.SCSH9.b.vi</b> - Recognize the features of disciplinary texts.
1	<b>GPS.9_12.SC.PS.CS.NS.SCSH9.c</b> - Building vocabulary knowledge
1	<b>GPS.9_12.SC.PS.CS.NS.SCSH9.c.i</b> - Demonstrate an understanding of contextual vocabulary in various subjects.
1	<b>GPS.9_12.SC.PS.CS.NS.SCSH9.c.ii</b> - Use content vocabulary in writing and speaking.
1	<b>GPS.9_12.SC.PS.CS.NS.SCSH9.c.iii</b> - Explore understanding of new words found in subject area texts.

1	<b>GPS.9_12.SC.PS.CS.NS.SCSH9.d</b> - Establishing context
1	<b>GPS.9_12.SC.PS.CS.NS.SCSH9.d.i</b> - Explore life experiences related to subject area content.
1	<b>GPS.9_12.SC.PS.CS.NS.SCSH9.d.ii</b> - Discuss in both writing and speaking how certain words are subject area related.
1	<b>GPS.9_12.SC.PS.CS.NS.SCSH9.d.iii</b> - Determine strategies for finding content and contextual meaning for unknown words.
<b>9_12 Science / Physical Science 2nd Term</b>	
<b>Term</b>	<b>Standard</b>
2	<b>GPS.9_12.SC.PS.C.SPS1.a</b> - Examine the structure of the atom in terms of:
2	<b>GPS.9_12.SC.PS.C.SPS1.a.iv</b> - explain the relationship of the proton number to the element's identity.
2	<b>NS_GPS.9_12.SC.PS.C.SPS1.a.2</b> - atomic mass and atomic number.
2	<b>NS_GPS.9_12.SC.PS.C.SPS1.a.3</b> - atoms with different numbers of neutrons (isotopes).
2	<b>NS_GPS.9_12.SC.PS.C.SPS1.a.4</b> - atoms with different numbers of protons.
2	<b>GPS.9_12.SC.PS.C.SPS1.b</b> - Compare and contrast ionic and covalent bonds in terms of electron position.
2	<b>GPS.9_12.SC.PS.C.SPS2.a</b> - Calculate density when given a means to determine a substance's mass and volume.
2	<b>GPS.9_12.SC.PS.C.SPS2.b</b> - Predict formulas for stable binary ionic compounds based on balance of charges.
2	<b>GPS.9_12.SC.PS.C.SPS2.c</b> - Use IUPAC nomenclature for transition between chemical names and chemical formulas of:
2	<b>GPS.9_12.SC.PS.C.SPS3.a</b> - Differentiate between alpha and beta particles and gamma radiation.
2	<b>GPS.9_12.SC.PS.C.SPS2.c.i</b> - binary ionic compounds (containing representative elements).
2	<b>GPS.9_12.SC.PS.C.SPS3.b</b> - Differentiate between fission and fusion.
2	<b>GPS.9_12.SC.PS.C.SPS2.c.ii</b> - binary covalent compounds (i.e. carbon dioxide, carbon tetrachloride).
2	<b>GPS.9_12.SC.PS.C.SPS3.c</b> - Explain the process half-life as related to radioactive decay.
2	<b>GPS.9_12.SC.PS.C.SPS3.d</b> - Describe nuclear energy, its practical application as an alternative energy source, and its potential problems.
2	<b>GPS.9_12.SC.PS.C.SPS4.a</b> - Determine the trends of the following:
2	<b>GPS.9_12.SC.PS.C.SPS4.a.i</b> - Number of valence electrons
2	<b>GPS.9_12.SC.PS.C.SPS4.a.ii</b> - Types of ions formed by representative elements
2	<b>GPS.9_12.SC.PS.C.SPS4.a.iii</b> - Location of metals, nonmetals, and metalloids
2	<b>GPS.9_12.SC.PS.C.SPS4.a.iv</b> - Phases at room temperature
2	<b>GPS.9_12.SC.PS.C.SPS4.b</b> - Use the Periodic Table to predict the above properties for representative elements.
2	<b>GPS.9_12.SC.PS.C.SPS2.d</b> - Demonstrate the Law of Conservation of Matter in a chemical reaction.
2	<b>GPS.9_12.SC.PS.C.SPS2.e</b> - Apply the Law of Conservation of Matter by balancing the following types of chemical equations:
2	<b>GPS.9_12.SC.PS.C.SPS2.e.i</b> - Synthesis
2	<b>GPS.9_12.SC.PS.C.SPS2.e.ii</b> - Decomposition

2	<b>GPS.9_12.SC.PS.C.SPS2.e.iii</b> - Single Replacement
2	<b>GPS.9_12.SC.PS.C.SPS2.e.iv</b> - Double Replacement
2	<b>GPS.9_12.SC.PS.C.SPS5.a</b> - Compare and contrast the atomic/molecular motion of solids, liquids, gases and plasmas.
2	<b>GPS.9_12.SC.PS.C.SPS5.b</b> - Relate temperature, pressure, and volume of gases to the behavior of gases.
2	<b>GPS.9_12.SC.PS.C.SPS6.a</b> - Describe solutions in terms of:
2	<b>GPS.9_12.SC.PS.C.SPS6.a.i</b> - solute/solvent
2	<b>GPS.9_12.SC.PS.C.SPS6.a.ii</b> - conductivity
2	<b>GPS.9_12.SC.PS.C.SPS6.a.iii</b> - concentration
2	<b>GPS.9_12.SC.PS.C.SPS6.b</b> - Observe factors affecting the rate a solute dissolves in a specific solvent.
2	<b>GPS.9_12.SC.PS.C.SPS6.c</b> - Demonstrate that solubility is related to temperature by constructing a solubility curve.
2	<b>GPS.9_12.SC.PS.C.SPS6.d</b> - Compare and contrast the components and properties of acids and bases.
2	<b>GPS.9_12.SC.PS.C.SPS6.e</b> - Determine whether common household substances are acidic, basic, or neutral.