GRADE 9: CHEMISTRY CURRICULUM FRAMEWORKS

UNIT 1: SCIENTIFIC METHOD AND MEASUREMENT

Big Questions	Formative/ Summative Assessments Formative and summative assessments created by teachers/teams
1. How is science a way of knowing about the natural world, and how is it characterized by empirical criteria, logical argument and skeptical review? 2. How does scientific inquiry use multiple interrelated processes to investigate and explain the natural world? 3. How does engineering address human needs by applying science concepts? 4. How does a scientific law differ from a scientific theory? 5. How does the engineering design process devise a solution to meet a need or solve a specific problem? 6. How have men and women throughout the history of all cultures, including Minnesota American Indian tribes and communities, been involved in engineering design and scientific inquiry? 7. How and why is the metric system used as a primary measurement system in science? 8. How is data collected, organized, analyzed, and communicated in a scientific experiment? 9. How does the society influence science and engineering? 10. How do science, technology, engineering and mathematics rely on each other to enhance knowledge and understanding?	Options include, but are not limited to: – Problem set from Chapter 1 in textbook (see Resources) – Metric System problem set – Quiz: Lab Safety and Equipment – Lab Report: Mass and Volume of Two Liquids – Unit 1 Test

Substrand/Standard	Curriculum Benchmark	MCA III Test Item Specifications	Standards of Proficiency Description of what students must show to demonstrate proficiency (created by teachers/teams)	Resources
<u>Substrand</u>: The Practice of Science <u>Standard</u>: Understand that science is a way of knowing about the natural world and is characterized by empirical criteria, logical argument and skeptical review.	Understand that scientists conduct investigations for a variety of reasons, including: to discover new aspects of the natural world, to explain observed phenomena, to test the conclusions of prior investigations, or to test the predictions of current theories. *(Standard NSE: 9.1.1.1.2)*	None		Textbook: <u>Physical Science: Concepts in Action</u> (Prentice Hall) Video: "World of Chemistry" (University of Maryland and the Educational Film Center-1990)
<u>Substrand</u>: The Practice of Science <u>Standard</u>: Understand that science is a way of knowing about the natural world and is characterized by empirical criteria, logical argument and skeptical review.	Explain how the traditions and norms of science define the bounds of professional scientific practice and reveal instances of scientific error or misconduct. (For example: The use of peer review, publications and presentations.) *(Standard NSE: 9.1.1.1.3)*	• Items will NOT require students to make ethical decisions.		Textbook: <u>Physical Science: Concepts in Action</u> (Prentice Hall)

GRADE 9: CHEMISTRY CURRICULUM FRAMEWORKS

UNIT 1: SCIENTIFIC METHOD AND MEASUREMENT (continued)				
Substrand/Standard	**Curriculum Benchmark**	**MCA III Test Item Specifications**	**Standards of Proficiency** Description of what students must show to demonstrate proficiency (created by teachers/teams)	**Resources**
Substrand: The Practice of Science Standard: Understand that science is a way of knowing about the natural world and is characterized by empirical criteria, logical argument and skeptical review.	Identify sources of bias and explain how bias might influence the direction of research and the interpretation of data. (For example: How funding of research can influence questions studied, procedures used, analysis of data, and communication of results.) *(Standard NSE: 9.1.1.1.5)*	• Items will NOT require students to make ethical decisions. • Sources of bias may include gender bias, misconception, cultural bias, funding bias, procedural bias, individual bias based on prior experience with the subject and political bias.		

GRADE 9: CHEMISTRY CURRICULUM FRAMEWORKS

UNIT 1: SCIENTIFIC METHOD AND MEASUREMENT (continued)				
Substrand/Standard	**Curriculum Benchmark**	**MCA III Test Item Specifications**	**Standards of Proficiency** Description of what students must show to demonstrate proficiency (created by teachers/teams)	**Resources**
Substrand: The Practice of Science Standard: Understand that scientific inquiry uses multiple interrelated processes to investigate and explain the natural world.	Formulate a testable hypothesis, design and conduct an experiment to test the hypothesis, analyze the data, consider alternative explanations, and draw conclusions supported by evidence from the investigation. *(Standard NSE: 9.1.1.2.1)*	• Context of items should demonstrate all appropriate safety considerations. • Items may address part or all of the benchmark. • Hypothesis is defined as "a testable statement about the natural world that can be used to build more complex inferences and explanations" (National Academy of Sciences, Teaching About Evolution and the Nature of Science, [National Academy Press, 1988], 5). • Items will NOT require students to define the term hypothesis. • Items may require students to evaluate or draw an accurate conclusion based on presented evidence. • Items may require students to identify which variables were changed, kept the same and measured in a given experiment. • Items will NOT use the terms independent variable, dependent variable, manipulated variable or responding variables.		Textbook: Physical Science: Concepts in Action (Prentice Hall)
Substrand: The Practice of Science Standard: Understand that scientific inquiry uses multiple interrelated processes to investigate and explain the natural world.	Evaluate the explanations proposed by others by examining and comparing evidence, identifying faulty reasoning, pointing out statements that go beyond the scientifically acceptable evidence, and suggesting alternative scientific explanations. *(Standard NSE: 9.1.1.2.2)*	• Items may require students to evaluate a set of data to formulate possible conclusions.		Textbook: Physical Science: Concepts in Action (Prentice Hall)
Substrand: The Practice of Science Standard: Understand that scientific inquiry uses multiple interrelated processes to investigate and explain the natural world.	Identify the critical assumptions and logic used in a line of reasoning to judge the validity of a claim. *(Standard NSE: 9.1.1.2.3)*	• Items may include product claims, pseudoscience and unsupported conclusions.		

GRADE 9: CHEMISTRY CURRICULUM FRAMEWORKS

UNIT 1: SCIENTIFIC METHOD AND MEASUREMENT (continued)				
Substrand/Standard	**Curriculum Benchmark**	**MCA III Test Item Specifications**	**Standards of Proficiency** Description of what students must show to demonstrate proficiency (created by teachers/teams)	**Resources**
<u>Substrand</u>: The Practice of Science <u>Standard</u>: Understand that scientific inquiry uses multiple interrelated processes to investigate and explain the natural world.	Use primary sources or scientific writings to identify and explain how different types of questions and their associated methodologies are used by scientists for investigations in different disciplines. *(Standard NSE: 9.1.1.2.4)*	• Disciplines are limited to zoology, botany, microbiology, evolutionary biology, ecology, genetics, cell biology, anatomy and physiology. • Methodologies may include observation, gathering data, organizing information, analysis, experimentation and computer modeling.		Textbook: <u>Physical Science: Concepts in Action</u> (Prentice Hall)
<u>Substrand</u>: The Practice of Engineering <u>Standard</u>: Understand that engineering is a way of addressing human needs by applying science concepts and mathematical techniques to develop new products, tools, processes, and systems.	Recognize that risk analysis is used to determine the potential positive and negative consequences of using a new technology or design, including the evaluation of causes and effects of failures. (For example: Risks and benefits associated with using lithium batteries.) *(Standard NSE: 9.1.2.1.2)*	• Items will NOT require students to know details of specific technologies. • Items will be placed in contexts that give sufficient background information. • Items are limited to environmental effects on ecosystems and their physical and biological components. • Items may require students to identify risks and benefits of a new technology or design.		
<u>Substrand</u>: The Practice of Engineering <u>Standard</u>: Understand that engineering design is an analytical and creative process of devising a solution to meet a need or solve a specific problem.	Identify a problem and the associated constraints on possible design solutions. (For example: Constraints can include time, money, scientific knowledge and available technology.) *(Standard NSE: 9.1.2.2.1)*	None		
<u>Substrand</u>: Interactions Among Science, Technology, Engineering, Mathematics, and Society <u>Standard</u>: Understand that men and women throughout the history of all cultures, including Minnesota American Indian tribes and communities, have been involved in engineering design and scientific inquiry.	Analyze possible careers in science and engineering in terms of educational requirements, working practices and rewards. *(Standard NSE: 9.1.3.2.2)*	• Not assessed on the MCA-III.		Video: "World of Chemistry" (University of Maryland and the Educational Film Center-1990)

GRADE 9: CHEMISTRY CURRICULUM FRAMEWORKS

UNIT 1: SCIENTIFIC METHOD AND MEASUREMENT (continued)				
Substrand/Standard	**Curriculum Benchmark**	**MCA III Test Item Specifications**	**Standards of Proficiency** Description of what students must show to demonstrate proficiency (created by teachers/teams)	**Resources**
Substrand: Interactions Among Science, Technology, Engineering, Mathematics, and Society Standard: Understand that science and engineering operate in the context of society and both influence and are influenced by this context.	Describe how values and constraints affect science and engineering. (For example: Economic, environmental, social, political, ethnical, health, safety, and sustainability issues.). *(Standard NSE: 9.1.3.3.1)*	• Not assessed on the MCA-III.		
Substrand: Interactions Among Science, Technology, Engineering, Mathematics, and Society Standard: Understand that science and engineering operate in the context of society and both influence and are influenced by this context.	Describe how scientific investigations and engineering processes require multi-disciplinary contributions and efforts. (For example: Nanotechnology, climate change, agriculture, or biotechnology.) *(Standard NSE: 9.1.3.3.3)*	• Examples of disciplines are limited to zoology, botany, microbiology, evolutionary biology, ecology, genetics, cell biology, anatomy and physiology. • Items will provide context with sufficient background information.		
Substrand: Interactions Among Science, Technology, Engineering, Mathematics, and Society Standard: Understand that science, technology, engineering and mathematics rely on each other to enhance knowledge and understanding.	Determine and use appropriate safety procedures, tools, computers and measurement instruments in science and engineering contexts. (For example: Consideration of chemical and biological hazards in the lab.) *(Standard NSE: 9.1.3.4.2)*	• All measurements will use the International System of Units (SI).		Textbook: Physical Science: Concepts in Action (Prentice Hall)
Substrand: Interactions Among Science, Technology, Engineering, Mathematics, and Society Standard: Understand that science, technology, engineering and mathematics rely on each other to enhance knowledge and understanding.	Select and use appropriate numeric, symbolic, pictorial, or graphical representation to communicate scientific ideas, procedures and experimental results. *(Standard NSE: 9.1.3.4.3)*	• All measurements will use the SI system of measurement. • Items may require students to place appropriate variables on graph axes. • Items may require students to determine appropriate increments on graphs.		Textbook: Physical Science: Concepts in Action (Prentice Hall)

UNIT 1: SCIENTIFIC METHOD AND MEASUREMENT (continued)				
Substrand/Standard	**Curriculum Benchmark**	**MCA III Test Item Specifications**	**Standards of Proficiency** Description of what students must show to demonstrate proficiency (created by teachers/teams)	**Resources**
Substrand: Interactions Among Science, Technology, Engineering, Mathematics, and Society Standard: Understand that science, technology, engineering and mathematics rely on each other to enhance knowledge and understanding.	Demonstrate how unit consistency and dimensional analysis can guide the calculation of quantitative solutions and verification of results. *(Standard NSE: 9.1.3.4.5)*	• Mathematics will be limited to grade 8 mathematics or below, per the Minnesota Academic Standards in Mathematics. • All measurements will use the SI system of measurement. • Items that require students to do calculations will provide a scientific calculator tool.		Textbook: Physical Science: Concepts in Action (Prentice Hall)
Substrand: Interactions Among Science, Technology, Engineering, Mathematics, and Society Standard: Understand that science, technology, engineering and mathematics rely on each other to enhance knowledge and understanding.	Analyze the strengths and limitations of physical, conceptual, mathematical and computer models used by scientists and engineers. *(Standard NSE: 9.1.3.4.6)*	• Examples of models include population growth, bacterial growth and probability of genetics.		

GRADE 9: CHEMISTRY CURRICULUM FRAMEWORKS

UNIT 2: WHAT'S THE MATTER?

Big Questions	Formative/ Summative Assessments Formative and summative assessments created by teachers/teams
1. How are kinetic molecular concepts used to explain states of matter and changes in state? 2. How does the engineering design process devise a solution to meet a need or solve a specific problem? (in this case, density) 3. How is matter classified based on physical and chemical properties? 4. How is scientific inquiry used to determine percent composition? 5. How are experimental results analyzed with regard to percent error?	Options include, but are not limited to: – Problem sets from Chapters 2 and 3 in textbook (see Resources) – Density problem set – Matter Classification problem set – Lab Report: Identification of an Unknown Liquid – Lab Report: Separation of a Mixture – Unit 2 Test

Substrand/Standard	Curriculum Benchmark	MCA III Test Item Specifications	Standards of Proficiency Description of what students must show to demonstrate proficiency (created by teachers/teams)	Resources
Substrand: Interactions Among Science, Technology, Engineering, Mathematics, and Society Standard: Understand that science and engineering operate in the context of society and both influence and are influenced by this context.	Communicate, justify, and defend the procedures and results of a scientific inquiry or engineering design project using verbal, graphic, quantitative, virtual, or written means. *(Standard NSE: 9.1.3.3.2)*	• Items may require students to justify or defend procedures and results based on data, observations, or other evidence. • Items may require students to interpret or create a graphic in order to communicate procedures and results. • Items may require students to analyze or produce quantitative information in order to communicate procedures and results.		Textbook: Physical Science: Concepts in Action (Prentice Hall)
Substrand: Interactions Among Science, Technology, Engineering, Mathematics, and Society Standard: Understand that science, technology, engineering and mathematics rely on each other to enhance knowledge and understanding.	Relate the reliability of data to consistency of results, identify sources of error, and suggest ways to improve the data collection and analysis. (For example: Use statistical analysis or error analysis to make judgments about the validity of results.) *(Standard NSE: 9.1.3.4.4)*	• Examples of error include uncontrolled variables, operator error and measurement error. • Mathematics will be limited to grade 8 mathematics or below, per the Minnesota Academic Standards in Mathematics, and can include the concepts of percent, mean, median, mode and line of best fit. • Items will NOT require students to do mathematics without using the results to evaluate data. • All measurements will use the SI system of measurement. • Items that require students to do calculations will provide a calculator tool.		Textbook: Physical Science: Concepts in Action (Prentice Hall)

GRADE 9: CHEMISTRY CURRICULUM FRAMEWORKS

UNIT 3: ATOMIC THEORY

Big Questions	Formative/ Summative Assessments Formative and summative assessments created by teachers/teams
1. How does the structure of the atom determine chemical properties of elements? 2. How has our understanding of the atom changed throughout history? 3. What technological and experimental advancements led to our understanding of the atom and its parts throughout history? 4. How is the periodic table arranged in relation to the various elements? 5. How does periodicity help us determine properties and trends of the elements?	Options include, but are not limited to: – Problem sets from Chapters 4 and 5 from the textbook (see Resources) – Problem set: Atomic Theory Timeline – Problem set: Atomic Structure – Periodic Table drawing – Quiz: Atomic History and Structure – Element brochure project – Lab Report: Periodic Law – Unit 3 Test

Substrand/Standard	Curriculum Benchmark	MCA III Test Item Specifications	Standards of Proficiency Description of what students must show to demonstrate proficiency (created by teachers/teams)	Resources
Substrand: Matter Standard: Understand that the structure of the atom determines chemical properties of elements.	Describe the relative charges, masses, and locations of the protons, neutrons, and electrons in an atom of an element. *(Standard PS: 9.2.1.1.1)*	None		Textbook: Physical Science: Concepts in Action (Prentice Hall) Video: "World of Chemistry" (University of Maryland and the Educational Film Center- 1990)
Substrand: Matter Standard: Understand that the structure of the atom determines chemical properties of elements.	Describe how experimental evidence led Dalton, Rutherford, Thompson, Chadwick and Bohr to develop increasingly accurate models of the atom. *(Standard PS: 9.2.1.1.2)*	None		Textbook: Physical Science: Concepts in Action (Prentice Hall)
Substrand: Matter Standard: Understand that the structure of the atom determines chemical properties of elements.	Explain the arrangements of the elements on the Periodic Table, including the relationships among elements in a given column or row. *(Standard PS: 9.2.1.1.3)*	None		"The Elements"- a song by Tom Lehrer (1959) Textbook: Physical Science: Concepts in Action (Prentice Hall) Video: "World of Chemistry" (University of Maryland and the Educational Film Center- 1990)

GRADE 9: CHEMISTRY CURRICULUM FRAMEWORKS

UNIT 3: ATOMIC THEORY (continued)

Substrand/Standard	Curriculum Benchmark	MCA III Test Item Specifications	Standards of Proficiency Description of what students must show to demonstrate proficiency (created by teachers/teams)	Resources
Substrand: The Practice of Science Standard: Understand that science is a way of knowing about the natural world and is characterized by empirical criteria, logical argument and skeptical review.	Describe how changes in scientific knowledge generally occur in incremental steps that include and build on earlier knowledge. *(Standard NSE: 9.1.1.1.6)*	• Items may require students to show how one scientific understanding leads to another (e.g., show how new evidence or analysis led to further development of the theory of evolution, germ theory or theory of inheritance). • Items assessing this benchmark may also assess benchmarks 9.1.3.2.1 and 9.4.4.1.3.		Textbook: Physical Science: Concepts in Action (Prentice Hall)
Substrand: The Practice of Science Standard: Understand that science is a way of knowing about the natural world and is characterized by empirical criteria, logical argument and skeptical review.	Explain how scientific and technological innovations-as well as new evidence-can challenge portions of, or entire accepted theories and models including, but not limited to: cell theory, atomic theory, theory of evolution, plate tectonic theory, term theory of disease, and the big bang theory. *(Standard NSE: 9.1.1.1.7)*	• Items will address theories, models and the validity of scientific knowledge in the context of life science. • Technological innovations may include microscopy, global positioning system (GPS), genetic engineering and molecular engineering.		Textbook: Physical Science: Concepts in Action (Prentice Hall)
Substrand: Interactions Among Science, Technology, Engineering, Mathematics, and Society Standard: Understand that men and women throughout the history of all cultures, including Minnesota American Indian tribes and communities, have been involved in engineering design and scientific inquiry.	Provide examples of how diverse cultures, including natives from all of the Americas, have contributed scientific mathematical ideas and technological inventions. (For example: Native American understanding of ecology; Lisa Meitner's contribution to understanding radioactivity; Tesla's ideas and inventions relating to electricity; Watson, Crick and Franklin's discovery of the structure of DNA; or how George Washington Carver's ideas changed land use.) *(Standard NSE: 9.1.3.2.1)*	• Items assessing this benchmark may also assess benchmarks 9.1.1.1.6 and 9.4.4.1.3. • Items will be placed in contexts that give sufficient background information. • Items will NOT require students to match an individual to a specific idea or invention. • Items may require students to recognize how an idea or invention has contributed to the field of science.		Textbook: Physical Science: Concepts in Action (Prentice Hall)
Substrand: Interactions Among Science, Technology, Engineering, Mathematics, and Society Standard: Understand that science, technology, engineering and mathematics rely on each other to enhance knowledge and understanding.	Describe how technological problems and advances often create a demand for new scientific knowledge, improved mathematics, and new technologies. *(Standard NSE: 9.1.3.4.1)*	• Not assessed on the MCA-III.		Textbook: Physical Science: Concepts in Action (Prentice Hall)

GRADE 9: CHEMISTRY CURRICULUM FRAMEWORKS

UNIT 4: REACTIVITY OF METALS AND NONMETALS

Big Questions	Formative/ Summative Assessments Formative and summative assessments created by teachers/teams
1. How do valence electrons determine the reactivity of elements? 2. How do an element's number of valence relate to its position on the periodic table? 3. How are metals and nonmetals distinguished based on their respective physical and chemical properties? 4. What are ions and how are they formed? 5. What is an activity series and how is it used to predict reactivity with other elements?	Options include, but are not limited to: – Problem sets from Chapter 4 in textbook (see Resources) – Problem set: Bohr Model of the Atom – Lab Report: Flame Tests – Lab Report: Activity Series of Metals – Problem set: Ions – Lab Report: Alchemy – Unit 4 Test

Substrand/Standard	Curriculum Benchmark	MCA III Test Item Specifications	Standards of Proficiency Description of what students must show to demonstrate proficiency (created by teachers/teams)	Resources
<u>Substrand</u>: Matter <u>Standard</u>: Understand that chemical reactions involve the rearrangement of atoms as chemical bonds are broken and formed through transferring or sharing of electrons and the absorption or release of energy.	Describe the role of valence electrons in the formation of chemical bonds. *(Standard PS: 9.2.1.2.1)*	None		Textbook: <u>Physical Science: Concepts in Action</u> (Prentice Hall) Video: "World of Chemistry" (University of Maryland and the Educational Film Center-1990)

GRADE 9: CHEMISTRY CURRICULUM FRAMEWORKS

UNIT 5: CHEMICAL COMPOUNDS AND EQUATIONS

Big Questions	Formative/ Summative Assessments Formative and summative assessments created by teachers/teams
1. Under what conditions do the chemical reactions involve the rearrangement of atoms? 2. How can energy, which is always conversed, be transformed within a system or transferred to other systems or the environment? 3. How are valence electrons arranged to form ionic and covalent bonds? 4. How are compounds named based on their electron arrangement and how are their formulas written? 5. How are chemical equations categorized? 6. What is the law of conservation of matter and how is it used to balance the reactants and products in a chemical process?	Options include, but are not limited to: – Problem sets from Chapters 6 and 7 in textbook (see Resources) – Problem set: Chemical Bonding – Test: Nomenclature – Problem set: Word Equations – Problem set: Balancing Equations – Quiz: Balancing Equations – Problem set: Types of Reactions – Lab Report: Types of Reactions – Unit 5 Test

Substrand/Standard	Curriculum Benchmark	MCA III Test Item Specifications	Standards of Proficiency Description of what students must show to demonstrate proficiency (created by teachers/teams)	Resources
Substrand: Matter Standard: Understand that chemical reactions involve the rearrangement of atoms as chemical bonds are broken and formed through transferring or sharing of electrons and the absorption or release of energy.	Explain how the rearrangement of atoms in a chemical reaction illustrates the law of conservation of mass. *(Standard PS: 9.2.1.2.2)*	None		Textbook: Physical Science: Concepts in Action (Prentice Hall)
Substrand: Matter Standard: Understand that chemical reactions involve the rearrangement of atoms as chemical bonds are broken and formed through transferring or sharing of electrons and the absorption or release of energy.	Describe a chemical reaction using words and symbolic equations. (For example: The reaction of hydrogen gas with oxygen gas can be written – 2H2 + O2 →2H2O.) *(Standard PS: 9.2.1.2.3)*	None		Textbook: Physical Science: Concepts in Action (Prentice Hall) Video: "World of Chemistry" (University of Maryland and the Educational Film Center-1990)
Substrand: Matter Standard: Understand that chemical reactions involve the rearrangement of atoms as chemical bonds are broken and formed through transferring or sharing of electrons and the absorption or release of energy.	Relate exothermic and endothermic chemical reactions to temperature and energy changes. *(Standard PS: 9.2.1.2.4)*	None		Textbook: Physical Science: Concepts in Action (Prentice Hall)

GRADE 9: CHEMISTRY CURRICULUM FRAMEWORKS

UNIT 6: NUCLEAR CHEMISTRY AND RADIOACTIVITY

Big Questions	Formative/ Summative Assessments Formative and summative assessments created by teachers/teams
1. How can geologic events be inferred and geologic time be estimated? 2. What is radioactivity and how do unstable atoms decay? 3. How does radiation affect matter and what are the risks and benefits associated with radiation? 4. How are decay rates used to determine Earth processes? 5. What are fission and fusion and how are they used for nuclear energy? 6. What are the risks and benefits of nuclear power?	Options include, but are not limited to: – Problem sets from Chapter 10 in textbook (see Resources) – Problem set: Radioactive decay equations – Lab Report: Half-Life of Radioactive Elements – Problem set: Half-Life – Unit 6 Quiz

Substrand/Standard	Curriculum Benchmark	MCA III Test Item Specifications	Standards of Proficiency Description of what students must show to demonstrate proficiency (created by teachers/teams)	Resources
Substrand: Matter Standard: Understand that the structure of the atom determines chemical properties of elements.	Explain that isotopes of an element have different numbers of neutrons and that some are unstable and emit particles and/or radiation. (For example: Some rock formations and building materials emit radioactive radon gas; the predictable rate of decay of radioactive isotopes makes it possible to estimate the age of some materials, and makes them useful in some medical procedures.) *(Standard PS: 9.2.1.1.4)*	None		Textbook: Physical Science: Concepts in Action (Prentice Hall) Video: "Nuclear Reaction" (PBS Frontline)
Substrand: Energy Standard: Understand that energy can be transformed within a system or transferred to other systems or the environment, but is always conserved.	Compare fission and fusion in terms of the reactants, the products and the conversion from matter into energy. (For example: The fusion of hydrogen produces energy in the sun; the use of chain reactions in nuclear reactors.) *(Standard PS: 9.2.3.2.6)*	None		Video: "Nuclear Reaction" (PBS Frontline) Textbook: Physical Science: Concepts in Action (Prentice Hall)
Substrand: Earth Structure and Processes Standard: Understand that by observing rock sequences and using fossils to correlate the sequences at various locations, geologic events can be inferred and geologic time can be estimated.	Use relative dating techniques to explain how the structures of the earth and life on Earth have changed over short and long periods of time. *(Standard ESS: 9.3.1.3.1)*	None		Textbook: Physical Science: Concepts in Action (Prentice Hall)

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