

Main Criteria: Cogent Education's Interactive Cases

Secondary Criteria: Minnesota Academic Standards

Subject: Science

Grades: 9, 10, 11, 12



Title	Common Among States	Minnesota Academic Standards	Minnesota Academic Standards	Minnesota Academic Standards	Minnesota Academic Standards
Action Potential -	MN	<p>MN.9.1. - The Nature of Science and Engineering</p> <p>9.1.1. - The Practice of Science</p> <p>9.1.1.2. - The student will understand that scientific inquiry uses multiple interrelated processes to investigate and explain the natural world.</p> <p>9.1.1.2.1. - 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.</p> <p>9.1.1.2.2. - 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.</p> <p>9.1.1.2.3. - Identify the critical assumptions and logic used in a line of reasoning to judge the validity of a claim.</p> <p>9.1.3. - Interactions Among Science, Technology, Engineering, Mathematics, and Society</p> <p>9.1.3.3. - The student will understand that science and engineering operate in the context of society and both influence and are influenced by this context.</p> <p>9.1.3.3.2. - Communicate, justify and defend the procedures and results of a scientific inquiry or engineering design project using verbal, graphic, quantitative, virtual or written means.</p> <p>9.1.3.4. - The student will understand that science, technology, engineering and mathematics rely on each other to enhance knowledge and understanding.</p> <p>9.1.3.4.6. - Analyze the strengths and limitations of physical, conceptual, mathematical and computer models used by scientists and engineers.</p> <p>MN.9.4. - Life Science</p> <p>9.4.1. - Structure and Function in Living Systems</p> <p>9.4.1.1. - The student will understand that organisms use the interaction of cellular processes as well as tissues and organ systems to maintain homeostasis.</p> <p>9.4.1.1.1. - Explain how cell processes are influenced by internal and external factors, such as pH and temperature, and how cells and organisms respond to changes in their environment to maintain homeostasis.</p> <p>9.4.1.1.2. - Describe how the functions of individual organ systems are integrated to maintain homeostasis in an organism.</p> <p>9.4.1.2. - The student will understand that cells and cell structures have specific functions that allow an organism to grow, survive and reproduce.</p> <p>9.4.1.2.1. - Recognize that cells are composed primarily of a few elements (carbon, hydrogen, oxygen, nitrogen, phosphorus, and sulfur), and describe the basic molecular structures of cells and the primary functions of carbohydrates, lipids, proteins and nucleic acids.</p> <p>9.4.1.2.2. - Recognize that the work of the cell is carried out primarily by proteins, most of which are enzymes, and that protein function depends on the amino acid sequence and the shape it takes as a consequence of the interactions between those amino acids.</p> <p>MN.9.13. - Reading Benchmarks: Literacy in Science and Technical Subjects 6-12</p> <p>- Key Ideas and Details</p>	<p>MN.9.1. - The Nature of Science and Engineering</p> <p>9.1.1. - The Practice of Science</p> <p>9.1.1.2. - The student will understand that scientific inquiry uses multiple interrelated processes to investigate and explain the natural world.</p> <p>9.1.1.2.1. - 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<p>9.13.1.1. - Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions.</p> <p>9.13.2.2. - Determine the central ideas or conclusions of a text; trace the text's explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text.</p> <p>9.13.5.5. - Analyze the structure of the relationships among concepts in a text, including relationships among key terms (e.g., force, friction, reaction force, energy).</p> <p>9.13.9.9. - Compare and contrast findings presented in a text to those from other sources (including their own experiments), noting when the findings support or contradict previous explanations or accounts.</p> <p>9.13.10.10. - By the end of grade 10, read and comprehend science/technical texts in the grades 9-10 text complexity band independently and proficiently.</p> <p>MN.9.14. - Writing Benchmarks: Literacy in Science and Technical Subjects 6-12</p> <p>9.14.1.1. - Write arguments focused on discipline-specific content.</p> <p>9.14.1.1.a. - Introduce precise claim(s), distinguish the claim(s) from alternate or opposing claims, and create an organization that establishes clear relationships among the claim(s), counterclaims, reasons, and evidence.</p> <p>9.14.1.1.b. - Develop claim(s) and counterclaims fairly, supplying data and credible evidence for each while pointing out the strengths and limitations of both claim(s) and counterclaims in a discipline-appropriate form and in a manner that anticipates the audience's knowledge level and concerns.</p> <p>9.14.1.1.c. - Use words, phrases, and clauses to link the major sections of the text, create cohesion, and clarify the relationships between claim(s) and reasons, between reasons and evidence, and between claim(s) and counterclaims.</p> <p>9.14.1.1.e. - Provide a concluding statement or section that follows from or supports the argument presented.</p> <p>9.14.2.2. - Write informative/explanatory texts, as they apply to each discipline and reporting format, including the narration of historical events, of scientific procedures/experiments, or description of technical processes.</p> <p>9.14.2.2.a. - Introduce a topic and organize ideas, concepts, and information to make important connections and distinctions; include formatting (e.g., headings), graphics (e.g., figures, tables), and multimedia when useful to aiding comprehension.</p> <p>9.14.2.2.b. - Develop the topic with well-chosen, relevant, credible and sufficient facts, extended definitions, concrete details, quotations, or other information and examples appropriate to the audience's knowledge of the topic.</p> <p>9.14.2.2.c. - Use varied transitions and sentence structures to link the major sections of the text, create cohesion, and clarify the relationships among ideas and concepts.</p> <p>9.14.2.2.f. - Provide a concluding statement or section that follows from and supports the information or explanation presented (e.g., articulating implications or the significance of the topic).</p> <p>9.14.3.3. - (See note; not applicable as a separate requirement)</p>	<p>9.13.1.1. - Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions.</p> <p>9.13.2.2. - Determine the central ideas or conclusions of a text; 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summarize complex concepts, processes, or information presented in a text by paraphrasing them in simpler but still accurate terms.</p> <p>11.13.5.5. - Analyze how the text structures information or ideas into categories or hierarchies, demonstrating understanding of the information or ideas.</p> <p>11.13.9.9. - Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible.</p> <p>11.13.10.10. - By the end of grade 12, read and comprehend science/technical texts in the grades 11-12 text complexity band independently and proficiently.</p> <p>MN.11.14. - Writing Benchmarks: Literacy in Science and Technical Subjects 6-12</p> <p>11.14.1.1. - Write arguments focused on discipline-specific content.</p> <p>11.14.1.1.a. - Introduce precise, knowledgeable claim(s), establish the significance of the claim(s), distinguish the claim(s) from alternate or opposing claims, and create an organization that logically sequences the claim(s), counterclaims, reasons, and evidence.</p> <p>11.14.1.1.b. - Develop claim(s) and counterclaims fairly and thoroughly, supplying the most relevant data and credible evidence for each while pointing out the strengths and limitations of both claim(s) and counterclaims in a discipline-appropriate form that anticipates the audience's knowledge level, concerns, values, and possible biases.</p> <p>11.14.1.1.c. - Use words, phrases, and clauses as well as varied syntax to link the major sections of the text, create cohesion, and clarify the relationships between claim(s) and reasons, between reasons and evidence, and between claim(s) and counterclaims.</p> <p>11.14.1.1.e. - Provide a concluding statement or section that follows from or supports the argument presented.</p> <p>11.14.2.2. - Write informative/explanatory texts, as they apply to each discipline and reporting format, including the narration of historical events, of scientific procedures/experiments, or description of technical processes.</p> <p>11.14.2.2.a. - Introduce a topic and organize complex ideas, concepts, and information so that each new element builds on that which precedes it to create a unified whole; include formatting (e.g., headings), graphics (e.g., figures, tables), and multimedia when useful to aiding comprehension.</p> <p>11.14.2.2.b. - Develop the topic thoroughly by selecting the most significant, credible, sufficient, and relevant facts, extended definitions, concrete details, quotations, or other information and examples appropriate to the audience's knowledge of the topic.</p> <p>11.14.2.2.c. - Use varied transitions and sentence structures to link the major sections of the text, create cohesion, and clarify the relationships among complex ideas and concepts.</p> <p>11.14.2.2.d. - Use precise language, domain-specific vocabulary and techniques such as metaphor, simile, and analogy to manage the complexity of the topic; convey a knowledgeable stance in a style that responds to the discipline and context as well as to the expertise of likely readers.</p> <p>11.14.2.2.e. - Establish and maintain a formal style and objective tone while attending to the norms and conventions of the discipline in which they are writing.</p>	<p>11.13.1.1. - Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account.</p> <p>11.13.2.2. - Determine the central ideas or conclusions of a text; 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Life Science</p> <p>9.4.1. - Structure and Function in Living Systems</p> <p>9.4.1.1. - The student will understand that organisms use the interaction of cellular processes as well as tissues and organ systems to maintain homeostasis.</p> <p>9.4.1.1.1. - Explain how cell processes are influenced by internal and external factors, such as pH and temperature, and how cells and organisms respond to changes in their environment to maintain homeostasis.</p> <p>9.4.1.1.2. - Describe how the functions of individual organ systems are integrated to maintain homeostasis in an organism.</p> <p>9.4.1.2. - The student will understand that cells and cell structures have specific functions that allow an organism to grow, survive and reproduce.</p>	<p>MN.9.1. - The Nature of Science and Engineering</p> <p>9.1.1. - The Practice of Science</p> <p>9.1.1.2. - The student will understand that scientific inquiry uses multiple interrelated processes to investigate and explain the natural world.</p> <p>9.1.1.2.1. - 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trace the text's explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text.</p> <p>9.13.5.5. - Analyze the structure of the relationships among concepts in a text, including relationships among key terms (e.g., force, friction, reaction force, energy).</p> <p>9.13.7.7. - Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words.</p> <p>9.13.9.9. - Compare and contrast findings presented in a text to those from other sources (including their own experiments), noting when the findings support or contradict previous explanations or accounts.</p> <p>9.13.10.10. - By the end of grade 10, read and comprehend science/technical texts in the grades 9-10 text complexity band independently and proficiently.</p> <p>MN.9.14. - Writing Benchmarks: Literacy in Science and Technical Subjects 6-12</p> <p>9.14.1.1. - Write arguments focused on discipline-specific content.</p> <p>9.14.1.1.a. - Introduce precise claim(s), distinguish the claim(s) from alternate or opposing claims, and create an organization that establishes clear relationships among the claim(s), counterclaims, reasons, and evidence.</p> <p>9.14.1.1.b. - Develop claim(s) and counterclaims fairly, supplying data and credible evidence for each while pointing out the strengths and limitations of both claim(s) and counterclaims in a discipline-appropriate form and in a manner that anticipates the audience's knowledge level and concerns.</p>	<p>9.4.1.2.1. - Recognize that cells are composed primarily of a few elements (carbon, hydrogen, oxygen, nitrogen, phosphorus, and sulfur), and describe the basic molecular structures of cells and the primary functions of carbohydrates, lipids, proteins and nucleic acids.</p> <p>9.4.1.2.2. - Recognize that the work of the cell is carried out primarily by proteins, most of which are enzymes, and that protein function depends on the amino acid sequence and the shape it takes as a consequence of the interactions between those amino acids.</p> <p>9.4.1.2.5. - Compare and contrast passive transport (including osmosis and facilitated transport) with active transport, such as endocytosis and exocytosis.</p> <p>9.4.2. - Interdependence among Living Systems</p> <p>9.4.2.2. - The student will understand that matter cycles and energy flows through different levels of organization of living systems and the physical environment, as chemical elements are combined in different ways.</p> <p>9.4.2.2.1. - Use words and equations to differentiate between the processes of photosynthesis and respiration in terms of energy flow, beginning reactants and end products.</p> <p>MN.9.13. - Reading Benchmarks: Literacy in Science and Technical Subjects 6-12</p> <p>- Key Ideas and Details</p> <p>9.13.1.1. - Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions.</p> <p>9.13.2.2. - Determine the central ideas or conclusions of a text; 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summarize complex concepts, processes, or information presented in a text by paraphrasing them in simpler but still accurate terms.</p> <p>11.13.5.5. - Analyze how the text structures information or ideas into categories or hierarchies, demonstrating understanding of the information or ideas.</p> <p>11.13.9.9. - Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible.</p> <p>11.13.10.10. - By the end of grade 12, read and comprehend science/technical texts in the grades 11-12 text complexity band independently and proficiently.</p> <p>MN.11.14. - Writing Benchmarks: Literacy in Science and Technical Subjects 6-12</p> <p>11.14.1.1. - Write arguments focused on discipline-specific content.</p> <p>11.14.1.1.a. - Introduce precise, knowledgeable claim(s), establish the significance of the claim(s), distinguish the claim(s) from alternate or opposing claims, and create an organization that logically sequences the claim(s), counterclaims, reasons, and evidence.</p> <p>11.14.1.1.b. - Develop claim(s) and counterclaims fairly and thoroughly, supplying the most relevant data and credible evidence for each while pointing out the strengths and limitations of both claim(s) and counterclaims in a discipline-appropriate form that anticipates the audience's knowledge level, concerns, values, and possible biases.</p> <p>11.14.1.1.c. - Use words, phrases, and clauses as well as varied syntax to link the major sections of the text, create cohesion, and clarify the relationships between claim(s) and reasons, between reasons and evidence, and between claim(s) and counterclaims.</p>	<p>9.4.1.2.1. - Recognize that cells are composed primarily of a few elements (carbon, hydrogen, oxygen, nitrogen, phosphorus, and sulfur), and describe the basic molecular structures of cells and the primary functions of carbohydrates, lipids, proteins and nucleic acids.</p> <p>9.4.1.2.2. - Recognize that the work of the cell is carried out primarily by proteins, most of which are enzymes, and that protein function depends on the amino acid sequence and the shape it takes as a consequence of the interactions between those amino acids.</p> <p>9.4.1.2.5. - Compare and contrast passive transport (including osmosis and facilitated transport) with active transport, such as endocytosis and exocytosis.</p> <p>9.4.2. - Interdependence among Living Systems</p> <p>9.4.2.2. - The student will understand that matter cycles and energy flows through different levels of organization of living systems and the physical environment, as chemical elements are combined in different ways.</p> <p>9.4.2.2.1. - Use words and equations to differentiate between the processes of photosynthesis and respiration in terms of energy flow, beginning reactants and end products.</p> <p>MN.11.13. - Reading Benchmarks: Literacy in Science and Technical Subjects 6-12</p> <p>- Key Ideas and Details</p> <p>11.13.1.1. - Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account.</p> <p>11.13.2.2. - Determine the central ideas or conclusions of a text; 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The Standards require that students be able to incorporate narrative elements effectively into arguments and informative/explanatory texts. In history/social studies, students must be able to incorporate narrative accounts into their analyses of individuals or events of historical import.</p> <p>9.14.4.4. - Produce clear and coherent writing in which the development, organization, and style are appropriate to discipline, task, purpose, and audience.</p>	<p>9.14.1.1.c. - Use words, phrases, and clauses to link the major sections of the text, create cohesion, and clarify the relationships between claim(s) and reasons, between reasons and evidence, and between claim(s) and counterclaims.</p> <p>9.14.1.1.e. - Provide a concluding statement or section that follows from or supports the argument presented.</p> <p>9.14.2.2. - Write informative/explanatory texts, as they apply to each discipline and reporting format, including the narration of historical events, of scientific procedures/ experiments, or description of technical processes.</p> <p>9.14.2.2.a. - Introduce a topic and organize ideas, concepts, and information to make important connections and distinctions; include formatting (e.g., headings), graphics (e.g., figures, tables), and multimedia when useful to aiding comprehension.</p> <p>9.14.2.2.b. - Develop the topic with well-chosen, relevant, credible and sufficient facts, extended definitions, concrete details, quotations, or other information and examples appropriate to the audience's knowledge of the topic.</p> <p>9.14.2.2.c. - Use varied transitions and sentence structures to link the major sections of the text, create cohesion, and clarify the relationships among ideas and concepts.</p> <p>9.14.2.2.f. - Provide a concluding statement or section that follows from and supports the information or explanation presented (e.g., articulating implications or the significance of the topic).</p> <p>9.14.3.3. - (See note; not applicable as a separate requirement)</p> <p>9.14.3.3.a. - Note: Students' narrative skills continue to grow in these grades. 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<p>9.1.3.1. - The student will understand that natural and designed systems are made up of components that act within a system and interact with other systems.</p> <p>9.1.3.1.3. - Describe how positive and/or negative feedback occur in systems.</p> <p>9.1.3.3. - The student will understand that science and engineering operate in the context of society and both influence and are influenced by this context.</p> <p>9.1.3.3.2. - Communicate, justify and defend the procedures and results of a scientific inquiry or engineering design project using verbal, graphic, quantitative, virtual or written means.</p> <p>9.1.3.4. - The student will understand that science, technology, engineering and mathematics rely on each other to enhance knowledge and understanding.</p> <p>9.1.3.4.6. - Analyze the strengths and limitations of physical, conceptual, mathematical and computer models used by scientists and engineers.</p> <p>MN.9.4. - Life Science</p> <p>9.4.1. - Structure and Function in Living Systems</p> <p>9.4.1.1. - The student will understand that organisms use the interaction of cellular processes as well as tissues and organ systems to maintain homeostasis.</p> <p>9.4.1.1.1. - Explain how cell processes are influenced by internal and external factors, such as pH and temperature, and how cells and organisms respond to changes in their environment to maintain homeostasis.</p> <p>9.4.1.1.2. - Describe how the functions of individual organ systems are integrated to maintain homeostasis in an organism.</p> <p>9.4.1.2. - The student will understand that cells and cell structures have specific functions that allow an organism to grow, survive and reproduce.</p> <p>9.4.1.2.1. - Recognize that cells are composed primarily of a few elements (carbon, hydrogen, oxygen, nitrogen, phosphorus, and sulfur), and describe the basic molecular structures of cells and the primary functions of carbohydrates, lipids, proteins and nucleic acids.</p> <p>MN.9.13. - Reading Benchmarks: Literacy in Science and Technical Subjects 6-12</p> <p>- Key Ideas and Details</p> <p>9.13.1.1. - Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions.</p> <p>MN.9.14. - Writing Benchmarks: Literacy in Science and Technical Subjects 6-12</p> <p>9.14.1.1. - Write arguments focused on discipline-specific content.</p> <p>9.14.1.1.a. - Introduce precise claim(s), distinguish the claim(s) from alternate or opposing claims, and create an organization that establishes clear relationships among the claim(s), counterclaims, reasons, and evidence.</p> <p>9.14.1.1.b. - Develop claim(s) and counterclaims fairly, supplying data and credible evidence for each while pointing out the strengths and limitations of both claim(s) and counterclaims in a discipline-appropriate form and in a manner that anticipates the audience's knowledge level and concerns.</p>	<p>9.1.3.1. - The student will understand that natural and designed systems are made up of components that act within a system and interact with other systems.</p> <p>9.1.3.1.3. - 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		<p>9.14.1.1.c. - Use words, phrases, and clauses to link the major sections of the text, create cohesion, and clarify the relationships between claim(s) and reasons, between reasons and evidence, and between claim(s) and counterclaims.</p> <p>9.14.1.1.e. - Provide a concluding statement or section that follows from or supports the argument presented.</p> <p>9.14.2.2. - Write informative/explanatory texts, as they apply to each discipline and reporting format, including the narration of historical events, of scientific procedures/ experiments, or description of technical processes.</p> <p>9.14.2.2.a. - Introduce a topic and organize ideas, concepts, and information to make important connections and distinctions; include formatting (e.g., headings), graphics (e.g., figures, tables), and multimedia when useful to aiding comprehension.</p> <p>9.14.2.2.b. - Develop the topic with well-chosen, relevant, credible and sufficient facts, extended definitions, concrete details, quotations, or other information and examples appropriate to the audience's knowledge of the topic.</p> <p>9.14.2.2.c. - Use varied transitions and sentence structures to link the major sections of the text, create cohesion, and clarify the relationships among ideas and concepts.</p> <p>9.14.2.2.f. - Provide a concluding statement or section that follows from and supports the information or explanation presented (e.g., articulating implications or the significance of the topic).</p> <p>9.14.3.3. - (See note; not applicable as a separate requirement)</p> <p>9.14.3.3.a. - Note: Students' narrative skills continue to grow in these grades. 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9.1.1.2.1. - 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.

9.1.1.2.2. - 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.

9.1.1.2.3. - Identify the critical assumptions and logic used in a line of reasoning to judge the validity of a claim.

9.1.3. - Interactions Among Science, Technology, Engineering, Mathematics, and Society

9.1.3.3. - The student will understand that science and engineering operate in the context of society and both influence and are influenced by this context.

9.1.3.3.2. - Communicate, justify and defend the procedures and results of a scientific inquiry or engineering design project using verbal, graphic, quantitative, virtual or written means.

9.1.3.4. - The student will understand that science, technology, engineering and mathematics rely on each other to enhance knowledge and understanding.

9.1.3.4.3. - Select and use appropriate numeric, symbolic, pictorial, or graphical representation to communicate scientific ideas, procedures and experimental results.

9.1.3.4.6. - Analyze the strengths and limitations of physical, conceptual, mathematical and computer models used by scientists and engineers.

MN.9.4. - Life Science

9.4.1. - Structure and Function in Living Systems

9.4.1.1. - The student will understand that organisms use the interaction of cellular processes as well as tissues and organ systems to maintain homeostasis.

9.4.1.1.1. - Explain how cell processes are influenced by internal and external factors, such as pH and temperature, and how cells and organisms respond to changes in their environment to maintain homeostasis.

9.4.1.1.2. - Describe how the functions of individual organ systems are integrated to maintain homeostasis in an organism.

9.4.1.2. - The student will understand that cells and cell structures have specific functions that allow an organism to grow, survive and reproduce.

9.4.1.2.1. - Recognize that cells are composed primarily of a few elements (carbon, hydrogen, oxygen, nitrogen, phosphorus, and sulfur), and describe the basic molecular structures of cells and the primary functions of carbohydrates, lipids, proteins and nucleic acids.

9.4.1.2.5. - Compare and contrast passive transport (including osmosis and facilitated transport) with active transport, such as endocytosis and exocytosis.

MN.9.13. - Reading Benchmarks: Literacy in Science and Technical Subjects 6-12

- Key Ideas and Details

9.13.1.1. - Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions.

9.13.2.2. - Determine the central ideas or conclusions of a text; trace the text's explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text.

9.1.1.2.1. - 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.

9.1.1.2.2. - 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.

9.1.1.2.3. - Identify the critical assumptions and logic used in a line of reasoning to judge the validity of a claim.

9.1.3. - Interactions Among Science, Technology, Engineering, Mathematics, and Society

9.1.3.3. - The student will understand that science and engineering operate in the context of society and both influence and are influenced by this context.

9.1.3.3.2. - Communicate, justify and defend the procedures and results of a scientific inquiry or engineering design project using verbal, graphic, quantitative, virtual or written means.

9.1.3.4. - The student will understand that science, technology, engineering and mathematics rely on each other to enhance knowledge and understanding.

9.1.3.4.3. - Select and use appropriate numeric, symbolic, pictorial, or graphical representation to communicate scientific ideas, procedures and experimental results.

9.1.3.4.6. - Analyze the strengths and limitations of physical, conceptual, mathematical and computer models used by scientists and engineers.

MN.9.4. - Life Science

9.4.1. - Structure and Function in Living Systems

9.4.1.1. - The student will understand that organisms use the interaction of cellular processes as well as tissues and organ systems to maintain homeostasis.

9.4.1.1.1. - Explain how cell processes are influenced by internal and external factors, such as pH and temperature, and how cells and organisms respond to changes in their environment to maintain homeostasis.

9.4.1.1.2. - Describe how the functions of individual organ systems are integrated to maintain homeostasis in an organism.

9.4.1.2. - The student will understand that cells and cell structures have specific functions that allow an organism to grow, survive and reproduce.

9.4.1.2.1. - Recognize that cells are composed primarily of a few elements (carbon, hydrogen, oxygen, nitrogen, phosphorus, and sulfur), and describe the basic molecular structures of cells and the primary functions of carbohydrates, lipids, proteins and nucleic acids.

9.4.1.2.5. - Compare and contrast passive transport (including osmosis and facilitated transport) with active transport, such as endocytosis and exocytosis.

MN.9.13. - Reading Benchmarks: Literacy in Science and Technical Subjects 6-12

- Key Ideas and Details

9.13.1.1. - Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions.

9.13.2.2. - Determine the central ideas or conclusions of a text; trace the text's explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text.

9.1.1.2.1. - 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.

9.1.1.2.2. - 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.

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9.4.1.1.2. - Describe how the functions of individual organ systems are integrated to maintain homeostasis in an organism.

9.4.1.2. - The student will understand that cells and cell structures have specific functions that allow an organism to grow, survive and reproduce.

9.4.1.2.1. - Recognize that cells are composed primarily of a few elements (carbon, hydrogen, oxygen, nitrogen, phosphorus, and sulfur), and describe the basic molecular structures of cells and the primary functions of carbohydrates, lipids, proteins and nucleic acids.

9.4.1.2.5. - Compare and contrast passive transport (including osmosis and facilitated transport) with active transport, such as endocytosis and exocytosis.

MN.11.13. - Reading Benchmarks: Literacy in Science and Technical Subjects 6-12

- Key Ideas and Details

11.13.1.1. - Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account.

11.13.2.2. - Determine the central ideas or conclusions of a text; summarize complex concepts, processes, or information presented in a text by paraphrasing them in simpler but still accurate terms.

9.1.1.2.1. - 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.

9.1.1.2.2. - 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.

9.1.1.2.3. - Identify the critical assumptions and logic used in a line of reasoning to judge the validity of a claim.

9.1.3. - Interactions Among Science, Technology, Engineering, Mathematics, and Society

9.1.3.3. - The student will understand that science and engineering operate in the context of society and both influence and are influenced by this context.

9.1.3.3.2. - Communicate, justify and defend the procedures and results of a scientific inquiry or engineering design project using verbal, graphic, quantitative, virtual or written means.

9.1.3.4. - The student will understand that science, technology, engineering and mathematics rely on each other to enhance knowledge and understanding.

9.1.3.4.3. - Select and use appropriate numeric, symbolic, pictorial, or graphical representation to communicate scientific ideas, procedures and experimental results.

9.1.3.4.6. - Analyze the strengths and limitations of physical, conceptual, mathematical and computer models used by scientists and engineers.

MN.9.4. - Life Science

9.4.1. - Structure and Function in Living Systems

9.4.1.1. - The student will understand that organisms use the interaction of cellular processes as well as tissues and organ systems to maintain homeostasis.

9.4.1.1.1. - Explain how cell processes are influenced by internal and external factors, such as pH and temperature, and how cells and organisms respond to changes in their environment to maintain homeostasis.

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9.4.1.2. - The student will understand that cells and cell structures have specific functions that allow an organism to grow, survive and reproduce.

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9.4.1.2.5. - Compare and contrast passive transport (including osmosis and facilitated transport) with active transport, such as endocytosis and exocytosis.

MN.11.13. - Reading Benchmarks: Literacy in Science and Technical Subjects 6-12

- Key Ideas and Details

11.13.1.1. - Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account.

11.13.2.2. - Determine the central ideas or conclusions of a text; summarize complex concepts, processes, or information presented in a text by paraphrasing them in simpler but still accurate terms.

<p>9.13.5.5. - Analyze the structure of the relationships among concepts in a text, including relationships among key terms (e.g., force, friction, reaction force, energy).</p> <p>9.13.7.7. - Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words.</p> <p>9.13.9.9. - Compare and contrast findings presented in a text to those from other sources (including their own experiments), noting when the findings support or contradict previous explanations or accounts.</p> <p>9.13.10.10. - By the end of grade 10, read and comprehend science/technical texts in the grades 9-10 text complexity band independently and proficiently.</p> <p>MN.9.14. - Writing Benchmarks: Literacy in Science and Technical Subjects 6-12</p> <p>9.14.1.1. - Write arguments focused on discipline-specific content.</p>	<p>9.13.5.5. - Analyze the structure of the relationships among concepts in a text, including relationships among key terms (e.g., force, friction, reaction force, energy).</p> <p>9.13.7.7. - Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words.</p> <p>9.13.9.9. - Compare and contrast findings presented in a text to those from other sources (including their own experiments), noting when the findings support or contradict previous explanations or accounts.</p> <p>9.13.10.10. - By the end of grade 10, read and comprehend science/technical texts in the grades 9-10 text complexity band independently and proficiently.</p> <p>MN.9.14. - Writing Benchmarks: Literacy in Science and Technical Subjects 6-12</p> <p>9.14.1.1. - Write arguments focused on discipline-specific content.</p>	<p>11.13.5.5. - Analyze how the text structures information or ideas into categories or hierarchies, demonstrating understanding of the information or ideas.</p> <p>11.13.9.9. - Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible.</p> <p>11.13.10.10. - By the end of grade 12, read and comprehend science/technical texts in the grades 11-12 text complexity band independently and proficiently.</p> <p>MN.11.14. - Writing Benchmarks: Literacy in Science and Technical Subjects 6-12</p> <p>11.14.1.1. - Write arguments focused on discipline-specific content.</p> <p>11.14.1.1.a. - Introduce precise, knowledgeable claim(s), establish the significance of the claim(s), distinguish the claim(s) from alternate or opposing claims, and create an organization that logically sequences the claim(s), counterclaims, reasons, and evidence.</p> <p>11.14.1.1.b. - Develop claim(s) and counterclaims fairly and thoroughly, supplying the most relevant data and credible evidence for each while pointing out the strengths and limitations of both claim(s) and counterclaims in a discipline-appropriate form that anticipates the audience's knowledge level, concerns, values, and possible biases.</p> <p>11.14.1.1.c. - Use words, phrases, and clauses as well as varied syntax to link the major sections of the text, create cohesion, and clarify the relationships between claim(s) and reasons, between reasons and evidence, and between claim(s) and counterclaims.</p> <p>11.14.1.1.e. - Provide a concluding statement or section that follows from or supports the argument presented.</p> <p>11.14.2.2. - Write informative/explanatory texts, as they apply to each discipline and reporting format, including the narration of historical events, of scientific procedures/experiments, or description of technical processes.</p> <p>11.14.2.2.a. - Introduce a topic and organize complex ideas, concepts, and information so that each new element builds on that which precedes it to create a unified whole; include formatting (e.g., headings), graphics (e.g., figures, tables), and multimedia when useful to aiding comprehension.</p> <p>11.14.2.2.b. - Develop the topic thoroughly by selecting the most significant, credible, sufficient, and relevant facts, extended definitions, concrete details, quotations, or other information and examples appropriate to the audience's knowledge of the topic.</p> <p>11.14.2.2.c. - Use varied transitions and sentence structures to link the major sections of the text, create cohesion, and clarify the relationships among complex ideas and concepts.</p> <p>11.14.2.2.d. - Use precise language, domain-specific vocabulary and techniques such as metaphor, simile, and analogy to manage the complexity of the topic; convey a knowledgeable stance in a style that responds to the discipline and context as well as to the expertise of likely readers.</p> <p>11.14.2.2.e. - Establish and maintain a formal style and objective tone while attending to the norms and conventions of the discipline in which they are writing.</p>	<p>11.13.5.5. - Analyze how the text structures information or ideas into categories or hierarchies, demonstrating understanding of the information or ideas.</p> <p>11.13.9.9. - Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible.</p> <p>11.13.10.10. - By the end of grade 12, read and comprehend science/technical texts in the grades 11-12 text complexity band independently and proficiently.</p> <p>MN.11.14. - Writing Benchmarks: Literacy in Science and Technical Subjects 6-12</p> <p>11.14.1.1. - Write arguments focused on discipline-specific content.</p> <p>11.14.1.1.a. - Introduce precise, knowledgeable claim(s), establish the significance of the claim(s), distinguish the claim(s) from alternate or opposing claims, and create an organization that logically sequences the claim(s), counterclaims, reasons, and evidence.</p> <p>11.14.1.1.b. - Develop claim(s) and counterclaims fairly and thoroughly, supplying the most relevant data and credible evidence for each while pointing out the strengths and limitations of both claim(s) and counterclaims in a discipline-appropriate form that anticipates the audience's knowledge level, concerns, values, and possible biases.</p> <p>11.14.1.1.c. - Use words, phrases, and clauses as well as varied syntax to link the major sections of the text, create cohesion, and clarify the relationships between claim(s) and reasons, between reasons and evidence, and between claim(s) and counterclaims.</p> <p>11.14.1.1.e. - Provide a concluding statement or section that follows from or supports the argument presented.</p> <p>11.14.2.2. - Write informative/explanatory texts, as they apply to each discipline and reporting format, including the narration of historical events, of scientific procedures/experiments, or description of technical processes.</p> <p>11.14.2.2.a. - Introduce a topic and organize complex ideas, concepts, and information so that each new element builds on that which precedes it to create a unified whole; include formatting (e.g., headings), graphics (e.g., figures, tables), and multimedia when useful to aiding comprehension.</p> <p>11.14.2.2.b. - Develop the topic thoroughly by selecting the most significant, credible, sufficient, and relevant facts, extended definitions, concrete details, quotations, or other information and examples appropriate to the audience's knowledge of the topic.</p> <p>11.14.2.2.c. - Use varied transitions and sentence structures to link the major sections of the text, create cohesion, and clarify the relationships among complex ideas and concepts.</p> <p>11.14.2.2.d. - Use precise language, domain-specific vocabulary and techniques such as metaphor, simile, and analogy to manage the complexity of the topic; convey a knowledgeable stance in a style that responds to the discipline and context as well as to the expertise of likely readers.</p> <p>11.14.2.2.e. - Establish and maintain a formal style and objective tone while attending to the norms and conventions of the discipline in which they are writing.</p>
<p>9.14.1.1.a. - Introduce precise claim(s), distinguish the claim(s) from alternate or opposing claims, and create an organization that establishes clear relationships among the claim(s), counterclaims, reasons, and evidence.</p> <p>9.14.1.1.b. - Develop claim(s) and counterclaims fairly, supplying data and credible evidence for each while pointing out the strengths and limitations of both claim(s) and counterclaims in a discipline-appropriate form and in a manner that anticipates the audience's knowledge level and concerns.</p> <p>9.14.1.1.c. - Use words, phrases, and clauses to link the major sections of the text, create cohesion, and clarify the relationships between claim(s) and reasons, between reasons and evidence, and between claim(s) and counterclaims.</p> <p>9.14.1.1.e. - Provide a concluding statement or section that follows from or supports the argument presented.</p>	<p>9.14.1.1.a. - Introduce precise claim(s), distinguish the claim(s) from alternate or opposing claims, and create an organization that establishes clear relationships among the claim(s), counterclaims, reasons, and evidence.</p> <p>9.14.1.1.b. - Develop claim(s) and counterclaims fairly, supplying data and credible evidence for each while pointing out the strengths and limitations of both claim(s) and counterclaims in a discipline-appropriate form and in a manner that anticipates the audience's knowledge level and concerns.</p> <p>9.14.1.1.c. - Use words, phrases, and clauses to link the major sections of the text, create cohesion, and clarify the relationships between claim(s) and reasons, between reasons and evidence, and between claim(s) and counterclaims.</p> <p>9.14.1.1.e. - Provide a concluding statement or section that follows from or supports the argument presented.</p>	<p>11.14.1.1.a. - Introduce precise, knowledgeable claim(s), establish the significance of the claim(s), distinguish the claim(s) from alternate or opposing claims, and create an organization that logically sequences the claim(s), counterclaims, reasons, and evidence.</p> <p>11.14.1.1.b. - Develop claim(s) and counterclaims fairly and thoroughly, supplying the most relevant data and credible evidence for each while pointing out the strengths and limitations of both claim(s) and counterclaims in a discipline-appropriate form that anticipates the audience's knowledge level, concerns, values, and possible biases.</p> <p>11.14.1.1.c. - Use words, phrases, and clauses as well as varied syntax to link the major sections of the text, create cohesion, and clarify the relationships between claim(s) and reasons, between reasons and evidence, and between claim(s) and counterclaims.</p> <p>11.14.1.1.e. - Provide a concluding statement or section that follows from or supports the argument presented.</p>	<p>11.14.1.1.a. - Introduce precise, knowledgeable claim(s), establish the significance of the claim(s), distinguish the claim(s) from alternate or opposing claims, and create an organization that logically sequences the claim(s), counterclaims, reasons, and evidence.</p> <p>11.14.1.1.b. - Develop claim(s) and counterclaims fairly and thoroughly, supplying the most relevant data and credible evidence for each while pointing out the strengths and limitations of both claim(s) and counterclaims in a discipline-appropriate form that anticipates the audience's knowledge level, concerns, values, and possible biases.</p> <p>11.14.1.1.c. - Use words, phrases, and clauses as well as varied syntax to link the major sections of the text, create cohesion, and clarify the relationships between claim(s) and reasons, between reasons and evidence, and between claim(s) and counterclaims.</p> <p>11.14.1.1.e. - Provide a concluding statement or section that follows from or supports the argument presented.</p>
<p>9.14.2.2. - Write informative/explanatory texts, as they apply to each discipline and reporting format, including the narration of historical events, of scientific procedures/experiments, or description of technical processes.</p> <p>9.14.2.2.a. - Introduce a topic and organize ideas, concepts, and information to make important connections and distinctions; include formatting (e.g., headings), graphics (e.g., figures, tables), and multimedia when useful to aiding comprehension.</p> <p>9.14.2.2.b. - Develop the topic with well-chosen, relevant, credible and sufficient facts, extended definitions, concrete details, quotations, or other information and examples appropriate to the audience's knowledge of the topic.</p> <p>9.14.2.2.c. - Use varied transitions and sentence structures to link the major sections of the text, create cohesion, and clarify the relationships among ideas and concepts.</p>	<p>9.14.2.2. - Write informative/explanatory texts, as they apply to each discipline and reporting format, including the narration of historical events, of scientific procedures/experiments, or description of technical processes.</p> <p>9.14.2.2.a. - Introduce a topic and organize ideas, concepts, and information to make important connections and distinctions; include formatting (e.g., headings), graphics (e.g., figures, tables), and multimedia when useful to aiding comprehension.</p> <p>9.14.2.2.b. - Develop the topic with well-chosen, relevant, credible and sufficient facts, extended definitions, concrete details, quotations, or other information and examples appropriate to the audience's knowledge of the topic.</p> <p>9.14.2.2.c. - Use varied transitions and sentence structures to link the major sections of the text, create cohesion, and clarify the relationships among ideas and concepts.</p>	<p>11.14.2.2. - Write informative/explanatory texts, as they apply to each discipline and reporting format, including the narration of historical events, of scientific procedures/experiments, or description of technical processes.</p> <p>11.14.2.2.a. - Introduce a topic and organize complex ideas, concepts, and information so that each new element builds on that which precedes it to create a unified whole; include formatting (e.g., headings), graphics (e.g., figures, tables), and multimedia when useful to aiding comprehension.</p> <p>11.14.2.2.b. - Develop the topic thoroughly by selecting the most significant, credible, sufficient, and relevant facts, extended definitions, concrete details, quotations, or other information and examples appropriate to the audience's knowledge of the topic.</p> <p>11.14.2.2.c. - Use varied transitions and sentence structures to link the major sections of the text, create cohesion, and clarify the relationships among complex ideas and concepts.</p> <p>11.14.2.2.d. - Use precise language, domain-specific vocabulary and techniques such as metaphor, simile, and analogy to manage the complexity of the topic; convey a knowledgeable stance in a style that responds to the discipline and context as well as to the expertise of likely readers.</p>	<p>11.14.2.2. - Write informative/explanatory texts, as they apply to each discipline and reporting format, including the narration of historical events, of scientific procedures/experiments, or description of technical processes.</p> <p>11.14.2.2.a. - Introduce a topic and organize complex ideas, concepts, and information so that each new element builds on that which precedes it to create a unified whole; include formatting (e.g., headings), graphics (e.g., figures, tables), and multimedia when useful to aiding comprehension.</p> <p>11.14.2.2.b. - Develop the topic thoroughly by selecting the most significant, credible, sufficient, and relevant facts, extended definitions, concrete details, quotations, or other information and examples appropriate to the audience's knowledge of the topic.</p> <p>11.14.2.2.c. - Use varied transitions and sentence structures to link the major sections of the text, create cohesion, and clarify the relationships among complex ideas and concepts.</p> <p>11.14.2.2.d. - Use precise language, domain-specific vocabulary and techniques such as metaphor, simile, and analogy to manage the complexity of the topic; convey a knowledgeable stance in a style that responds to the discipline and context as well as to the expertise of likely readers.</p>
<p>9.14.2.2.f. - Provide a concluding statement or section that follows from and supports the information or explanation presented (e.g., articulating implications or the significance of the topic).</p>	<p>9.14.2.2.f. - Provide a concluding statement or section that follows from and supports the information or explanation presented (e.g., articulating implications or the significance of the topic).</p>	<p>11.14.2.2.e. - Establish and maintain a formal style and objective tone while attending to the norms and conventions of the discipline in which they are writing.</p>	<p>11.14.2.2.e. - Establish and maintain a formal style and objective tone while attending to the norms and conventions of the discipline in which they are writing.</p>

		<p>9.14.3.3. - (See note; not applicable as a separate requirement)</p> <p>9.14.3.3.a. - Note: Students' narrative skills continue to grow in these grades. The Standards require that students be able to incorporate narrative elements effectively into arguments and informative/explanatory texts. In history/social studies, students must be able to incorporate narrative accounts into their analyses of individuals or events of historical import.</p> <p>9.14.4.4. - Produce clear and coherent writing in which the development, organization, and style are appropriate to discipline, task, purpose, and audience.</p>	<p>9.14.3.3. - (See note; not applicable as a separate requirement)</p> <p>9.14.3.3.a. - Note: Students' narrative skills continue to grow in these grades. The Standards require that students be able to incorporate narrative elements effectively into arguments and informative/explanatory texts. In history/social studies, students must be able to incorporate narrative accounts into their analyses of individuals or events of historical import.</p> <p>9.14.4.4. - Produce clear and coherent writing in which the development, organization, and style are appropriate to discipline, task, purpose, and audience.</p>	<p>11.14.2.2.f. - Provide a concluding statement or section that follows from and supports the information or explanation provided (e.g., articulating implications or the significance of the topic).</p> <p>11.14.4.4. - Produce clear and coherent writing in which the development, organization, and style are appropriate to discipline, task, purpose, and audience.</p> <p>11.14.10.10. - Write routinely over extended time frames (time for reflection and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences.</p>	<p>11.14.2.2.f. - Provide a concluding statement or section that follows from and supports the information or explanation provided (e.g., articulating implications or the significance of the topic).</p> <p>11.14.4.4. - Produce clear and coherent writing in which the development, organization, and style are appropriate to discipline, task, purpose, and audience.</p> <p>11.14.10.10. - Write routinely over extended time frames (time for reflection and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences.</p>
Membrane Potential -	MN	<p>MN.9.1. - The Nature of Science and Engineering</p> <p>9.1.1. - The Practice of Science</p> <p>9.1.1.2. - The student will understand that scientific inquiry uses multiple interrelated processes to investigate and explain the natural world.</p> <p>9.1.1.2.1. - 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.</p> <p>9.1.1.2.2. - 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.</p> <p>9.1.1.2.3. - Identify the critical assumptions and logic used in a line of reasoning to judge the validity of a claim.</p> <p>9.1.3. - Interactions Among Science, Technology, Engineering, Mathematics, and Society</p> <p>9.1.3.3. - The student will understand that science and engineering operate in the context of society and both influence and are influenced by this context.</p> <p>9.1.3.3.2. - Communicate, justify and defend the procedures and results of a scientific inquiry or engineering design project using verbal, graphic, quantitative, virtual or written means.</p> <p>9.1.3.4. - The student will understand that science, technology, engineering and mathematics rely on each other to enhance knowledge and understanding.</p> <p>9.1.3.4.6. - Analyze the strengths and limitations of physical, conceptual, mathematical and computer models used by scientists and engineers.</p> <p>MN.9.4. - Life Science</p> <p>9.4.1. - Structure and Function in Living Systems</p> <p>9.4.1.1. - The student will understand that organisms use the interaction of cellular processes as well as tissues and organ systems to maintain homeostasis.</p> <p>9.4.1.1.1. - Explain how cell processes are influenced by internal and external factors, such as pH and temperature, and how cells and organisms respond to changes in their environment to maintain homeostasis.</p> <p>9.4.1.1.2. - Describe how the functions of individual organ systems are integrated to maintain homeostasis in an organism.</p> <p>9.4.1.2. - The student will understand that cells and cell structures have specific functions that allow an organism to grow, survive and reproduce.</p> <p>9.4.1.2.2. - Recognize that the work of the cell is carried out primarily by proteins, most of which are enzymes, and that protein function depends on the amino acid sequence and the shape it takes as a consequence of the interactions between those amino acids.</p>	<p>MN.9.1. - The Nature of Science and Engineering</p> <p>9.1.1. - The Practice of Science</p> <p>9.1.1.2. - The student will understand that scientific inquiry uses multiple interrelated processes to investigate and explain the natural world.</p> <p>9.1.1.2.1. - 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.</p> <p>9.1.1.2.2. - 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.</p> <p>9.1.1.2.3. - 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MN.9.13. - Reading Benchmarks: Literacy in Science and Technical Subjects 6-12
- Key Ideas and Details

9.13.1.1. - Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions.

9.13.2.2. - Determine the central ideas or conclusions of a text; trace the text's explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text.

9.13.5.5. - Analyze the structure of the relationships among concepts in a text, including relationships among key terms (e.g., force, friction, reaction force, energy).

9.13.9.9. - Compare and contrast findings presented in a text to those from other sources (including their own experiments), noting when the findings support or contradict previous explanations or accounts.

9.13.10.10. - By the end of grade 10, read and comprehend science/technical texts in the grades 9-10 text complexity band independently and proficiently.

MN.9.14. - Writing Benchmarks: Literacy in Science and Technical Subjects 6-12

9.14.1.1. - Write arguments focused on discipline-specific content.

9.14.1.1.a. - Introduce precise claim(s), distinguish the claim(s) from alternate or opposing claims, and create an organization that establishes clear relationships among the claim(s), counterclaims, reasons, and evidence.

9.14.1.1.b. - Develop claim(s) and counterclaims fairly, supplying data and credible evidence for each while pointing out the strengths and limitations of both claim(s) and counterclaims in a discipline-appropriate form and in a manner that anticipates the audience's knowledge level and concerns.

9.14.1.1.c. - Use words, phrases, and clauses to link the major sections of the text, create cohesion, and clarify the relationships between claim(s) and reasons, between reasons and evidence, and between claim(s) and counterclaims.

9.14.1.1.e. - Provide a concluding statement or section that follows from or supports the argument presented.

9.14.2.2. - Write informative/explanatory texts, as they apply to each discipline and reporting format, including the narration of historical events, of scientific procedures/experiments, or description of technical processes.

9.14.2.2.a. - Introduce a topic and organize ideas, concepts, and information to make important connections and distinctions; include formatting (e.g., headings), graphics (e.g., figures, tables), and multimedia when useful to aiding comprehension.

9.14.2.2.b. - Develop the topic with well-chosen, relevant, credible and sufficient facts, extended definitions, concrete details, quotations, or other information and examples appropriate to the audience's knowledge of the topic.

9.14.2.2.c. - Use varied transitions and sentence structures to link the major sections of the text, create cohesion, and clarify the relationships among ideas and concepts.

9.14.2.2.f. - Provide a concluding statement or section that follows from and supports the information or explanation presented (e.g., articulating implications or the significance of the topic).

MN.9.13. - Reading Benchmarks: Literacy in Science and Technical Subjects 6-12
- Key Ideas and Details

9.13.1.1. - Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions.

9.13.2.2. - Determine the central ideas or conclusions of a text; trace the text's explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text.

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9.13.9.9. - Compare and contrast findings presented in a text to those from other sources (including their own experiments), noting when the findings support or contradict previous explanations or accounts.

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MN.9.14. - Writing Benchmarks: Literacy in Science and Technical Subjects 6-12

9.14.1.1. - Write arguments focused on discipline-specific content.

9.14.1.1.a. - Introduce precise claim(s), distinguish the claim(s) from alternate or opposing claims, and create an organization that establishes clear relationships among the claim(s), counterclaims, reasons, and evidence.

9.14.1.1.b. - Develop claim(s) and counterclaims fairly, supplying data and credible evidence for each while pointing out the strengths and limitations of both claim(s) and counterclaims in a discipline-appropriate form and in a manner that anticipates the audience's knowledge level and concerns.

9.14.1.1.c. - Use words, phrases, and clauses to link the major sections of the text, create cohesion, and clarify the relationships between claim(s) and reasons, between reasons and evidence, and between claim(s) and counterclaims.

9.14.1.1.e. - Provide a concluding statement or section that follows from or supports the argument presented.

9.14.2.2. - Write informative/explanatory texts, as they apply to each discipline and reporting format, including the narration of historical events, of scientific procedures/experiments, or description of technical processes.

9.14.2.2.a. - Introduce a topic and organize ideas, concepts, and information to make important connections and distinctions; include formatting (e.g., headings), graphics (e.g., figures, tables), and multimedia when useful to aiding comprehension.

9.14.2.2.b. - Develop the topic with well-chosen, relevant, credible and sufficient facts, extended definitions, concrete details, quotations, or other information and examples appropriate to the audience's knowledge of the topic.

9.14.2.2.c. - Use varied transitions and sentence structures to link the major sections of the text, create cohesion, and clarify the relationships among ideas and concepts.

9.14.2.2.f. - Provide a concluding statement or section that follows from and supports the information or explanation presented (e.g., articulating implications or the significance of the topic).

MN.11.13. - Reading Benchmarks: Literacy in Science and Technical Subjects 6-12
- Key Ideas and Details

11.13.1.1. - Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account.

11.13.2.2. - Determine the central ideas or conclusions of a text; summarize complex concepts, processes, or information presented in a text by paraphrasing them in simpler but still accurate terms.

11.13.5.5. - Analyze how the text structures information or ideas into categories or hierarchies, demonstrating understanding of the information or ideas.

11.13.9.9. - Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible.

11.13.10.10. - By the end of grade 12, read and comprehend science/technical texts in the grades 11-12 text complexity band independently and proficiently.

MN.11.14. - Writing Benchmarks: Literacy in Science and Technical Subjects 6-12

11.14.1.1. - Write arguments focused on discipline-specific content.

11.14.1.1.a. - Introduce precise, knowledgeable claim(s), establish the significance of the claim(s), distinguish the claim(s) from alternate or opposing claims, and create an organization that logically sequences the claim(s), counterclaims, reasons, and evidence.

11.14.1.1.b. - Develop claim(s) and counterclaims fairly and thoroughly, supplying the most relevant data and credible evidence for each while pointing out the strengths and limitations of both claim(s) and counterclaims in a discipline-appropriate form that anticipates the audience's knowledge level, concerns, values, and possible biases.

11.14.1.1.c. - Use words, phrases, and clauses as well as varied syntax to link the major sections of the text, create cohesion, and clarify the relationships between claim(s) and reasons, between reasons and evidence, and between claim(s) and counterclaims.

11.14.1.1.e. - Provide a concluding statement or section that follows from or supports the argument presented.

11.14.2.2. - Write informative/explanatory texts, as they apply to each discipline and reporting format, including the narration of historical events, of scientific procedures/experiments, or description of technical processes.

11.14.2.2.a. - Introduce a topic and organize complex ideas, concepts, and information so that each new element builds on that which precedes it to create a unified whole; include formatting (e.g., headings), graphics (e.g., figures, tables), and multimedia when useful to aiding comprehension.

11.14.2.2.b. - Develop the topic thoroughly by selecting the most significant, credible, sufficient, and relevant facts, extended definitions, concrete details, quotations, or other information and examples appropriate to the audience's knowledge of the topic.

11.14.2.2.c. - Use varied transitions and sentence structures to link the major sections of the text, create cohesion, and clarify the relationships among complex ideas and concepts.

11.14.2.2.d. - Use precise language, domain-specific vocabulary and techniques such as metaphor, simile, and analogy to manage the complexity of the topic; convey a knowledgeable stance in a style that responds to the discipline and context as well as to the expertise of likely readers.

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MN.11.14. - Writing Benchmarks: Literacy in Science and Technical Subjects 6-12

11.14.1.1. - Write arguments focused on discipline-specific content.

11.14.1.1.a. - Introduce precise, knowledgeable claim(s), establish the significance of the claim(s), distinguish the claim(s) from alternate or opposing claims, and create an organization that logically sequences the claim(s), counterclaims, reasons, and evidence.

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11.14.2.2.a. - Introduce a topic and organize complex ideas, concepts, and information so that each new element builds on that which precedes it to create a unified whole; include formatting (e.g., headings), graphics (e.g., figures, tables), and multimedia when useful to aiding comprehension.

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		<p>9.14.3.3. - (See note; not applicable as a separate requirement)</p> <p>9.14.3.3.a. - Note: Students' narrative skills continue to grow in these grades. The Standards require that students be able to incorporate narrative elements effectively into arguments and informative/explanatory texts. In history/social studies, students must be able to incorporate narrative accounts into their analyses of individuals or events of historical import.</p> <p>9.14.4.4. - Produce clear and coherent writing in which the development, organization, and style are appropriate to discipline, task, purpose, and audience.</p>	<p>9.14.3.3. - (See note; not applicable as a separate requirement)</p> <p>9.14.3.3.a. - Note: Students' narrative skills continue to grow in these grades. The Standards require that students be able to incorporate narrative elements effectively into arguments and informative/explanatory texts. In history/social studies, students must be able to incorporate narrative accounts into their analyses of individuals or events of historical import.</p> <p>9.14.4.4. - Produce clear and coherent writing in which the development, organization, and style are appropriate to discipline, task, purpose, and audience.</p>	<p>11.14.2.2.e. - Establish and maintain a formal style and objective tone while attending to the norms and conventions of the discipline in which they are writing.</p> <p>11.14.2.2.f. - Provide a concluding statement or section that follows from and supports the information or explanation provided (e.g., articulating implications or the significance of the topic).</p> <p>11.14.4.4. - Produce clear and coherent writing in which the development, organization, and style are appropriate to discipline, task, purpose, and audience.</p> <p>11.14.10.10. - Write routinely over extended time frames (time for reflection and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences.</p>	<p>11.14.2.2.e. - Establish and maintain a formal style and objective tone while attending to the norms and conventions of the discipline in which they are writing.</p> <p>11.14.2.2.f. - Provide a concluding statement or section that follows from and supports the information or explanation provided (e.g., articulating implications or the significance of the topic).</p> <p>11.14.4.4. - Produce clear and coherent writing in which the development, organization, and style are appropriate to discipline, task, purpose, and audience.</p> <p>11.14.10.10. - Write routinely over extended time frames (time for reflection and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences.</p>
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Identify the critical assumptions and logic used in a line of reasoning to judge the validity of a claim.</p> <p>9.1.3. - Interactions Among Science, Technology, Engineering, Mathematics, and Society</p> <p>9.1.3.3. - The student will understand that science and engineering operate in the context of society and both influence and are influenced by this context.</p> <p>9.1.3.3.2. - Communicate, justify and defend the procedures and results of a scientific inquiry or engineering design project using verbal, graphic, quantitative, virtual or written means.</p> <p>9.1.3.4. - The student will understand that science, technology, engineering and mathematics rely on each other to enhance knowledge and understanding.</p> <p>9.1.3.4.6. - Analyze the strengths and limitations of physical, conceptual, mathematical and computer models used by scientists and engineers.</p> <p>MN.9.4. - Life Science</p> <p>9.4.1. - Structure and Function in Living Systems</p> <p>9.4.1.1. - The student will understand that organisms use the interaction of cellular processes as well as tissues and organ systems to maintain homeostasis.</p> <p>9.4.1.1.1. - Explain how cell processes are influenced by internal and external factors, such as pH and temperature, and how cells and organisms respond to changes in their environment to maintain homeostasis.</p> <p>9.4.1.1.2. - Describe how the functions of individual organ systems are integrated to maintain homeostasis in an organism.</p> <p>9.4.1.2. - The student will understand that cells and cell structures have specific functions that allow an organism to grow, survive and reproduce.</p>

<p>9.4.1.2.1. - Recognize that cells are composed primarily of a few elements (carbon, hydrogen, oxygen, nitrogen, phosphorus, and sulfur), and describe the basic molecular structures of cells and the primary functions of carbohydrates, lipids, proteins and nucleic acids.</p> <p>9.4.1.2.2. - Recognize that the work of the cell is carried out primarily by proteins, most of which are enzymes, and that protein function depends on the amino acid sequence and the shape it takes as a consequence of the interactions between those amino acids.</p> <p>MN.9.13. - Reading Benchmarks: Literacy in Science and Technical Subjects 6-12 - Key Ideas and Details</p> <p>9.13.1.1. - Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions.</p> <p>9.13.2.2. - Determine the central ideas or conclusions of a text; trace the text's explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text.</p> <p>9.13.5.5. - Analyze the structure of the relationships among concepts in a text, including relationships among key terms (e.g., force, friction, reaction force, energy).</p> <p>9.13.9.9. - Compare and contrast findings presented in a text to those from other sources (including their own experiments), noting when the findings support or contradict previous explanations or accounts.</p> <p>9.13.10.10. - By the end of grade 10, read and comprehend science/technical texts in the grades 9-10 text complexity band independently and proficiently.</p> <p>MN.9.14. - Writing Benchmarks: Literacy in Science and Technical Subjects 6-12</p> <p>9.14.1.1. - Write arguments focused on discipline-specific content.</p> <p>9.14.1.1.a. - Introduce precise claim(s), distinguish the claim(s) from alternate or opposing claims, and create an organization that establishes clear relationships among the claim(s), counterclaims, reasons, and evidence.</p> <p>9.14.1.1.b. - Develop claim(s) and counterclaims fairly, supplying data and credible evidence for each while pointing out the strengths and limitations of both claim(s) and counterclaims in a discipline-appropriate form and in a manner that anticipates the audience's knowledge level and concerns.</p> <p>9.14.1.1.c. - Use words, phrases, and clauses to link the major sections of the text, create cohesion, and clarify the relationships between claim(s) and reasons, between reasons and evidence, and between claim(s) and counterclaims.</p> <p>9.14.1.1.e. - Provide a concluding statement or section that follows from or supports the argument presented.</p> <p>9.14.2.2. - Write informative/explanatory texts, as they apply to each discipline and reporting format, including the narration of historical events, of scientific procedures/experiments, or description of technical processes.</p> <p>9.14.2.2.a. - Introduce a topic and organize ideas, concepts, and information to make important connections and distinctions; include formatting (e.g., headings), graphics (e.g., figures, tables), and multimedia when useful to aiding comprehension.</p>	<p>9.4.1.2.1. - Recognize that cells are composed primarily of a few elements (carbon, hydrogen, oxygen, nitrogen, phosphorus, and sulfur), and describe the basic molecular structures of cells and the primary functions of carbohydrates, lipids, proteins and nucleic acids.</p> <p>9.4.1.2.2. - Recognize that the work of the cell is carried out primarily by proteins, most of which are enzymes, and that protein function depends on the amino acid sequence and the shape it takes as a consequence of the interactions between those amino acids.</p> <p>MN.9.13. - Reading Benchmarks: Literacy in Science and Technical Subjects 6-12 - Key Ideas and Details</p> <p>9.13.1.1. - Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions.</p> <p>9.13.2.2. - Determine the central ideas or conclusions of a text; 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include formatting (e.g., headings), graphics (e.g., figures, tables), and multimedia when useful to aiding comprehension.</p>	<p>9.4.1.2.1. - Recognize that cells are composed primarily of a few elements (carbon, hydrogen, oxygen, nitrogen, phosphorus, and sulfur), and describe the basic molecular structures of cells and the primary functions of carbohydrates, lipids, proteins and nucleic acids.</p> <p>9.4.1.2.2. - Recognize that the work of the cell is carried out primarily by proteins, most of which are enzymes, and that protein function depends on the amino acid sequence and the shape it takes as a consequence of the interactions between those amino acids.</p> <p>MN.11.13. - Reading Benchmarks: Literacy in Science and Technical Subjects 6-12 - Key Ideas and Details</p> <p>11.13.1.1. - Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account.</p> <p>11.13.2.2. - Determine the central ideas or conclusions of a text; summarize complex concepts, processes, or information presented in a text by paraphrasing them in simpler but still accurate terms.</p> <p>11.13.5.5. - Analyze how the text structures information or ideas into categories or hierarchies, demonstrating understanding of the information or ideas.</p> <p>11.13.9.9. - Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible.</p> <p>11.13.10.10. - By the end of grade 12, read and comprehend science/technical texts in the grades 11-12 text complexity band independently and proficiently.</p> <p>MN.11.14. - Writing Benchmarks: Literacy in Science and Technical Subjects 6-12</p> <p>11.14.1.1. - Write arguments focused on discipline-specific content.</p> <p>11.14.1.1.a. - Introduce precise, knowledgeable claim(s), establish the significance of the claim(s), distinguish the claim(s) from alternate or opposing claims, and create an organization that logically sequences the claim(s), counterclaims, reasons, and evidence.</p> <p>11.14.1.1.b. - Develop claim(s) and counterclaims fairly and thoroughly, supplying the most relevant data and credible evidence for each while pointing out the strengths and limitations of both claim(s) and counterclaims in a discipline-appropriate form that anticipates the audience's knowledge level, concerns, values, and possible biases.</p> <p>11.14.1.1.c. - Use words, phrases, and clauses as well as varied syntax to link the major sections of the text, create cohesion, and clarify the relationships between claim(s) and reasons, between reasons and evidence, and between claim(s) and counterclaims.</p> <p>11.14.1.1.e. - Provide a concluding statement or section that follows from or supports the argument presented.</p> <p>11.14.2.2. - Write informative/explanatory texts, as they apply to each discipline and reporting format, including the narration of historical events, of scientific procedures/experiments, or description of technical processes.</p> <p>11.14.2.2.a. - Introduce a topic and organize complex ideas, concepts, and information so that each new element builds on that which precedes it to create a unified whole; include formatting (e.g., headings), graphics (e.g., figures, tables), and multimedia when useful to aiding comprehension.</p>	<p>9.4.1.2.1. - Recognize that cells are composed primarily of a few elements (carbon, hydrogen, oxygen, nitrogen, phosphorus, and sulfur), and describe the basic molecular structures of cells and the primary functions of carbohydrates, lipids, proteins and nucleic acids.</p> <p>9.4.1.2.2. - Recognize that the work of the cell is carried out primarily by proteins, most of which are enzymes, and that protein function depends on the amino acid sequence and the shape it takes as a consequence of the interactions between those amino acids.</p> <p>MN.11.13. - Reading Benchmarks: Literacy in Science and Technical Subjects 6-12 - Key Ideas and Details</p> <p>11.13.1.1. - Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account.</p> <p>11.13.2.2. - Determine the central ideas or conclusions of a text; 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In history/social studies, students must be able to incorporate narrative accounts into their analyses of individuals or events of historical import.</p> <p>9.14.4.4. - Produce clear and coherent writing in which the development, organization, and style are appropriate to discipline, task, purpose, and audience.</p>	<p>9.14.2.2.b. - Develop the topic with well-chosen, relevant, credible and sufficient facts, extended definitions, concrete details, quotations, or other information and examples appropriate to the audience's knowledge of the topic.</p> <p>9.14.2.2.c. - Use varied transitions and sentence structures to link the major sections of the text, create cohesion, and clarify the relationships among ideas and concepts.</p> <p>9.14.2.2.f. - Provide a concluding statement or section that follows from and supports the information or explanation presented (e.g., articulating implications or the significance of the topic).</p> <p>9.14.3.3. - (See note; not applicable as a separate requirement)</p> <p>9.14.3.3.a. - Note: Students' narrative skills continue to grow in these grades. The Standards require that students be able to incorporate narrative elements effectively into arguments and informative/explanatory texts. In history/social studies, students must be able to incorporate narrative accounts into their analyses of individuals or events of historical import.</p> <p>9.14.4.4. - Produce clear and coherent writing in which the development, organization, and style are appropriate to discipline, task, purpose, and audience.</p>	<p>11.14.2.2.b. - Develop the topic thoroughly by selecting the most significant, credible, sufficient, and relevant facts, extended definitions, concrete details, quotations, or other information and examples appropriate to the audience's knowledge of the topic.</p> <p>11.14.2.2.c. - Use varied transitions and sentence structures to link the major sections of the text, create cohesion, and clarify the relationships among complex ideas and concepts.</p> <p>11.14.2.2.d. - Use precise language, domain-specific vocabulary and techniques such as metaphor, simile, and analogy to manage the complexity of the topic; convey a knowledgeable stance in a style that responds to the discipline and context as well as to the expertise of likely readers.</p> <p>11.14.2.2.e. - Establish and maintain a formal style and objective tone while attending to the norms and conventions of the discipline in which they are writing.</p> <p>11.14.2.2.f. - Provide a concluding statement or section that follows from and supports the information or explanation provided (e.g., articulating implications or the significance of the topic).</p> <p>11.14.4.4. - Produce clear and coherent writing in which the development, organization, and style are appropriate to discipline, task, purpose, and audience.</p> <p>11.14.10.10. - Write routinely over extended time frames (time for reflection and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences.</p>	<p>11.14.2.2.b. - Develop the topic thoroughly by selecting the most significant, credible, sufficient, and relevant facts, extended definitions, concrete details, quotations, or other information and examples appropriate to the audience's knowledge of the topic.</p> <p>11.14.2.2.c. - Use varied transitions and sentence structures to link the major sections of the text, create cohesion, and clarify the relationships among complex ideas and concepts.</p> <p>11.14.2.2.d. - Use precise language, domain-specific vocabulary and techniques such as metaphor, simile, and analogy to manage the complexity of the topic; convey a knowledgeable stance in a style that responds to the discipline and context as well as to the expertise of likely readers.</p> <p>11.14.2.2.e. - Establish and maintain a formal style and objective tone while attending to the norms and conventions of the discipline in which they are writing.</p> <p>11.14.2.2.f. - Provide a concluding statement or section that follows from and supports the information or explanation provided (e.g., articulating implications or the significance of the topic).</p> <p>11.14.4.4. - Produce clear and coherent writing in which the development, organization, and style are appropriate to discipline, task, purpose, and audience.</p> <p>11.14.10.10. - Write routinely over extended time frames (time for reflection and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences.</p>
Nitrogen Cycle -	MN	<p>MN.9.1. - The Nature of Science and Engineering</p> <p>9.1.1. - The Practice of Science</p> <p>9.1.1.1. - The student will understand that science is a way of knowing about the natural world that is characterized by empirical criteria, logical argument and skeptical review.</p> <p>9.1.1.1.6. - Describe how changes in scientific knowledge generally occur in incremental steps that include and build on earlier knowledge.</p> <p>9.1.1.2. - The student will understand that scientific inquiry uses multiple interrelated processes to investigate and explain the natural world.</p> <p>9.1.1.2.1. - 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.</p> <p>9.1.1.2.2. - 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.</p> <p>9.1.1.2.3. - Identify the critical assumptions and logic used in a line of reasoning to judge the validity of a claim.</p> <p>9.1.3. - Interactions Among Science, Technology, Engineering, Mathematics, and Society</p> <p>9.1.3.1. - The student will understand that natural and designed systems are made up of components that act within a system and interact with other systems.</p> <p>9.1.3.1.3. - Describe how positive and/or negative feedback occur in systems.</p> <p>9.1.3.3. - The student will understand that science and engineering operate in the context of society and both influence and are influenced by this context.</p> <p>9.1.3.3.2. - Communicate, justify and defend the procedures and results of a scientific inquiry or engineering design project using verbal, graphic, quantitative, virtual or written means.</p>	<p>MN.9.1. - The Nature of Science and Engineering</p> <p>9.1.1. - The Practice of Science</p> <p>9.1.1.1. - The student will understand that science is a way of knowing about the natural world that is characterized by empirical criteria, logical argument and skeptical review.</p> <p>9.1.1.1.6. - 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Communicate, justify and defend the procedures and results of a scientific inquiry or engineering design project using verbal, graphic, quantitative, virtual or written means.</p>

9.1.3.4. - The student will understand that science, technology, engineering and mathematics rely on each other to enhance knowledge and understanding.

9.1.3.4.6. - Analyze the strengths and limitations of physical, conceptual, mathematical and computer models used by scientists and engineers.

MN.9.4. - Life Science

9.4.1. - Structure and Function in Living Systems

9.4.1.1. - The student will understand that organisms use the interaction of cellular processes as well as tissues and organ systems to maintain homeostasis.

9.4.1.1.1. - Explain how cell processes are influenced by internal and external factors, such as pH and temperature, and how cells and organisms respond to changes in their environment to maintain homeostasis.

9.4.1.2. - The student will understand that cells and cell structures have specific functions that allow an organism to grow, survive and reproduce.

9.4.1.2.1. - Recognize that cells are composed primarily of a few elements (carbon, hydrogen, oxygen, nitrogen, phosphorus, and sulfur), and describe the basic molecular structures of cells and the primary functions of carbohydrates, lipids, proteins and nucleic acids.

9.4.1.2.2. - Recognize that the work of the cell is carried out primarily by proteins, most of which are enzymes, and that protein function depends on the amino acid sequence and the shape it takes as a consequence of the interactions between those amino acids.

9.4.2. - Interdependence among Living Systems

9.4.2.2. - The student will understand that matter cycles and energy flows through different levels of organization of living systems and the physical environment, as chemical elements are combined in different ways.

9.4.2.2.2. - Explain how matter and energy in an ecosystem is transformed and transferred among organisms, and how energy is dissipated as heat into the environment.

9.4.4. - Human Interactions with Living Systems

9.4.4.2. - The student will understand that personal and community health can be affected by the environment, body functions and human behavior.

9.4.4.2.4. - Explain how environmental factors and personal decisions, such as water pollution, air quality and smoking affect personal and community health.

MN.9.13. - Reading Benchmarks: Literacy in Science and Technical Subjects 6-12

- Key Ideas and Details

9.13.1.1. - Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions.

9.13.2.2. - Determine the central ideas or conclusions of a text; trace the text's explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text.

9.13.5.5. - Analyze the structure of the relationships among concepts in a text, including relationships among key terms (e.g., force, friction, reaction force, energy).

9.13.9.9. - Compare and contrast findings presented in a text to those from other sources (including their own experiments), noting when the findings support or contradict previous explanations or accounts.

9.13.10.10. - By the end of grade 10, read and comprehend science/technical texts in the grades 9-10 text complexity band independently and proficiently.

9.1.3.4. - The student will understand that science, technology, engineering and mathematics rely on each other to enhance knowledge and understanding.

9.1.3.4.6. - Analyze the strengths and limitations of physical, conceptual, mathematical and computer models used by scientists and engineers.

MN.9.4. - Life Science

9.4.1. - Structure and Function in Living Systems

9.4.1.1. - The student will understand that organisms use the interaction of cellular processes as well as tissues and organ systems to maintain homeostasis.

9.4.1.1.1. - Explain how cell processes are influenced by internal and external factors, such as pH and temperature, and how cells and organisms respond to changes in their environment to maintain homeostasis.

9.4.1.2. - The student will understand that cells and cell structures have specific functions that allow an organism to grow, survive and reproduce.

9.4.1.2.1. - Recognize that cells are composed primarily of a few elements (carbon, hydrogen, oxygen, nitrogen, phosphorus, and sulfur), and describe the basic molecular structures of cells and the primary functions of carbohydrates, lipids, proteins and nucleic acids.

9.4.1.2.2. - Recognize that the work of the cell is carried out primarily by proteins, most of which are enzymes, and that protein function depends on the amino acid sequence and the shape it takes as a consequence of the interactions between those amino acids.

9.4.2. - Interdependence among Living Systems

9.4.2.2. - The student will understand that matter cycles and energy flows through different levels of organization of living systems and the physical environment, as chemical elements are combined in different ways.

9.4.2.2.2. - Explain how matter and energy in an ecosystem is transformed and transferred among organisms, and how energy is dissipated as heat into the environment.

9.4.4. - Human Interactions with Living Systems

9.4.4.2. - The student will understand that personal and community health can be affected by the environment, body functions and human behavior.

9.4.4.2.4. - Explain how environmental factors and personal decisions, such as water pollution, air quality and smoking affect personal and community health.

MN.9.13. - Reading Benchmarks: Literacy in Science and Technical Subjects 6-12

- Key Ideas and Details

9.13.1.1. - Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions.

9.13.2.2. - Determine the central ideas or conclusions of a text; trace the text's explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text.

9.13.5.5. - Analyze the structure of the relationships among concepts in a text, including relationships among key terms (e.g., force, friction, reaction force, energy).

9.13.9.9. - Compare and contrast findings presented in a text to those from other sources (including their own experiments), noting when the findings support or contradict previous explanations or accounts.

9.13.10.10. - By the end of grade 10, read and comprehend science/technical texts in the grades 9-10 text complexity band independently and proficiently.

9.1.3.4. - The student will understand that science, technology, engineering and mathematics rely on each other to enhance knowledge and understanding.

9.1.3.4.6. - Analyze the strengths and limitations of physical, conceptual, mathematical and computer models used by scientists and engineers.

MN.9.4. - Life Science

9.4.1. - Structure and Function in Living Systems

9.4.1.1. - The student will understand that organisms use the interaction of cellular processes as well as tissues and organ systems to maintain homeostasis.

9.4.1.1.1. - Explain how cell processes are influenced by internal and external factors, such as pH and temperature, and how cells and organisms respond to changes in their environment to maintain homeostasis.

9.4.1.2. - The student will understand that cells and cell structures have specific functions that allow an organism to grow, survive and reproduce.

9.4.1.2.1. - Recognize that cells are composed primarily of a few elements (carbon, hydrogen, oxygen, nitrogen, phosphorus, and sulfur), and describe the basic molecular structures of cells and the primary functions of carbohydrates, lipids, proteins and nucleic acids.

9.4.1.2.2. - Recognize that the work of the cell is carried out primarily by proteins, most of which are enzymes, and that protein function depends on the amino acid sequence and the shape it takes as a consequence of the interactions between those amino acids.

9.4.2. - Interdependence among Living Systems

9.4.2.2. - The student will understand that matter cycles and energy flows through different levels of organization of living systems and the physical environment, as chemical elements are combined in different ways.

9.4.2.2.2. - Explain how matter and energy in an ecosystem is transformed and transferred among organisms, and how energy is dissipated as heat into the environment.

9.4.4. - Human Interactions with Living Systems

9.4.4.2. - The student will understand that personal and community health can be affected by the environment, body functions and human behavior.

9.4.4.2.4. - Explain how environmental factors and personal decisions, such as water pollution, air quality and smoking affect personal and community health.

MN.11.13. - Reading Benchmarks: Literacy in Science and Technical Subjects 6-12

- Key Ideas and Details

11.13.1.1. - Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account.

11.13.2.2. - Determine the central ideas or conclusions of a text; summarize complex concepts, processes, or information presented in a text by paraphrasing them in simpler but still accurate terms.

11.13.5.5. - Analyze how the text structures information or ideas into categories or hierarchies, demonstrating understanding of the information or ideas.

11.13.9.9. - Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible.

11.13.10.10. - By the end of grade 12, read and comprehend science/technical texts in the grades 11-12 text complexity band independently and proficiently.

9.1.3.4. - The student will understand that science, technology, engineering and mathematics rely on each other to enhance knowledge and understanding.

9.1.3.4.6. - Analyze the strengths and limitations of physical, conceptual, mathematical and computer models used by scientists and engineers.

MN.9.4. - Life Science

9.4.1. - Structure and Function in Living Systems

9.4.1.1. - The student will understand that organisms use the interaction of cellular processes as well as tissues and organ systems to maintain homeostasis.

9.4.1.1.1. - Explain how cell processes are influenced by internal and external factors, such as pH and temperature, and how cells and organisms respond to changes in their environment to maintain homeostasis.

9.4.1.2. - The student will understand that cells and cell structures have specific functions that allow an organism to grow, survive and reproduce.

9.4.1.2.1. - Recognize that cells are composed primarily of a few elements (carbon, hydrogen, oxygen, nitrogen, phosphorus, and sulfur), and describe the basic molecular structures of cells and the primary functions of carbohydrates, lipids, proteins and nucleic acids.

9.4.1.2.2. - Recognize that the work of the cell is carried out primarily by proteins, most of which are enzymes, and that protein function depends on the amino acid sequence and the shape it takes as a consequence of the interactions between those amino acids.

9.4.2. - Interdependence among Living Systems

9.4.2.2. - The student will understand that matter cycles and energy flows through different levels of organization of living systems and the physical environment, as chemical elements are combined in different ways.

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MN.11.13. - Reading Benchmarks: Literacy in Science and Technical Subjects 6-12

- Key Ideas and Details

11.13.1.1. - Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account.

11.13.2.2. - Determine the central ideas or conclusions of a text; summarize complex concepts, processes, or information presented in a text by paraphrasing them in simpler but still accurate terms.

11.13.5.5. - Analyze how the text structures information or ideas into categories or hierarchies, demonstrating understanding of the information or ideas.

11.13.9.9. - Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible.

11.13.10.10. - By the end of grade 12, read and comprehend science/technical texts in the grades 11-12 text complexity band independently and proficiently.

		<p>MN.9.14. - Writing Benchmarks: Literacy in Science and Technical Subjects 6-12</p> <p>9.14.1.1. - Write arguments focused on discipline-specific content.</p> <p>9.14.1.1.a. - Introduce precise claim(s), distinguish the claim(s) from alternate or opposing claims, and create an organization that establishes clear relationships among the claim(s), counterclaims, reasons, and evidence.</p> <p>9.14.1.1.b. - Develop claim(s) and counterclaims fairly, supplying data and credible evidence for each while pointing out the strengths and limitations of both claim(s) and counterclaims in a discipline-appropriate form and in a manner that anticipates the audience's knowledge level and concerns.</p> <p>9.14.1.1.c. - Use words, phrases, and clauses to link the major sections of the text, create cohesion, and clarify the relationships between claim(s) and reasons, between reasons and evidence, and between claim(s) and counterclaims.</p> <p>9.14.1.1.e. - Provide a concluding statement or section that follows from or supports the argument presented.</p> <p>9.14.2.2. - Write informative/explanatory texts, as they apply to each discipline and reporting format, including the narration of historical events, of scientific procedures/ experiments, or description of technical processes.</p> <p>9.14.2.2.a. - Introduce a topic and organize ideas, concepts, and information to make important connections and distinctions; include formatting (e.g., headings), graphics (e.g., figures, tables), and multimedia when useful to aiding comprehension.</p> <p>9.14.2.2.b. - Develop the topic with well-chosen, relevant, credible and sufficient facts, extended definitions, concrete details, quotations, or other information and examples appropriate to the audience's knowledge of the topic.</p> <p>9.14.2.2.c. - Use varied transitions and sentence structures to link the major sections of the text, create cohesion, and clarify the relationships among ideas and concepts.</p> <p>9.14.2.2.f. - Provide a concluding statement or section that follows from and supports the information or explanation presented (e.g., articulating implications or the significance of the topic).</p> <p>9.14.3.3. - (See note; not applicable as a separate requirement)</p> <p>9.14.3.3.a. - Note: Students' narrative skills continue to grow in these grades. The Standards require that students be able to incorporate narrative elements effectively into arguments and informative/explanatory texts. In history/social studies, students must be able to incorporate narrative accounts into their analyses of individuals or events of historical import.</p> <p>9.14.4.4. - Produce clear and coherent writing in which the development, organization, and style are appropriate to discipline, task, purpose, and audience.</p>	<p>MN.9.14. - Writing Benchmarks: Literacy in Science and Technical Subjects 6-12</p> <p>9.14.1.1. - Write arguments focused on discipline-specific content.</p> <p>9.14.1.1.a. - Introduce precise claim(s), distinguish the claim(s) from alternate or opposing claims, and create an organization that establishes clear relationships among the claim(s), counterclaims, reasons, and evidence.</p> <p>9.14.1.1.b. - Develop claim(s) and counterclaims fairly, supplying data and credible evidence for each while pointing out the strengths and limitations of both claim(s) and counterclaims in a discipline-appropriate form and in a manner that anticipates the audience's knowledge level and concerns.</p> <p>9.14.1.1.c. - Use words, phrases, and clauses to link the major sections of the text, create cohesion, and clarify the relationships between claim(s) and reasons, between reasons and evidence, and between claim(s) and counterclaims.</p> <p>9.14.1.1.e. - Provide a concluding statement or section that follows from or supports the argument presented.</p> <p>9.14.2.2. - Write informative/explanatory texts, as they apply to each discipline and reporting format, including the narration of historical events, of scientific procedures/ experiments, or description of technical processes.</p> <p>9.14.2.2.a. - Introduce a topic and organize ideas, concepts, and information to make important connections and distinctions; include formatting (e.g., headings), graphics (e.g., figures, tables), and multimedia when useful to aiding comprehension.</p> <p>9.14.2.2.b. - Develop the topic with well-chosen, relevant, credible and sufficient facts, extended definitions, concrete details, quotations, or other information and examples appropriate to the audience's knowledge of the topic.</p> <p>9.14.2.2.c. - Use varied transitions and sentence structures to link the major sections of the text, create cohesion, and clarify the relationships among ideas and concepts.</p> <p>9.14.2.2.f. - Provide a concluding statement or section that follows from and supports the information or explanation presented (e.g., articulating implications or the significance of the topic).</p> <p>9.14.3.3. - (See note; not applicable as a separate requirement)</p> <p>9.14.3.3.a. - Note: Students' narrative skills continue to grow in these grades. 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include formatting (e.g., headings), graphics (e.g., figures, tables), and multimedia when useful to aiding comprehension.</p> <p>11.14.2.2.b. - Develop the topic thoroughly by selecting the most significant, credible, sufficient, and relevant facts, extended definitions, concrete details, quotations, or other information and examples appropriate to the audience's knowledge of the topic.</p> <p>11.14.2.2.c. - Use varied transitions and sentence structures to link the major sections of the text, create cohesion, and clarify the relationships among complex ideas and concepts.</p> <p>11.14.2.2.d. - Use precise language, domain-specific vocabulary and techniques such as metaphor, simile, and analogy to manage the complexity of the topic; convey a knowledgeable stance in a style that responds to the discipline and context as well as to the expertise of likely readers.</p> <p>11.14.2.2.e. - Establish and maintain a formal style and objective tone while attending to the norms and conventions of the discipline in which they are writing.</p> <p>11.14.2.2.f. - Provide a concluding statement or section that follows from and supports the information or explanation provided (e.g., articulating implications or the significance of the topic).</p> <p>11.14.4.4. - Produce clear and coherent writing in which the development, organization, and style are appropriate to discipline, task, purpose, and audience.</p> <p>11.14.10.10. - Write routinely over extended time frames (time for reflection and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences.</p>	<p>MN.11.14. - Writing Benchmarks: Literacy in Science and Technical Subjects 6-12</p> <p>11.14.1.1. - Write arguments focused on discipline-specific content.</p> <p>11.14.1.1.a. - Introduce precise, knowledgeable claim(s), establish the significance of the claim(s), distinguish the claim(s) from alternate or opposing claims, and create an organization that logically sequences the claim(s), counterclaims, reasons, and evidence.</p> <p>11.14.1.1.b. - Develop claim(s) and counterclaims fairly and thoroughly, supplying the most relevant data and credible evidence for each while pointing out the strengths and limitations of both claim(s) and counterclaims in a discipline-appropriate form that anticipates the audience's knowledge level, concerns, values, and possible biases.</p> <p>11.14.1.1.c. - Use words, phrases, and clauses as well as varied syntax to link the major sections of the text, create cohesion, and clarify the relationships between claim(s) and reasons, between reasons and evidence, and between claim(s) and counterclaims.</p> <p>11.14.1.1.e. - Provide a concluding statement or section that follows from or supports the argument presented.</p> <p>11.14.2.2. - Write informative/explanatory texts, as they apply to each discipline and reporting format, including the narration of historical events, of scientific procedures/ experiments, or description of technical processes.</p> <p>11.14.2.2.a. - Introduce a topic and organize complex ideas, concepts, and information so that each new element builds on that which precedes it to create a unified whole; 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Osmosis -	MN	<p>MN.9.1. - The Nature of Science and Engineering</p> <p>9.1.1. - The Practice of Science</p> <p>9.1.1.2. - The student will understand that scientific inquiry uses multiple interrelated processes to investigate and explain the natural world.</p>	<p>MN.9.1. - The Nature of Science and Engineering</p> <p>9.1.1. - The Practice of Science</p> <p>9.1.1.2. - The student will understand that scientific inquiry uses multiple interrelated processes to investigate and explain the natural world.</p>	<p>MN.9.1. - The Nature of Science and Engineering</p> <p>9.1.1. - The Practice of Science</p> <p>9.1.1.2. - The student will understand that scientific inquiry uses multiple interrelated processes to investigate and explain the natural world.</p>	<p>MN.9.1. - The Nature of Science and Engineering</p> <p>9.1.1. - The Practice of Science</p> <p>9.1.1.2. - The student will understand that scientific inquiry uses multiple interrelated processes to investigate and explain the natural world.</p>

<p>9.1.1.2.1. - 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.</p> <p>9.1.1.2.2. - 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.</p> <p>9.1.1.2.3. - Identify the critical assumptions and logic used in a line of reasoning to judge the validity of a claim.</p> <p>9.1.3. - Interactions Among Science, Technology, Engineering, Mathematics, and Society</p> <p>9.1.3.3. - The student will understand that science and engineering operate in the context of society and both influence and are influenced by this context.</p> <p>9.1.3.3.2. - Communicate, justify and defend the procedures and results of a scientific inquiry or engineering design project using verbal, graphic, quantitative, virtual or written means.</p>	<p>9.1.1.2.1. - 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.</p> <p>9.1.1.2.2. - 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.</p> <p>9.1.1.2.3. - Identify the critical assumptions and logic used in a line of reasoning to judge the validity of a claim.</p> <p>9.1.3. - Interactions Among Science, Technology, Engineering, Mathematics, and Society</p> <p>9.1.3.3. - The student will understand that science and engineering operate in the context of society and both influence and are influenced by this context.</p> <p>9.1.3.3.2. - Communicate, justify and defend the procedures and results of a scientific inquiry or engineering design project using verbal, graphic, quantitative, virtual or written means.</p>	<p>9.1.1.2.1. - 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.</p> <p>9.1.1.2.2. - 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.</p> <p>9.1.1.2.3. - Identify the critical assumptions and logic used in a line of reasoning to judge the validity of a claim.</p> <p>9.1.3. - Interactions Among Science, Technology, Engineering, Mathematics, and Society</p> <p>9.1.3.3. - The student will understand that science and engineering operate in the context of society and both influence and are influenced by this context.</p> <p>9.1.3.3.2. - Communicate, justify and defend the procedures and results of a scientific inquiry or engineering design project using verbal, graphic, quantitative, virtual or written means.</p>	<p>9.1.1.2.1. - 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.</p> <p>9.1.1.2.2. - 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.</p> <p>9.1.1.2.3. - Identify the critical assumptions and logic used in a line of reasoning to judge the validity of a claim.</p> <p>9.1.3. - Interactions Among Science, Technology, Engineering, Mathematics, and Society</p> <p>9.1.3.3. - The student will understand that science and engineering operate in the context of society and both influence and are influenced by this context.</p> <p>9.1.3.3.2. - Communicate, justify and defend the procedures and results of a scientific inquiry or engineering design project using verbal, graphic, quantitative, virtual or written means.</p>
<p>9.1.3.4. - The student will understand that science, technology, engineering and mathematics rely on each other to enhance knowledge and understanding.</p> <p>9.1.3.4.6. - Analyze the strengths and limitations of physical, conceptual, mathematical and computer models used by scientists and engineers.</p> <p>MN.9.4. - Life Science</p>	<p>9.1.3.4. - The student will understand that science, technology, engineering and mathematics rely on each other to enhance knowledge and understanding.</p> <p>9.1.3.4.6. - Analyze the strengths and limitations of physical, conceptual, mathematical and computer models used by scientists and engineers.</p> <p>MN.9.4. - Life Science</p>	<p>9.1.3.4. - The student will understand that science, technology, engineering and mathematics rely on each other to enhance knowledge and understanding.</p> <p>9.1.3.4.6. - Analyze the strengths and limitations of physical, conceptual, mathematical and computer models used by scientists and engineers.</p> <p>MN.9.4. - Life Science</p>	<p>9.1.3.4. - The student will understand that science, technology, engineering and mathematics rely on each other to enhance knowledge and understanding.</p> <p>9.1.3.4.6. - Analyze the strengths and limitations of physical, conceptual, mathematical and computer models used by scientists and engineers.</p> <p>MN.9.4. - Life Science</p>
<p>9.4.1. - Structure and Function in Living Systems</p> <p>9.4.1.1. - The student will understand that organisms use the interaction of cellular processes as well as tissues and organ systems to maintain homeostasis.</p> <p>9.4.1.1.1. - Explain how cell processes are influenced by internal and external factors, such as pH and temperature, and how cells and organisms respond to changes in their environment to maintain homeostasis.</p> <p>9.4.1.1.2. - Describe how the functions of individual organ systems are integrated to maintain homeostasis in an organism.</p> <p>9.4.1.2. - The student will understand that cells and cell structures have specific functions that allow an organism to grow, survive and reproduce.</p> <p>9.4.1.2.1. - Recognize that cells are composed primarily of a few elements (carbon, hydrogen, oxygen, nitrogen, phosphorus, and sulfur), and describe the basic molecular structures of cells and the primary functions of carbohydrates, lipids, proteins and nucleic acids.</p> <p>MN.9.13. - Reading Benchmarks: Literacy in Science and Technical Subjects 6-12</p>	<p>9.4.1. - Structure and Function in Living Systems</p> <p>9.4.1.1. - The student will understand that organisms use the interaction of cellular processes as well as tissues and organ systems to maintain homeostasis.</p> <p>9.4.1.1.1. - Explain how cell processes are influenced by internal and external factors, such as pH and temperature, and how cells and organisms respond to changes in their environment to maintain homeostasis.</p> <p>9.4.1.1.2. - Describe how the functions of individual organ systems are integrated to maintain homeostasis in an organism.</p> <p>9.4.1.2. - The student will understand that cells and cell structures have specific functions that allow an organism to grow, survive and reproduce.</p> <p>9.4.1.2.1. - Recognize that cells are composed primarily of a few elements (carbon, hydrogen, oxygen, nitrogen, phosphorus, and sulfur), and describe the basic molecular structures of cells and the primary functions of carbohydrates, lipids, proteins and nucleic acids.</p> <p>MN.9.13. - Reading Benchmarks: Literacy in Science and Technical Subjects 6-12</p>	<p>9.4.1. - Structure and Function in Living Systems</p> <p>9.4.1.1. - The student will understand that organisms use the interaction of cellular processes as well as tissues and organ systems to maintain homeostasis.</p> <p>9.4.1.1.1. - Explain how cell processes are influenced by internal and external factors, such as pH and temperature, and how cells and organisms respond to changes in their environment to maintain homeostasis.</p> <p>9.4.1.1.2. - Describe how the functions of individual organ systems are integrated to maintain homeostasis in an organism.</p> <p>9.4.1.2. - The student will understand that cells and cell structures have specific functions that allow an organism to grow, survive and reproduce.</p> <p>9.4.1.2.1. - Recognize that cells are composed primarily of a few elements (carbon, hydrogen, oxygen, nitrogen, phosphorus, and sulfur), and describe the basic molecular structures of cells and the primary functions of carbohydrates, lipids, proteins and nucleic acids.</p> <p>MN.11.13. - Reading Benchmarks: Literacy in Science and Technical Subjects 6-12</p>	<p>9.4.1. - Structure and Function in Living Systems</p> <p>9.4.1.1. - The student will understand that organisms use the interaction of cellular processes as well as tissues and organ systems to maintain homeostasis.</p> <p>9.4.1.1.1. - Explain how cell processes are influenced by internal and external factors, such as pH and temperature, and how cells and organisms respond to changes in their environment to maintain homeostasis.</p> <p>9.4.1.1.2. - Describe how the functions of individual organ systems are integrated to maintain homeostasis in an organism.</p> <p>9.4.1.2. - The student will understand that cells and cell structures have specific functions that allow an organism to grow, survive and reproduce.</p> <p>9.4.1.2.1. - Recognize that cells are composed primarily of a few elements (carbon, hydrogen, oxygen, nitrogen, phosphorus, and sulfur), and describe the basic molecular structures of cells and the primary functions of carbohydrates, lipids, proteins and nucleic acids.</p> <p>MN.11.13. - Reading Benchmarks: Literacy in Science and Technical Subjects 6-12</p>
<p>- Key Ideas and Details</p> <p>9.13.1.1. - Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions.</p> <p>9.13.2.2. - Determine the central ideas or conclusions of a text; trace the text's explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text.</p> <p>9.13.5.5. - Analyze the structure of the relationships among concepts in a text, including relationships among key terms (e.g., force, friction, reaction force, energy).</p> <p>9.13.9.9. - Compare and contrast findings presented in a text to those from other sources (including their own experiments), noting when the findings support or contradict previous explanations or accounts.</p>	<p>9.13.1.1. - Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions.</p> <p>9.13.2.2. - Determine the central ideas or conclusions of a text; trace the text's explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text.</p> <p>9.13.5.5. - Analyze the structure of the relationships among concepts in a text, including relationships among key terms (e.g., force, friction, reaction force, energy).</p> <p>9.13.9.9. - Compare and contrast findings presented in a text to those from other sources (including their own experiments), noting when the findings support or contradict previous explanations or accounts.</p>	<p>11.13.1.1. - Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account.</p> <p>11.13.2.2. - Determine the central ideas or conclusions of a text; summarize complex concepts, processes, or information presented in a text by paraphrasing them in simpler but still accurate terms.</p> <p>11.13.5.5. - Analyze how the text structures information or ideas into categories or hierarchies, demonstrating understanding of the information or ideas.</p> <p>11.13.9.9. - Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible.</p>	<p>11.13.1.1. - Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account.</p> <p>11.13.2.2. - Determine the central ideas or conclusions of a text; summarize complex concepts, processes, or information presented in a text by paraphrasing them in simpler but still accurate terms.</p> <p>11.13.5.5. - Analyze how the text structures information or ideas into categories or hierarchies, demonstrating understanding of the information or ideas.</p> <p>11.13.9.9. - Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible.</p>

		<p>9.13.10.10. - By the end of grade 10, read and comprehend science/technical texts in the grades 9-10 text complexity band independently and proficiently.</p> <p>MN.9.14. - Writing Benchmarks: Literacy in Science and Technical Subjects 6-12</p> <p>9.14.1.1. - Write arguments focused on discipline-specific content.</p> <p>9.14.1.1.a. - Introduce precise claim(s), distinguish the claim(s) from alternate or opposing claims, and create an organization that establishes clear relationships among the claim(s), counterclaims, reasons, and evidence.</p> <p>9.14.1.1.b. - Develop claim(s) and counterclaims fairly, supplying data and credible evidence for each while pointing out the strengths and limitations of both claim(s) and counterclaims in a discipline-appropriate form and in a manner that anticipates the audience's knowledge level and concerns.</p> <p>9.14.1.1.c. - Use words, phrases, and clauses to link the major sections of the text, create cohesion, and clarify the relationships between claim(s) and reasons, between reasons and evidence, and between claim(s) and counterclaims.</p> <p>9.14.1.1.e. - Provide a concluding statement or section that follows from or supports the argument presented.</p> <p>9.14.2.2. - Write informative/explanatory texts, as they apply to each discipline and reporting format, including the narration of historical events, of scientific procedures/experiments, or description of technical processes.</p> <p>9.14.2.2.a. - Introduce a topic and organize ideas, concepts, and information to make important connections and distinctions; include formatting (e.g., headings), graphics (e.g., figures, tables), and multimedia when useful to aiding comprehension.</p> <p>9.14.2.2.b. - Develop the topic with well-chosen, relevant, credible and sufficient facts, extended definitions, concrete details, quotations, or other information and examples appropriate to the audience's knowledge of the topic.</p> <p>9.14.2.2.c. - Use varied transitions and sentence structures to link the major sections of the text, create cohesion, and clarify the relationships among ideas and concepts.</p> <p>9.14.2.2.f. - Provide a concluding statement or section that follows from and supports the information or explanation presented (e.g., articulating implications or the significance of the topic).</p> <p>9.14.3.3. - (See note; not applicable as a separate requirement)</p> <p>9.14.3.3.a. - Note: Students' narrative skills continue to grow in these grades. The Standards require that students be able to incorporate narrative elements effectively into arguments and informative/explanatory texts. In history/social studies, students must be able to incorporate narrative accounts into their analyses of individuals or events of historical import.</p> <p>9.14.4.4. - Produce clear and coherent writing in which the development, organization, and style are appropriate to discipline, task, purpose, and audience.</p>	<p>9.13.10.10. - By the end of grade 10, read and comprehend science/technical texts in the grades 9-10 text complexity band independently and proficiently.</p> <p>MN.9.14. - Writing Benchmarks: Literacy in Science and Technical Subjects 6-12</p> <p>9.14.1.1. - Write arguments focused on discipline-specific content.</p> <p>9.14.1.1.a. - Introduce precise claim(s), distinguish the claim(s) from alternate or opposing claims, and create an organization that establishes clear relationships among the claim(s), counterclaims, reasons, and evidence.</p> <p>9.14.1.1.b. - Develop claim(s) and counterclaims fairly, supplying data and credible evidence for each while pointing out the strengths and limitations of both claim(s) and counterclaims in a discipline-appropriate form and in a manner that anticipates the audience's knowledge level and concerns.</p> <p>9.14.1.1.c. - Use words, phrases, and clauses to link the major sections of the text, create cohesion, and clarify the relationships between claim(s) and reasons, between reasons and evidence, and between claim(s) and counterclaims.</p> <p>9.14.1.1.e. - Provide a concluding statement or section that follows from or supports the argument presented.</p> <p>9.14.2.2. - Write informative/explanatory texts, as they apply to each discipline and reporting format, including the narration of historical events, of scientific procedures/experiments, or description of technical processes.</p> <p>9.14.2.2.a. - Introduce a topic and organize ideas, concepts, and information to make important connections and distinctions; include formatting (e.g., headings), graphics (e.g., figures, tables), and multimedia when useful to aiding comprehension.</p> <p>9.14.2.2.b. - Develop the topic with well-chosen, relevant, credible and sufficient facts, extended definitions, concrete details, quotations, or other information and examples appropriate to the audience's knowledge of the topic.</p> <p>9.14.2.2.c. - Use varied transitions and sentence structures to link the major sections of the text, create cohesion, and clarify the relationships among ideas and concepts.</p> <p>9.14.2.2.f. - Provide a concluding statement or section that follows from and supports the information or explanation presented (e.g., articulating implications or the significance of the topic).</p> <p>9.14.3.3. - (See note; not applicable as a separate requirement)</p> <p>9.14.3.3.a. - Note: Students' narrative skills continue to grow in these grades. 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include formatting (e.g., headings), graphics (e.g., figures, tables), and multimedia when useful to aiding comprehension.</p> <p>11.14.2.2.b. - Develop the topic thoroughly by selecting the most significant, credible, sufficient, and relevant facts, extended definitions, concrete details, quotations, or other information and examples appropriate to the audience's knowledge of the topic.</p> <p>11.14.2.2.c. - Use varied transitions and sentence structures to link the major sections of the text, create cohesion, and clarify the relationships among complex ideas and concepts.</p> <p>11.14.2.2.d. - Use precise language, domain-specific vocabulary and techniques such as metaphor, simile, and analogy to manage the complexity of the topic; convey a knowledgeable stance in a style that responds to the discipline and context as well as to the expertise of likely readers.</p> <p>11.14.2.2.e. - Establish and maintain a formal style and objective tone while attending to the norms and conventions of the discipline in which they are writing.</p> <p>11.14.2.2.f. - Provide a concluding statement or section that follows from and supports the information or explanation provided (e.g., articulating implications or the significance of the topic).</p> <p>11.14.4.4. - Produce clear and coherent writing in which the development, organization, and style are appropriate to discipline, task, purpose, and audience.</p> <p>11.14.10.10. - Write routinely over extended time frames (time for reflection and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences.</p>	<p>11.13.10.10. - By the end of grade 12, read and comprehend science/technical texts in the grades 11-12 text complexity band independently and proficiently.</p> <p>MN.11.14. - Writing Benchmarks: Literacy in Science and Technical Subjects 6-12</p> <p>11.14.1.1. - Write arguments focused on discipline-specific content.</p> <p>11.14.1.1.a. - Introduce precise, knowledgeable claim(s), establish the significance of the claim(s), distinguish the claim(s) from alternate or opposing claims, and create an organization that logically sequences the claim(s), counterclaims, reasons, and evidence.</p> <p>11.14.1.1.b. - Develop claim(s) and counterclaims fairly and thoroughly, supplying the most relevant data and credible evidence for each while pointing out the strengths and limitations of both claim(s) and counterclaims in a discipline-appropriate form that anticipates the audience's knowledge level, concerns, values, and possible biases.</p> <p>11.14.1.1.c. - Use words, phrases, and clauses as well as varied syntax to link the major sections of the text, create cohesion, and clarify the relationships between claim(s) and reasons, between reasons and evidence, and between claim(s) and counterclaims.</p> <p>11.14.1.1.e. - Provide a concluding statement or section that follows from or supports the argument presented.</p> <p>11.14.2.2. - Write informative/explanatory texts, as they apply to each discipline and reporting format, including the narration of historical events, of scientific procedures/experiments, or description of technical processes.</p> <p>11.14.2.2.a. - Introduce a topic and organize complex ideas, concepts, and information so that each new element builds on that which precedes it to create a unified whole; 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Photosynthesis -	MN	MN.9.1. - The Nature of Science and Engineering 9.1.1. - The Practice of Science	MN.9.1. - The Nature of Science and Engineering 9.1.1. - The Practice of Science	MN.9.1. - The Nature of Science and Engineering 9.1.1. - The Practice of Science	MN.9.1. - The Nature of Science and Engineering 9.1.1. - The Practice of Science

<p>9.1.1.1. - The student will understand that science is a way of knowing about the natural world that is characterized by empirical criteria, logical argument and skeptical review.</p> <p>9.1.1.1.6. - Describe how changes in scientific knowledge generally occur in incremental steps that include and build on earlier knowledge.</p> <p>9.1.1.2. - The student will understand that scientific inquiry uses multiple interrelated processes to investigate and explain the natural world.</p> <p>9.1.1.2.1. - 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.</p> <p>9.1.1.2.2. - 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.</p> <p>9.1.1.2.3. - Identify the critical assumptions and logic used in a line of reasoning to judge the validity of a claim.</p> <p>9.1.3. - Interactions Among Science, Technology, Engineering, Mathematics, and Society</p> <p>9.1.3.3. - The student will understand that science and engineering operate in the context of society and both influence and are influenced by this context.</p> <p>9.1.3.3.2. - Communicate, justify and defend the procedures and results of a scientific inquiry or engineering design project using verbal, graphic, quantitative, virtual or written means.</p>	<p>9.1.1.1. - The student will understand that science is a way of knowing about the natural world that is characterized by empirical criteria, logical argument and skeptical review.</p> <p>9.1.1.1.6. - Describe how changes in scientific knowledge generally occur in incremental steps that include and build on earlier knowledge.</p> <p>9.1.1.2. - The student will understand that scientific inquiry uses multiple interrelated processes to investigate and explain the natural world.</p> <p>9.1.1.2.1. - 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.</p> <p>9.1.1.2.2. - 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<p>9.1.3.4. - The student will understand that science, technology, engineering and mathematics rely on each other to enhance knowledge and understanding.</p> <p>9.1.3.4.3. - Select and use appropriate numeric, symbolic, pictorial, or graphical representation to communicate scientific ideas, procedures and experimental results.</p> <p>9.1.3.4.6. - Analyze the strengths and limitations of physical, conceptual, mathematical and computer models used by scientists and engineers.</p> <p>MN.9.4. - Life Science</p> <p>9.4.1. - Structure and Function in Living Systems</p> <p>9.4.1.2. - The student will understand that cells and cell structures have specific functions that allow an organism to grow, survive and reproduce.</p> <p>9.4.1.2.1. - Recognize that cells are composed primarily of a few elements (carbon, hydrogen, oxygen, nitrogen, phosphorus, and sulfur), and describe the basic molecular structures of cells and the primary functions of carbohydrates, lipids, proteins and nucleic acids.</p> <p>9.4.1.2.2. - Recognize that the work of the cell is carried out primarily by proteins, most of which are enzymes, and that protein function depends on the amino acid sequence and the shape it takes as a consequence of the interactions between those amino acids.</p> <p>9.4.2. - Interdependence among Living Systems</p> <p>9.4.2.2. - The student will understand that matter cycles and energy flows through different levels of organization of living systems and the physical environment, as chemical elements are combined in different ways.</p> <p>9.4.2.2.1. - Use words and equations to differentiate between the processes of photosynthesis and respiration in terms of energy flow, beginning reactants and end products.</p> <p>9.4.4. - Human Interactions with Living Systems</p> <p>9.4.4.2. - The student will understand that personal and community health can be affected by the environment, body functions and human behavior.</p>	<p>9.1.3.4. - The student will understand that science, technology, engineering and mathematics rely on each other to enhance knowledge and understanding.</p> <p>9.1.3.4.3. - 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Analyze the strengths and limitations of physical, conceptual, mathematical and computer models used by scientists and engineers.</p> <p>MN.9.4. - Life Science</p> <p>9.4.1. - Structure and Function in Living Systems</p> <p>9.4.1.2. - The student will understand that cells and cell structures have specific functions that allow an organism to grow, survive and reproduce.</p> <p>9.4.1.2.1. - Recognize that cells are composed primarily of a few elements (carbon, hydrogen, oxygen, nitrogen, phosphorus, and sulfur), and describe the basic molecular structures of cells and the primary functions of carbohydrates, lipids, proteins and nucleic acids.</p> <p>9.4.1.2.2. - Recognize that the work of the cell is carried out primarily by proteins, most of which are enzymes, and that protein function depends on the amino acid sequence and the shape it takes as a consequence of the interactions between those amino acids.</p> <p>9.4.2. - Interdependence among Living Systems</p> <p>9.4.2.2. - The student will understand that matter cycles and energy flows through different levels of organization of living systems and the physical environment, as chemical elements are combined in different ways.</p> <p>9.4.2.2.1. - 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Recognize that cells are composed primarily of a few elements (carbon, hydrogen, oxygen, nitrogen, phosphorus, and sulfur), and describe the basic molecular structures of cells and the primary functions of carbohydrates, lipids, proteins and nucleic acids.</p> <p>9.4.1.2.2. - Recognize that the work of the cell is carried out primarily by proteins, most of which are enzymes, and that protein function depends on the amino acid sequence and the shape it takes as a consequence of the interactions between those amino acids.</p> <p>9.4.2. - Interdependence among Living Systems</p> <p>9.4.2.2. - The student will understand that matter cycles and energy flows through different levels of organization of living systems and the physical environment, as chemical elements are combined in different ways.</p> <p>9.4.2.2.1. - Use words and equations to differentiate between the processes of photosynthesis and respiration in terms of energy flow, beginning reactants and end products.</p> <p>9.4.4. - Human Interactions with Living Systems</p> <p>9.4.4.2. - The student will understand that personal and community health can be affected by the environment, body functions and human behavior.</p>

<p>9.4.4.2.4. - Explain how environmental factors and personal decisions, such as water pollution, air quality and smoking affect personal and community health.</p> <p>MN.9.13. - Reading Benchmarks: Literacy in Science and Technical Subjects 6-12</p> <p>- Key Ideas and Details</p> <p>9.13.1.1. - Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions.</p> <p>9.13.2.2. - Determine the central ideas or conclusions of a text; trace the text's explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text.</p> <p>9.13.5.5. - Analyze the structure of the relationships among concepts in a text, including relationships among key terms (e.g., force, friction, reaction force, energy).</p> <p>9.13.7.7. - Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words.</p> <p>9.13.9.9. - Compare and contrast findings presented in a text to those from other sources (including their own experiments), noting when the findings support or contradict previous explanations or accounts.</p> <p>9.13.10.10. - By the end of grade 10, read and comprehend science/technical texts in the grades 9-10 text complexity band independently and proficiently.</p> <p>MN.9.14. - Writing Benchmarks: Literacy in Science and Technical Subjects 6-12</p> <p>9.14.1.1. - Write arguments focused on discipline-specific content.</p> <p>9.14.1.1.a. - Introduce precise claim(s), distinguish the claim(s) from alternate or opposing claims, and create an organization that establishes clear relationships among the claim(s), counterclaims, reasons, and evidence.</p> <p>9.14.1.1.b. - Develop claim(s) and counterclaims fairly, supplying data and credible evidence for each while pointing out the strengths and limitations of both claim(s) and counterclaims in a discipline-appropriate form and in a manner that anticipates the audience's knowledge level and concerns.</p> <p>9.14.1.1.c. - Use words, phrases, and clauses to link the major sections of the text, create cohesion, and clarify the relationships between claim(s) and reasons, between reasons and evidence, and between claim(s) and counterclaims.</p> <p>9.14.1.1.e. - Provide a concluding statement or section that follows from or supports the argument presented.</p> <p>9.14.2.2. - Write informative/explanatory texts, as they apply to each discipline and reporting format, including the narration of historical events, of scientific procedures/ experiments, or description of technical processes.</p> <p>9.14.2.2.a. - Introduce a topic and organize ideas, concepts, and information to make important connections and distinctions; include formatting (e.g., headings), graphics (e.g., figures, tables), and multimedia when useful to aiding comprehension.</p>	<p>9.4.4.2.4. - Explain how environmental factors and personal decisions, such as water pollution, air quality and smoking affect personal and community health.</p> <p>MN.9.13. - Reading Benchmarks: Literacy in Science and Technical Subjects 6-12</p> <p>- Key Ideas and Details</p> <p>9.13.1.1. - Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions.</p> <p>9.13.2.2. - Determine the central ideas or conclusions of a text; trace the text's explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text.</p> <p>9.13.5.5. - Analyze the structure of the relationships among concepts in a text, including relationships among key terms (e.g., force, friction, reaction force, energy).</p> <p>9.13.7.7. - Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words.</p> <p>9.13.9.9. - Compare and contrast findings presented in a text to those from other sources (including their own experiments), noting when the findings support or contradict previous explanations or accounts.</p> <p>9.13.10.10. - By the end of grade 10, read and comprehend science/technical texts in the grades 9-10 text complexity band independently and proficiently.</p> <p>MN.9.14. - Writing Benchmarks: Literacy in Science and Technical Subjects 6-12</p> <p>9.14.1.1. - Write arguments focused on discipline-specific content.</p> <p>9.14.1.1.a. - Introduce precise claim(s), distinguish the claim(s) from alternate or opposing claims, and create an organization that establishes clear relationships among the claim(s), counterclaims, reasons, and evidence.</p> <p>9.14.1.1.b. - Develop claim(s) and counterclaims fairly, supplying data and credible evidence for each while pointing out the strengths and limitations of both claim(s) and counterclaims in a discipline-appropriate form and in a manner that anticipates the audience's knowledge level and concerns.</p> <p>9.14.1.1.c. - Use words, phrases, and clauses to link the major sections of the text, create cohesion, and clarify the relationships between claim(s) and reasons, between reasons and evidence, and between claim(s) and counterclaims.</p> <p>9.14.1.1.e. - Provide a concluding statement or section that follows from or supports the argument presented.</p> <p>9.14.2.2. - Write informative/explanatory texts, as they apply to each discipline and reporting format, including the narration of historical events, of scientific procedures/ experiments, or description of technical processes.</p> <p>9.14.2.2.a. - Introduce a topic and organize ideas, concepts, and information to make important connections and distinctions; include formatting (e.g., headings), graphics (e.g., figures, tables), and multimedia when useful to aiding comprehension.</p>	<p>9.4.4.2.4. - Explain how environmental factors and personal decisions, such as water pollution, air quality and smoking affect personal and community health.</p> <p>MN.11.13. - Reading Benchmarks: Literacy in Science and Technical Subjects 6-12</p> <p>- Key Ideas and Details</p> <p>11.13.1.1. - Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account.</p> <p>11.13.2.2. - Determine the central ideas or conclusions of a text; summarize complex concepts, processes, or information presented in a text by paraphrasing them in simpler but still accurate terms.</p> <p>11.13.5.5. - Analyze how the text structures information or ideas into categories or hierarchies, demonstrating understanding of the information or ideas.</p> <p>11.13.9.9. - Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible.</p> <p>11.13.10.10. - By the end of grade 12, read and comprehend science/technical texts in the grades 11-12 text complexity band independently and proficiently.</p> <p>MN.11.14. - Writing Benchmarks: Literacy in Science and Technical Subjects 6-12</p> <p>11.14.1.1. - Write arguments focused on discipline-specific content.</p> <p>11.14.1.1.a. - Introduce precise, knowledgeable claim(s), establish the significance of the claim(s), distinguish the claim(s) from alternate or opposing claims, and create an organization that logically sequences the claim(s), counterclaims, reasons, and evidence.</p> <p>11.14.1.1.b. - Develop claim(s) and counterclaims fairly and thoroughly, supplying the most relevant data and credible evidence for each while pointing out the strengths and limitations of both claim(s) and counterclaims in a discipline-appropriate form that anticipates the audience's knowledge level, concerns, values, and possible biases.</p> <p>11.14.1.1.c. - Use words, phrases, and clauses as well as varied syntax to link the major sections of the text, create cohesion, and clarify the relationships between claim(s) and reasons, between reasons and evidence, and between claim(s) and counterclaims.</p> <p>11.14.1.1.e. - Provide a concluding statement or section that follows from or supports the argument presented.</p> <p>11.14.2.2. - Write informative/explanatory texts, as they apply to each discipline and reporting format, including the narration of historical events, of scientific procedures/ experiments, or description of technical processes.</p> <p>11.14.2.2.a. - Introduce a topic and organize complex ideas, concepts, and information so that each new element builds on that which precedes it to create a unified whole; include formatting (e.g., headings), graphics (e.g., figures, tables), and multimedia when useful to aiding comprehension.</p> <p>11.14.2.2.b. - Develop the topic thoroughly by selecting the most significant, credible, sufficient, and relevant facts, extended definitions, concrete details, quotations, or other information and examples appropriate to the audience's knowledge of the topic.</p>	<p>9.4.4.2.4. - Explain how environmental factors and personal decisions, such as water pollution, air quality and smoking affect personal and community health.</p> <p>MN.11.13. - Reading Benchmarks: Literacy in Science and Technical Subjects 6-12</p> <p>- Key Ideas and Details</p> <p>11.13.1.1. - Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account.</p> <p>11.13.2.2. - Determine the central ideas or conclusions of a text; summarize complex concepts, processes, or information presented in a text by paraphrasing them in simpler but still accurate terms.</p> <p>11.13.5.5. - Analyze how the text structures information or ideas into categories or hierarchies, demonstrating understanding of the information or ideas.</p> <p>11.13.9.9. - Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible.</p> <p>11.13.10.10. - By the end of grade 12, read and comprehend science/technical texts in the grades 11-12 text complexity band independently and proficiently.</p> <p>MN.11.14. - Writing Benchmarks: Literacy in Science and Technical Subjects 6-12</p> <p>11.14.1.1. - Write arguments focused on discipline-specific content.</p> <p>11.14.1.1.a. - Introduce precise, knowledgeable claim(s), establish the significance of the claim(s), distinguish the claim(s) from alternate or opposing claims, and create an organization that logically sequences the claim(s), counterclaims, reasons, and evidence.</p> <p>11.14.1.1.b. - Develop claim(s) and counterclaims fairly and thoroughly, supplying the most relevant data and credible evidence for each while pointing out the strengths and limitations of both claim(s) and counterclaims in a discipline-appropriate form that anticipates the audience's knowledge level, concerns, values, and possible biases.</p> <p>11.14.1.1.c. - Use words, phrases, and clauses as well as varied syntax to link the major sections of the text, create cohesion, and clarify the relationships between claim(s) and reasons, between reasons and evidence, and between claim(s) and counterclaims.</p> <p>11.14.1.1.e. - Provide a concluding statement or section that follows from or supports the argument presented.</p> <p>11.14.2.2. - Write informative/explanatory texts, as they apply to each discipline and reporting format, including the narration of historical events, of scientific procedures/ experiments, or description of technical processes.</p> <p>11.14.2.2.a. - Introduce a topic and organize complex ideas, concepts, and information so that each new element builds on that which precedes it to create a unified whole; 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Synaptic Transmission - MN	MN	<p>MN.9.1. - The Nature of Science and Engineering</p> <p>9.1.1. - The Practice of Science</p> <p>9.1.1.2. - The student will understand that scientific inquiry uses multiple interrelated processes to investigate and explain the natural world.</p> <p>9.1.1.2.1. - 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.</p> <p>9.1.1.2.2. - 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.</p> <p>9.1.1.2.3. - Identify the critical assumptions and logic used in a line of reasoning to judge the validity of a claim.</p> <p>9.1.3. - Interactions Among Science, Technology, Engineering, Mathematics, and Society</p> <p>9.1.3.3. - The student will understand that science and engineering operate in the context of society and both influence and are influenced by this context.</p> <p>9.1.3.3.2. - Communicate, justify and defend the procedures and results of a scientific inquiry or engineering design project using verbal, graphic, quantitative, virtual or written means.</p> <p>9.1.3.4. - The student will understand that science, technology, engineering and mathematics rely on each other to enhance knowledge and understanding.</p> <p>9.1.3.4.6. - Analyze the strengths and limitations of physical, conceptual, mathematical and computer models used by scientists and engineers.</p> <p>MN.9.4. - Life Science</p> <p>9.4.1. - Structure and Function in Living Systems</p> <p>9.4.1.1. - The student will understand that organisms use the interaction of cellular processes as well as tissues and organ systems to maintain homeostasis.</p>	<p>MN.9.1. - The Nature of Science and Engineering</p> <p>9.1.1. - The Practice of Science</p> <p>9.1.1.2. - 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Analyze the strengths and limitations of physical, conceptual, mathematical and computer models used by scientists and engineers.</p> <p>MN.9.4. - Life Science</p> <p>9.4.1. - Structure and Function in Living Systems</p> <p>9.4.1.1. - The student will understand that organisms use the interaction of cellular processes as well as tissues and organ systems to maintain homeostasis.</p>

9.4.1.1.1. - Explain how cell processes are influenced by internal and external factors, such as pH and temperature, and how cells and organisms respond to changes in their environment to maintain homeostasis.

9.4.1.1.2. - Describe how the functions of individual organ systems are integrated to maintain homeostasis in an organism.

9.4.1.2. - The student will understand that cells and cell structures have specific functions that allow an organism to grow, survive and reproduce.

9.4.1.2.1. - Recognize that cells are composed primarily of a few elements (carbon, hydrogen, oxygen, nitrogen, phosphorus, and sulfur), and describe the basic molecular structures of cells and the primary functions of carbohydrates, lipids, proteins and nucleic acids.

9.4.1.2.2. - Recognize that the work of the cell is carried out primarily by proteins, most of which are enzymes, and that protein function depends on the amino acid sequence and the shape it takes as a consequence of the interactions between those amino acids.

MN.9.13. - Reading Benchmarks: Literacy in Science and Technical Subjects 6-12
- Key Ideas and Details

9.13.1.1. - Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions.

9.13.2.2. - Determine the central ideas or conclusions of a text; trace the text's explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text.

9.13.5.5. - Analyze the structure of the relationships among concepts in a text, including relationships among key terms (e.g., force, friction, reaction force, energy).

9.13.9.9. - Compare and contrast findings presented in a text to those from other sources (including their own experiments), noting when the findings support or contradict previous explanations or accounts.

9.13.10.10. - By the end of grade 10, read and comprehend science/technical texts in the grades 9-10 text complexity band independently and proficiently.

MN.9.14. - Writing Benchmarks: Literacy in Science and Technical Subjects 6-12

9.14.1.1. - Write arguments focused on discipline-specific content.

9.14.1.1.a. - Introduce precise claim(s), distinguish the claim(s) from alternate or opposing claims, and create an organization that establishes clear relationships among the claim(s), counterclaims, reasons, and evidence.

9.14.1.1.b. - Develop claim(s) and counterclaims fairly, supplying data and credible evidence for each while pointing out the strengths and limitations of both claim(s) and counterclaims in a discipline-appropriate form and in a manner that anticipates the audience's knowledge level and concerns.

9.14.1.1.c. - Use words, phrases, and clauses to link the major sections of the text, create cohesion, and clarify the relationships between claim(s) and reasons, between reasons and evidence, and between claim(s) and counterclaims.

9.14.1.1.e. - Provide a concluding statement or section that follows from or supports the argument presented.

9.4.1.1.1. - Explain how cell processes are influenced by internal and external factors, such as pH and temperature, and how cells and organisms respond to changes in their environment to maintain homeostasis.

9.4.1.1.2. - Describe how the functions of individual organ systems are integrated to maintain homeostasis in an organism.

9.4.1.2. - The student will understand that cells and cell structures have specific functions that allow an organism to grow, survive and reproduce.

9.4.1.2.1. - Recognize that cells are composed primarily of a few elements (carbon, hydrogen, oxygen, nitrogen, phosphorus, and sulfur), and describe the basic molecular structures of cells and the primary functions of carbohydrates, lipids, proteins and nucleic acids.

9.4.1.2.2. - Recognize that the work of the cell is carried out primarily by proteins, most of which are enzymes, and that protein function depends on the amino acid sequence and the shape it takes as a consequence of the interactions between those amino acids.

MN.9.13. - Reading Benchmarks: Literacy in Science and Technical Subjects 6-12
- Key Ideas and Details

9.13.1.1. - Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions.

9.13.2.2. - Determine the central ideas or conclusions of a text; trace the text's explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text.

9.13.5.5. - Analyze the structure of the relationships among concepts in a text, including relationships among key terms (e.g., force, friction, reaction force, energy).

9.13.9.9. - Compare and contrast findings presented in a text to those from other sources (including their own experiments), noting when the findings support or contradict previous explanations or accounts.

9.13.10.10. - By the end of grade 10, read and comprehend science/technical texts in the grades 9-10 text complexity band independently and proficiently.

MN.9.14. - Writing Benchmarks: Literacy in Science and Technical Subjects 6-12

9.14.1.1. - Write arguments focused on discipline-specific content.

9.14.1.1.a. - Introduce precise claim(s), distinguish the claim(s) from alternate or opposing claims, and create an organization that establishes clear relationships among the claim(s), counterclaims, reasons, and evidence.

9.14.1.1.b. - Develop claim(s) and counterclaims fairly, supplying data and credible evidence for each while pointing out the strengths and limitations of both claim(s) and counterclaims in a discipline-appropriate form and in a manner that anticipates the audience's knowledge level and concerns.

9.14.1.1.c. - Use words, phrases, and clauses to link the major sections of the text, create cohesion, and clarify the relationships between claim(s) and reasons, between reasons and evidence, and between claim(s) and counterclaims.

9.14.1.1.e. - Provide a concluding statement or section that follows from or supports the argument presented.

9.4.1.1.1. - Explain how cell processes are influenced by internal and external factors, such as pH and temperature, and how cells and organisms respond to changes in their environment to maintain homeostasis.

9.4.1.1.2. - Describe how the functions of individual organ systems are integrated to maintain homeostasis in an organism.

9.4.1.2. - The student will understand that cells and cell structures have specific functions that allow an organism to grow, survive and reproduce.

9.4.1.2.1. - Recognize that cells are composed primarily of a few elements (carbon, hydrogen, oxygen, nitrogen, phosphorus, and sulfur), and describe the basic molecular structures of cells and the primary functions of carbohydrates, lipids, proteins and nucleic acids.

9.4.1.2.2. - Recognize that the work of the cell is carried out primarily by proteins, most of which are enzymes, and that protein function depends on the amino acid sequence and the shape it takes as a consequence of the interactions between those amino acids.

MN.11.13. - Reading Benchmarks: Literacy in Science and Technical Subjects 6-12
- Key Ideas and Details

11.13.1.1. - Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account.

11.13.2.2. - Determine the central ideas or conclusions of a text; summarize complex concepts, processes, or information presented in a text by paraphrasing them in simpler but still accurate terms.

11.13.5.5. - Analyze how the text structures information or ideas into categories or hierarchies, demonstrating understanding of the information or ideas.

11.13.9.9. - Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible.

11.13.10.10. - By the end of grade 12, read and comprehend science/technical texts in the grades 11-12 text complexity band independently and proficiently.

MN.11.14. - Writing Benchmarks: Literacy in Science and Technical Subjects 6-12

11.14.1.1. - Write arguments focused on discipline-specific content.

11.14.1.1.a. - Introduce precise, knowledgeable claim(s), establish the significance of the claim(s), distinguish the claim(s) from alternate or opposing claims, and create an organization that logically sequences the claim(s), counterclaims, reasons, and evidence.

11.14.1.1.b. - Develop claim(s) and counterclaims fairly and thoroughly, supplying the most relevant data and credible evidence for each while pointing out the strengths and limitations of both claim(s) and counterclaims in a discipline-appropriate form that anticipates the audience's knowledge level, concerns, values, and possible biases.

11.14.1.1.c. - Use words, phrases, and clauses as well as varied syntax to link the major sections of the text, create cohesion, and clarify the relationships between claim(s) and reasons, between reasons and evidence, and between claim(s) and counterclaims.

11.14.1.1.e. - Provide a concluding statement or section that follows from or supports the argument presented.

9.4.1.1.1. - Explain how cell processes are influenced by internal and external factors, such as pH and temperature, and how cells and organisms respond to changes in their environment to maintain homeostasis.

9.4.1.1.2. - Describe how the functions of individual organ systems are integrated to maintain homeostasis in an organism.

9.4.1.2. - The student will understand that cells and cell structures have specific functions that allow an organism to grow, survive and reproduce.

9.4.1.2.1. - Recognize that cells are composed primarily of a few elements (carbon, hydrogen, oxygen, nitrogen, phosphorus, and sulfur), and describe the basic molecular structures of cells and the primary functions of carbohydrates, lipids, proteins and nucleic acids.

9.4.1.2.2. - Recognize that the work of the cell is carried out primarily by proteins, most of which are enzymes, and that protein function depends on the amino acid sequence and the shape it takes as a consequence of the interactions between those amino acids.

MN.11.13. - Reading Benchmarks: Literacy in Science and Technical Subjects 6-12
- Key Ideas and Details

11.13.1.1. - Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account.

11.13.2.2. - Determine the central ideas or conclusions of a text; summarize complex concepts, processes, or information presented in a text by paraphrasing them in simpler but still accurate terms.

11.13.5.5. - Analyze how the text structures information or ideas into categories or hierarchies, demonstrating understanding of the information or ideas.

11.13.9.9. - Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible.

11.13.10.10. - By the end of grade 12, read and comprehend science/technical texts in the grades 11-12 text complexity band independently and proficiently.

MN.11.14. - Writing Benchmarks: Literacy in Science and Technical Subjects 6-12

11.14.1.1. - Write arguments focused on discipline-specific content.

11.14.1.1.a. - Introduce precise, knowledgeable claim(s), establish the significance of the claim(s), distinguish the claim(s) from alternate or opposing claims, and create an organization that logically sequences the claim(s), counterclaims, reasons, and evidence.

11.14.1.1.b. - Develop claim(s) and counterclaims fairly and thoroughly, supplying the most relevant data and credible evidence for each while pointing out the strengths and limitations of both claim(s) and counterclaims in a discipline-appropriate form that anticipates the audience's knowledge level, concerns, values, and possible biases.

11.14.1.1.c. - Use words, phrases, and clauses as well as varied syntax to link the major sections of the text, create cohesion, and clarify the relationships between claim(s) and reasons, between reasons and evidence, and between claim(s) and counterclaims.

11.14.1.1.e. - Provide a concluding statement or section that follows from or supports the argument presented.

	<p>9.14.2.2. - Write informative/explanatory texts, as they apply to each discipline and reporting format, including the narration of historical events, of scientific procedures/ experiments, or description of technical processes.</p> <p>9.14.2.2.a. - Introduce a topic and organize ideas, concepts, and information to make important connections and distinctions; include formatting (e.g., headings), graphics (e.g., figures, tables), and multimedia when useful to aiding comprehension.</p> <p>9.14.2.2.b. - Develop the topic with well-chosen, relevant, credible and sufficient facts, extended definitions, concrete details, quotations, or other information and examples appropriate to the audience's knowledge of the topic.</p> <p>9.14.2.2.c. - Use varied transitions and sentence structures to link the major sections of the text, create cohesion, and clarify the relationships among ideas and concepts.</p> <p>9.14.2.2.f. - Provide a concluding statement or section that follows from and supports the information or explanation presented (e.g., articulating implications or the significance of the topic).</p> <p>9.14.3.3. - (See note; not applicable as a separate requirement)</p> <p>9.14.3.3.a. - Note: Students' narrative skills continue to grow in these grades. The Standards require that students be able to incorporate narrative elements effectively into arguments and informative/explanatory texts. In history/social studies, students must be able to incorporate narrative accounts into their analyses of individuals or events of historical import.</p> <p>9.14.4.4. - Produce clear and coherent writing in which the development, organization, and style are appropriate to discipline, task, purpose, and audience.</p>	<p>9.14.2.2. - Write informative/explanatory texts, as they apply to each discipline and reporting format, including the narration of historical events, of scientific procedures/ experiments, or description of technical processes.</p> <p>9.14.2.2.a. - Introduce a topic and organize ideas, concepts, and information to make important connections and distinctions; include formatting (e.g., headings), graphics (e.g., figures, tables), and multimedia when useful to aiding comprehension.</p> <p>9.14.2.2.b. - Develop the topic with well-chosen, relevant, credible and sufficient facts, extended definitions, concrete details, quotations, or other information and examples appropriate to the audience's knowledge of the topic.</p> <p>9.14.2.2.c. - Use varied transitions and sentence structures to link the major sections of the text, create cohesion, and clarify the relationships among ideas and concepts.</p> <p>9.14.2.2.f. - Provide a concluding statement or section that follows from and supports the information or explanation presented (e.g., articulating implications or the significance of the topic).</p> <p>9.14.3.3. - (See note; not applicable as a separate requirement)</p> <p>9.14.3.3.a. - Note: Students' narrative skills continue to grow in these grades. The Standards require that students be able to incorporate narrative elements effectively into arguments and informative/explanatory texts. In history/social studies, students must be able to incorporate narrative accounts into their analyses of individuals or events of historical import.</p> <p>9.14.4.4. - Produce clear and coherent writing in which the development, organization, and style are appropriate to discipline, task, purpose, and audience.</p>	<p>11.14.2.2. - Write informative/explanatory texts, as they apply to each discipline and reporting format, including the narration of historical events, of scientific procedures/ experiments, or description of technical processes.</p> <p>11.14.2.2.a. - Introduce a topic and organize complex ideas, concepts, and information so that each new element builds on that which precedes it to create a unified whole; include formatting (e.g., headings), graphics (e.g., figures, tables), and multimedia when useful to aiding comprehension.</p> <p>11.14.2.2.b. - Develop the topic thoroughly by selecting the most significant, credible, sufficient, and relevant facts, extended definitions, concrete details, quotations, or other information and examples appropriate to the audience's knowledge of the topic.</p> <p>11.14.2.2.c. - Use varied transitions and sentence structures to link the major sections of the text, create cohesion, and clarify the relationships among complex ideas and concepts.</p> <p>11.14.2.2.d. - Use precise language, domain-specific vocabulary and techniques such as metaphor, simile, and analogy to manage the complexity of the topic; convey a knowledgeable stance in a style that responds to the discipline and context as well as to the expertise of likely readers.</p> <p>11.14.2.2.e. - Establish and maintain a formal style and objective tone while attending to the norms and conventions of the discipline in which they are writing.</p> <p>11.14.2.2.f. - Provide a concluding statement or section that follows from and supports the information or explanation provided (e.g., articulating implications or the significance of the topic).</p> <p>11.14.4.4. - Produce clear and coherent writing in which the development, organization, and style are appropriate to discipline, task, purpose, and audience.</p> <p>11.14.10.10. - Write routinely over extended time frames (time for reflection and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences.</p>	<p>11.14.2.2. - Write informative/explanatory texts, as they apply to each discipline and reporting format, including the narration of historical events, of scientific procedures/ experiments, or description of technical processes.</p> <p>11.14.2.2.a. - Introduce a topic and organize complex ideas, concepts, and information so that each new element builds on that which precedes it to create a unified whole; include formatting (e.g., headings), graphics (e.g., figures, tables), and multimedia when useful to aiding comprehension.</p> <p>11.14.2.2.b. - Develop the topic thoroughly by selecting the most significant, credible, sufficient, and relevant facts, extended definitions, concrete details, quotations, or other information and examples appropriate to the audience's knowledge of the topic.</p> <p>11.14.2.2.c. - Use varied transitions and sentence structures to link the major sections of the text, create cohesion, and clarify the relationships among complex ideas and concepts.</p> <p>11.14.2.2.d. - Use precise language, domain-specific vocabulary and techniques such as metaphor, simile, and analogy to manage the complexity of the topic; convey a knowledgeable stance in a style that responds to the discipline and context as well as to the expertise of likely readers.</p> <p>11.14.2.2.e. - Establish and maintain a formal style and objective tone while attending to the norms and conventions of the discipline in which they are writing.</p> <p>11.14.2.2.f. - Provide a concluding statement or section that follows from and supports the information or explanation provided (e.g., articulating implications or the significance of the topic).</p> <p>11.14.4.4. - Produce clear and coherent writing in which the development, organization, and style are appropriate to discipline, task, purpose, and audience.</p> <p>11.14.10.10. - Write routinely over extended time frames (time for reflection and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences.</p>
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