### MINNESOTA ACADEMIC SCIENCE CONTENT AND PERFORMANCE STANDARDS

**Grades 9-12**

#### 1. HISTORY AND NATURE OF SCIENCE

**A. Scientific World View**
The student will understand the nature of scientific ways of thinking and that scientific knowledge changes and accumulates over time.

**Benchmarks (Performance Standards)**

1. The student will be able to distinguish among hypothesis, theory and law as scientific terms and how they are used to answer a specific question.

2. The student will be able to explain how scientific and technological innovations as well as new evidence can challenge portions of or entire accepted theories and models including but not limited to cell theory, atomic theory, theory of evolution, plate tectonic theory, germ theory of disease and big bang theory.

3. The student will recognize that in order to be valid, scientific knowledge must meet certain criteria including that it: be consistent with experimental, observational and inferential evidence about nature; follow rules of logic and reporting both methods and procedures; and, be falsifiable and open to criticism.
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<tr>
<td>4. The student will explain how traditions of ethics, peer review, conflict and general consensus influences the conduct of science.</td>
<td>SE/TE: 2, 25, 59, 281, 302, 513, 579, 608, 718, 802</td>
</tr>
<tr>
<td>5. The student will recognize that some scientific ideas are incomplete, and opportunity exists in these areas for new advances.</td>
<td>SE/TE: 8-11, 16-21, 59, 281, 513, 608, 718, 802, 866-867</td>
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**B. Scientific Inquiry**

The student will design and conduct a scientific investigation.

**Benchmarks (Performance Standards)**

1. The student will design and complete a scientific experiment using scientific methods by determining a testable question, making a hypothesis, designing a scientific investigation with appropriate controls, analyzing data, making conclusions based on evidence and comparing conclusions to the original hypothesis and prior knowledge.
   

2. The student will distinguish between qualitative and quantitative data.
   

3. The student will apply mathematics and models to analyze data and support conclusions.
   

4. The student will identify possible sources of error and their effects on results.
   
   SE/TE: 27, 473, 524-525, 866-867 |

5. The student will know that professional scientists and engineers have ethical codes.
   
   SE/TE: 59, 513, 579, 608, 718, 802 |

6. The student will give examples of how different domains of science use different bodies of scientific knowledge and employ different methods to investigate questions.
   
C. Scientific Enterprise
The student will understand the relationship between science and technology and how both are used.

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<tr>
<td><strong>Benchmarks (Performance Standards)</strong></td>
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<tr>
<td>1. The student will compare and contrast the purposes and career opportunities of engineering, technology and science.</td>
<td>SE/TE: 34-35, 324-325, 656-657</td>
</tr>
<tr>
<td>2. The student will provide an example of a need or problem identified by science and solved by engineering or technology.</td>
<td>SE/TE: 21, 49, 87, 111, 137, 163, 201, 233, 277, 314, 335, 366, 402, 434, 465, 488, 520, 560, 591, 620, 634, 688, 721, 756, 795, 845</td>
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<tr>
<td>4. The student will know that technological changes and scientific advances are often accompanied by social, political, environmental and economic changes.</td>
<td>SE/TE: 3, 21, 49, 87, 111, 114, 137, 163, 178, 201, 235, 277, 312, 314, 335, 366, 374, 402, 422, 434, 465, 488, 518, 520, 560, 582, 591, 620, 634, 680, 688, 721, 806, 877</td>
</tr>
<tr>
<td>5. The student will recognize that science and technology are influenced by cultural backgrounds and beliefs and by social needs, attitudes, values and limitations.</td>
<td>SE/TE: 3, 21, 49, 87, 111, 114, 137, 163, 178, 201, 235, 277, 312, 314, 335, 366, 374, 402, 422, 434, 465, 488, 518, 520, 560, 582, 591, 620, 634, 680, 688, 721, 806, 877</td>
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D. Historic Perspectives
The student will recognize the historical and cultural context of scientific endeavors and how they influence each other.

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<tr>
<td><strong>Benchmarks (Performance Standards)</strong></td>
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<tr>
<td>1. The student will be able to trace the development of a scientific advancement, invention or theory and its impact on society.</td>
<td>SE/TE: 114, 178, 312, 374, 422, 518, 582, 680, 806</td>
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### II. PHYSICAL SCIENCE

#### A. Structure of Matter

The student will understand the nature of matter including its forms, properties and interactions.

**Benchmarks (Performance Standards)**

1. The student will identify protons, neutrons and electrons as the major components of the atom, their mass relative to one another, their arrangement and their charge.
   - SE/TE: 108-112, 120-123
   - TE: 98C-98D
   - TR: Transparencies and Presentation Pro CD: Ch. 4
   - TECH: PHSchool.com, NSTA SciLinks

2. The student will be able to explain the relationship of an element’s position on the periodic table to its atomic number and atomic mass.
   - SE/TE: 130-134, 152-155
   - TE: 124C
   - TR: Transparencies and Presentation Pro CD: Ch. 5

3. The student will compare and contrast the properties of an element and its isotopes, and describe how isotopes can be used in research, medicine and industry.
   - SE/TE: 112, 134, 152-155, 293
   - TR: Transparencies and Presentation Pro CD: Ch. 4
   - TECH: PHSchool.com, Science news

4. The student will use the periodic table to identify regions, families, groups and periods.
   - SE/TE: 135-136, 139-145, 152-155
   - TE: 124C-124D
   - TR: Transparencies and Presentation Pro CD: Ch. 5

5. The student will explain how neutral atoms become ions.
   - SE/TE: 159-160
   - TE: 156C-156D
   - TR: Transparencies and Presentation Pro CD: Ch. 6
   - TECH: PHSchool.com, NSTA SciLinks
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<tr>
<td>6. The student will be able to explain how atoms form compounds through bonding.</td>
<td>SE/TE: 158-164, 186-189</td>
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<td>TE: 156C-156D</td>
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<tr>
<td></td>
<td>TR: Transparencies and Presentation Pro CD: Ch. 6</td>
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<td>TECH: PHSchool.com, NSTA SciLinks</td>
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<td>7. The student will compare and contrast the states of matter in terms of interactions between particles.</td>
<td>SE/TE: 68-74, 94-97</td>
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<td>TE: 66C</td>
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<td>TR: Transparencies and Presentation Pro CD: Ch. 3</td>
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<td>TECH: PHSchool.com, NSTA SciLinks</td>
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<td>8. The student will differentiate between an atom and a molecule.</td>
<td>SE/TE: 165-169, 186-189</td>
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<td>TE: 156C-156D</td>
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<td>TECH: PHSchool.com, NSTA SciLinks</td>
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<tr>
<td>9. The student will differentiate between an element and compound.</td>
<td>SE/TE: 158-164, 186-189</td>
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<td>TE: 156C-156D</td>
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<td>TR: Transparencies and Presentation Pro CD: Ch. 6</td>
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<td>TECH: PHSchool.com, NSTA SciLinks</td>
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### B. Chemical Reactions
The student will describe chemical reactions and the factors that influence them.

#### Benchmarks (Performance Standards)

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<tr>
<td>1. The student will describe chemical reactions using words and symbolic equations.</td>
<td>SE/TE: 192-205, 222-225</td>
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<td></td>
<td>TE: 190C</td>
</tr>
<tr>
<td></td>
<td>TR: Transparencies and Presentation Pro CD: Ch. 7</td>
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<td>TECH: PHSchool.com, NSTA SciLinks, Science News</td>
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<tr>
<td>2. The student will explain the influence of temperature, surface area, agitation and catalysts on the rate of a reaction.</td>
<td>SE/TE: 206-219, 222-225, 228-239, 256-259</td>
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<td></td>
<td>TR: Transparencies and Presentation Pro CD: Chapters 7 and 8</td>
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<td>TECH: PHSchool.com, NSTA SciLinks</td>
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<tr>
<td>3. The student will distinguish between a chemical reaction and a nuclear reaction.</td>
<td>SE/TE: 199-205, 222-225, 292-297, 321</td>
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<td></td>
<td>TR: Transparencies and Presentation Pro CD: Chapters 7 and 10</td>
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<td>TECH: PHSchool.com, NSTA SciLinks</td>
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<tr>
<td>4. The student will explain how the rearrangement of atoms and molecules in a chemical reaction illustrates conservation of mass.</td>
<td>SE/TE: 192-198, 222-225</td>
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<td>TR: Transparencies and Presentation Pro CD: Ch. 7</td>
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<td>TECH: PHSchool.com, NSTA SciLinks, Science News</td>
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</table>
C. **Energy Transformations**
The student will understand energy forms, transformations and transfers.

### Benchmarks (Performance Standards)

1. The student will know that potential energy is stored energy and is associated with gravitational or electrical force, mechanical position or chemical composition.
   - SE/TE: 446-459, 468-471
   - TE: 444C-444D
   - TR: Transparencies and Presentation Pro CD: Ch. 15

2. The student will differentiate between kinetic and potential energy and identify situations where kinetic energy is converted into potential energy and vice versa.
   - SE/TE: 446-459, 468-471
   - TE: 444C-444D
   - TR: Transparencies and Presentation Pro CD: Ch. 15

3. The student will differentiate between AC and DC current.
   - SE/TE: 604-607, 624-627, 642-649
   - TE: 598D, 628C
   - TR: Transparencies and Presentation Pro CD: Chapters 20 and 21
   - TECH: PHSchool.com, NSTA SciLinks

4. The student will describe the production, storage and transmission of electricity.
   - SE/TE: 642-647, 650-653
   - TE: 628D
   - TR: Transparencies and Presentation Pro CD: Ch. 21
   - TECH: PHSchool.com, NSTA SciLinks

5. The student will be able to describe physical and chemical changes in terms of the law of conservation of energy.
   - SE/TE: 453-459, 468-471, 486-492, 494-497
   - TR: Transparencies and Presentation Pro CD: Chapters 15 and 16

6. The student will compare and contrast the amount of energy released through chemical reactions and nuclear fission and fusion.
   - TE: 290C-290D
   - TR: Transparencies and Presentation Pro CD: Chapters 7 and 10
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<tr>
<td>8</td>
<td>The student will describe applications of the different wavelengths of the electromagnetic spectrum.</td>
<td>SE/TE: 539-545, 564-567 TE: 530C TR: Transparencies and Presentation Pro CD: Ch. 18 TECH: PHSchool.com, NSTA SciLinks, Science News</td>
</tr>
<tr>
<td>9</td>
<td>The student will describe energy, work and power both conceptually and quantitatively.</td>
<td>SE/TE: 410, 412-420, 440-443 TE: 410C TR: Transparencies and Presentation Pro CD: Ch. 14 TECH: PHSchool.com, NSTA SciLinks</td>
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### D. Motion
The student will understand the nature of force and motion.

#### Benchmarks (Performance Standards)

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<tbody>
<tr>
<td>1</td>
<td>The student will use Newton’s three laws of motion to qualitatively and quantitatively describe the interaction of objects.</td>
<td>SE/TE: 356-377, 384-387 TE: 354C-354D TR: Transparencies and Presentation Pro CD: Ch. 12 TECH: PHSchool.com, NSTA SciLinks</td>
</tr>
<tr>
<td>2</td>
<td>The student will describe the effect of friction and gravity on the motion of an object.</td>
<td>SE/TE: 356-362, 384-397 TR: Transparencies and Presentation Pro CD: Ch. 12 TECH: PHSchool.com, NSTA SciLinks</td>
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### E. Forces of Nature
The student will understand the forces of nature and their application.

#### Benchmarks (Performance Standards)

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<tbody>
<tr>
<td>1</td>
<td>The student will recognize the factors that affect the presence and magnitude of gravitational, electromagnetic, weak and strong nuclear forces.</td>
<td>SE/TE: 308, 378, 384-387 TE: 354D TR: Transparencies and Presentation Pro CD: Ch. 12 TECH: PHSchool.com, NSTA SciLinks</td>
</tr>
<tr>
<td>2</td>
<td>The student will identify the dominant force or forces in a variety of interactions.</td>
<td>SE/TE: 372-377, 383-387 TR: Transparencies and Presentation Pro CD: Ch. 12 TECH: PHSchool.com, NSTA SciLinks</td>
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III. EARTH AND SPACE SCIENCE

### A. Earth Structure and Processes
The student will understand that the interactions of the atmosphere, biosphere, lithosphere, hydrosphere and space have resulted in ongoing change of the Earth system over geologic time.

#### Benchmarks (Performance Standards)

1. The student will identify the internal and external sources of energy for the Earth.
   - **TR:** Transparencies and Presentation Pro CD: Chapters 22, 23 and 24
   - **TECH:** PHSchool.com, NSTA SciLinks, Science News, PlanetDiary

2. The student will apply the laws of thermodynamics to explain the cycling of materials and transfer of energy in the Earth system.
   - **SE/TE:** 268, 270-271, 462, 482-485, 670-675, 698-701, 704-729, 740-743, 782-784
   - **TR:** Transparencies and Presentation Pro CD: Chapters 8, 16, 23 and 24
   - **TECH:** PHSchool.com, NSTA SciLinks, Science News, PlanetDiary

3. The student will illustrate how biological processes have played significant roles in determining the character of the atmosphere, biosphere, hydrosphere and lithosphere over time.
   - **SE/TE:** 676-696, 698-701
   - **TE:** 658D
   - **TR:** Transparencies and Presentation Pro CD: Chapters 22, 23 and 24
   - **TECH:** PHSchool.com, NSTA SciLinks, Science News, PlanetDiary

4. The student will use the theory of plate tectonics to analyze relationships among earthquakes, volcanoes, mountains fossil deposits, rock layers and ocean features.
   - **SE/TE:** 676-696, 698-701, 709-729, 740-743
   - **TE:** 702C
   - **TR:** Transparencies and Presentation Pro CD: Chapters 22 and 23
   - **TECH:** PHSchool.com, NSTA SciLinks, Science News, PlanetDiary

5. The student will describe how glaciers, gravity, wind, temperature changes, waves and rivers cause weathering and erosion.
   - **SE/TE:** 670-675, 698-701, 709-724, 740-743
   - **TE:** 658C, 702C
   - **TR:** Transparencies and Presentation Pro CD: Chapters 22 and 23
   - **TECH:** PHSchool.com, NSTA SciLinks, Science News, PlanetDiary

6. The student will describe the rock cycle and compare and contrast the processes responsible for the formation of igneous, sedimentary and metamorphic rocks.
   - **SE/TE:** 670-675, 698-701
   - **TE:** 658C
   - **TR:** Transparencies and Presentation Pro CD: Ch. 22
   - **TECH:** PHSchool.com, NSTA SciLinks, Science News, PlanetDiary
7. The student will use evidence found in fossils, rock layers, ice cores, radiometric dating and globally gathered data to explain how Earth has changed over short and long periods of time.

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<td>SE/TE: 732-738, 740-743</td>
<td>The student will use evidence found in fossils, rock layers, ice cores, radiometric dating and globally gathered data to explain how Earth has changed over short and long periods of time.</td>
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<td>TE: 702D</td>
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<td>TR: Transparencies and Presentation Pro CD: Ch. 23</td>
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**A. Earth Structure and Processes**

The student will investigate the impact humans have on the environment.

**Benchmarks (Performance Standards)**

1. The student will identify and research an environmental issue and evaluate its impact.

**SE/TE:** 270-272, 312, 463, 466, 488, 513, 782

**B. The Water Cycle, Weather and Climate**

The student will explain the causes and effects of the Earth’s atmospheric and hydrologic processes.

**Benchmarks (Performance Standards)**

1. The student will explain how the transfer of energy and motions of the Earth contribute to global climatic processes including wind, waves and ocean currents.

**SE/TE:** 755-764, 784-787

**TR:** Transparencies and Presentation Pro CD: Ch. 24

**TECH:** PHSchool.com, NSTA SciLinks, Science News, PlanetDiary

2. The student will trace the cyclical movement of carbon and water through the lithosphere, hydrosphere, atmosphere and biosphere.

**SE/TE:** 704-729, 740-743, 755-759

**TE:** 744C-744D

**TR:** Transparencies and Presentation Pro CD: Ch. 24

**TECH:** PHSchool.com, NSTA SciLinks, Science News, PlanetDiary

3. The student will demonstrate the effect of the Earth’s tilt, rotation and revolution on the seasons, day length and tides.

**SE/TE:** 752-754, 784-787

**TR:** Transparencies and Presentation Pro CD: Ch. 24

**TECH:** PHSchool.com, NSTA SciLinks, Science News, PlanetDiary

4. The student will identify, predict and investigate the factors that influence the quality of water and how it can be reused, recycled and conserved.

**SE/TE:** 52, 705-706

**TR:** Transparencies and Presentation Pro CD: Ch. 23

**TECH:** PHSchool.com, NSTA SciLinks, Science News, PlanetDiary

5. The student will discuss the impact of the use of natural resources and other human activities on the Earth’s climate.

**SE/TE:** 778-782, 784-787
### C. The Universe
The student will relate the formation and components of our solar system to the conditions necessary for life.

#### Benchmarks (Performance Standards)

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<tbody>
<tr>
<td>1.</td>
<td>The student will explain how the sun, Earth and solar system formed.</td>
<td>SE/TE: 818-820, 822-825</td>
<td>TR: Transparencies and Presentation Pro CD: Ch. 25</td>
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<tr>
<td>2.</td>
<td>The student will compare the characteristics of Earth with the characteristics and movement patterns of the other planets, their satellites and other objects in our solar system.</td>
<td>SE/TE: 790-815, 822-825</td>
<td>TR: Transparencies and Presentation Pro CD: Ch. 25</td>
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<td>TECH: PHSchool.com, NSTA SciLinks, Science News</td>
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<td>3.</td>
<td>The student will compare and contrast the environmental parameters that make life possible on Earth with conditions found on the other planets of our solar system.</td>
<td>SE/TE: 803-815, 822-825</td>
<td>TR: Transparencies and Presentation Pro CD: Ch. 25</td>
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<td>TECH: PHSchool.com, NSTA SciLinks, Science News</td>
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### C. The Universe
The student will use astronomical data to reveal the structure, scale, and changes in the stars, galaxies and universe over time.

#### Benchmarks (Performance Standards)

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<tr>
<td>1.</td>
<td>The student will identify different types of stars and galaxies and describe how stars, galaxies and the universe change over time.</td>
<td>SE/TE: 834-849, 858-861</td>
<td>TR: Transparencies and Presentation Pro CD: Ch. 26</td>
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<tr>
<td>2.</td>
<td>The student will explain how nuclear fusion produces energy and other elements.</td>
<td>SE/TE: 823-833, 858-861</td>
<td>TR: Transparencies and Presentation Pro CD: Ch. 26</td>
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<tr>
<td>3.</td>
<td>The student will describe the evidence from current technologies that has been used to understand the composition and the early history of the universe.</td>
<td>SE/TE: 834-839, 852-855, 858-861</td>
<td>TR: Transparencies and Presentation Pro CD: Ch. 26</td>
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<td>4.</td>
<td>The student will explain how Doppler evidence indicates our universe is expanding in all directions.</td>
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### IV. LIFE SCIENCE

#### A. Cells

The student will comprehend that all living things are composed of cells, and that the life processes in a cell are based on molecular interactions.

**Benchmarks (Performance Standards)**

1. The student will relate cellular structures to their functions.  
   - Out of Scope  
   - This objective will be covered in a Biology Course

2. The student will compare and contrast the structures found in typical plant, animal and bacterial cells.  
   - Out of Scope  
   - This objective will be covered in a Biology Course

3. The student will explain the role of the cell membrane as a highly selective barrier in diffusion, osmosis and active transport.  
   - SE/TE: 146-147, 250-251

4. The student will describe the role of enzymes as catalysts in metabolism and cellular synthesis of new molecules.  
   - SE/TE: 284

5. The student will differentiate between the processes of photosynthesis and respiration in terms of energy flow, reactants and products.  
   - SE/TE: 165, 282-283, 747

6. The student will describe and compare the processes of mitosis and meiosis and their roles in the cell cycle.  
   - Out of Scope  
   - This objective will be covered in a Biology Course

#### B. Diversity of Organisms

The student will classify, compare and contrast the diversity of organisms on Earth and their modes of accommodating the requirements for life.

**Benchmarks (Performance Standards)**

1. The student will relate the structure, complexity and organization of organ systems to the methods of obtaining, transforming, releasing and eliminating the matter and energy used to sustain the organism.  
   - SE/TE: 143, 146-147, 149, 264, 275, 278, 280, 282, 283, 747

2. The student will recognize that organisms have both innate and learned behavioral responses to internal and external stimuli, including the tropic responses in plants.  
   - SE/TE: 515, 517, 580, 588-590
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3. The student will use scientific evidence, including the fossil record, homologous structures, embryological development or biochemical similarities, to classify organisms in order to show probable evolutionary relationships and common ancestry.

SE/TE: 735-738

C. **Interdependence of Life**

The student will describe how the environment and interactions between organisms can affect the number of species and the diversity of species in an ecosystem.

#### Benchmarks (Performance Standards)

1. The student will describe the factors related to matter and energy in an ecosystem that both influence fluctuations in population size and determine the carrying capacity of a population.

SE/TE: 281, 312, 462, 513, 782

2. The student will explain how adaptations of species and co-evolution with other species are related to success in an ecosystem.

Out of Scope
This objective will be covered in a Biology Course

3. The student will identify examples of mutualism, commensalism, and parasitism in a stable ecosystem.

Out of Scope
This objective will be covered in a Biology Course

4. The student will predict and analyze how a change in an ecosystem, resulting from natural causes, changes in climate, human activity or introduction of invasive species, can affect both the number of organisms in a population and the biodiversity of species in the ecosystem.


D. **Heredity**

The student will explain how inherited characteristics are encoded by genes.

#### Benchmarks (Performance Standards)

1. The student will explain that the instructions for the characteristics of all organisms are carried in nucleic acids.

SE/TE: 279-280

2. The student will define the relationship between DNA, genes and chromosomes.

Out of Scope
This objective will be covered in a Biology Course

3. The student will describe the structure and function of DNA and distinguish between replication, transcription and translation.

Out of Scope
This objective will be covered in a Biology Course
### MINNESOTA ACADEMIC SCIENCE CONTENT AND PERFORMANCE STANDARDS

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<tr>
<td>4. The student will know that different species of multicellular organisms have a characteristic number of chromosomes, and that in typical humans there are 22 autosomal pairs and 2 sex chromosomes.</td>
<td>Out of Scope This objective will be covered in a Biology Course</td>
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<td>5. The student will describe how genetic information is transmitted from parents to offspring through the processes of meiosis and fertilization as they relate to chromosome recombination and sexual reproduction.</td>
<td>Out of Scope This objective will be covered in a Biology Course</td>
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<td>6. The student will use Mendel’s laws of segregation and independent assortment to determine the genotype and phenotype of a monohybrid cross.</td>
<td>Out of Scope This objective will be covered in a Biology Course</td>
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<td>7. The student will differentiate between dominant, recessive, co-dominant, incompletely dominant, polygenic and sex-linked traits.</td>
<td>Out of Scope This objective will be covered in a Biology Course</td>
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### E. Biological Populations Change Over Time

The student will understand how biological evolution provides a scientific explanation for the fossil record of ancient life forms, as well as for the striking molecular similarities observed among the diverse species of living organisms.

#### Benchmarks (Performance Standards)

1. The student will understand that species change over time and the term biological evolution is used to describe this process. | SE/TE: 735-736, 738 |

2. The student will use the principles of natural selection to explain the differential survival of groups of organisms as a consequence of:
   - The potential for a species to increase its numbers;
   - The genetic variability of offspring due to mutation and recombination of genes;
   - A finite supply of the resources required for life; and,
   - The ensuing selection based on environmental factors of those offspring better able to survive and produce reproductively successful offspring. | Out of Scope This objective will be covered in a Biology Course |
### MINNESOTA ACADEMIC SCIENCE CONTENT AND PERFORMANCE STANDARDS

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| 3. The student will describe how genetic variation between populations is due to different selective pressures acting on each population, which can lead to a new species. | Out of Scope  
This objective will be covered in a Biology Course |
| 4. The student will use biological evolution to explain the diversity of species. | Out of Scope  
This objective will be covered in a Biology Course |

#### F. Flow of Matter and Energy

The student will describe and explain the cycling of matter and flow of energy through an ecosystem’s living and non-living components.

**Benchmarks (Performance Standards)**

1. The student will explain the relationship between abiotic and biotic components of an ecosystem in terms of the cycling of water, carbon, oxygen and nitrogen.  

2. The student will know that all matter tends to become more disorganized over time, and that living systems require a continuous input of energy in order to maintain their chemical and physical organizations and prevent death.  
   - SE/TE: 143, 146-147, 149, 264, 275, 278, 280, 282, 283, 747

3. The student will explain that sunlight is transformed into chemical energy by photosynthetic organisms.  
   - SE/TE: 165, 282-283, 747

4. The student will explain that respiration releases chemical energy through the breakdown of molecules.  
   - SE/TE: 206, 282-283, 451

5. The student will understand that matter and energy flow through different levels of organization of living systems, from cells to communities, as well as between living systems and the physical environment as chemical elements are recombined in different ways. Each recombination results in both storage and dissipation of energy.  

#### G. Human Organism

The student will understand how all organ systems, including the nervous system, interact to maintain homeostasis.

**Benchmarks (Performance Standards)**

1. The student will understand and describe the basic anatomy and physiology of the nervous system and sense organs.  
   - Out of Scope  
   - This objective will be covered in a Biology Course
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| 2. The student will describe how the functions of individual organ systems are integrated to maintain a homeostatic balance in the body. | Out of Scope  
This objective will be covered in a Biology Course |

Reference: [http://education.state.mn.us/content/072583.pdf](http://education.state.mn.us/content/072583.pdf)