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|       | <b>Science Benchmarks</b><br><b>Grade Eight</b>   |
|       | The student will:   |
|       | <b>Standard 1: NATURE OF SCIENCE</b><br>Understand that science is ongoing and inventive, and that scientific understandings have changed over time as new evidence is found.                                 |
| 8-1a. | Describe how scientific knowledge and conceptual models and explanations have changed over time in the sciences.  |
| 8-1b. | Identify the people, cultures, and conditions that led to the changes in scientific knowledge and concepts over time.   |
| 8-1c. | Explain how the general rules of science apply to the development and use of evidence in scientific investigations, model making, and applications.   |
| 8-1d. | Relate the reasoning and evidence that confirms that science is one way of answering questions and explaining the natural world.  |
| 8-1e. | Explain ways in which scientific knowledge is shared, checked, and extended; and show how these processes change over time.   |
| 8-1f. | Investigate the ways in which scientific knowledge is useful and also limited when applied to social issues.  |
|       | <b>Standard 2: SCIENCE INQUIRY</b><br>Investigate questions using scientific methods and tools, revise their personal understanding to accommodate knowledge, and communicate these understandings to others. |
| 8-2a. | Identify questions that they can investigate using resources and equipment that they have available.  |
| 8-2b. | Identify data and locate sources of information to answer the questions being investigated.   |
| 8-2c. | Design and safely conduct investigations that provide reliable data, appropriate to answer their questions.   |
| 8-2d. | Use inferences to help decide possible results of their investigations and use observations to check their inferences.  |
| 8-2e. | Use accepted scientific knowledge, models, and theories to explain their results and to raise further questions about their investigations.   |
| 8-2f. | State what they have learned from investigations relating their inferences to scientific knowledge and to data that they have collected.  |
| 8-2g. | Explain their data and conclusions in ways that allow an audience to understand the questions that they selected for investigation and the answers that they have developed.                                  |
| 8-2h. | Use computer software and other technologies to organize, process, and present their data.  |
| 8-2i. | Analyze, explain, and defend the validity of questions, hypotheses, and conclusions to their investigations.  |
| 8-2j. | Discuss the importance of their results and implications of their work with peers, teachers, and other adults.  |
| 8-2k. | Raise further questions that still need to be answered.   |

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|                                   | Standard 3: PHYSICAL SCIENCE<br>Demonstrate an understanding of the physical and chemical properties of matter, the forms and properties of energy, and the ways in which matter and energy interact.   |
| 8-3a.                             | Explain matter has chemical properties that change during chemical reactions.   |
| 8-3b.                             | Explain matter has physical properties affected by physical changes.  |
| 8-3c.                             | Recognize that elements are classified by atomic structure in a periodic table.   |
| 8-3d.                             | Know that there are more than 100 known elements that can be combined in a multitude of ways to produce compounds, which account for living and non-living substances that we encounter.  |
| 8-3e.                             | Use the periodic table to show that many elements can be grouped according to similar properties called chemical families.  |
| 8-3f.                             | Define an atom, molecule, element, and compound.  |
| 8-3g.                             | Describe parts of matter known as proton, neutron, and electron.  |
| 8-3h.                             | Describe the properties of solids, liquids, and gases.  |
| 8-3i.                             | Describe how atoms combine to form a molecule (crystal) the smallest part of the substance that retains its properties.   |
| 8-3j.                             | Apply knowledge of atomic number, atomic mass, chemical families etc., to the use of the periodic table.  |
| 8-3k.                             | Understand that atoms interact with one another by transferring or sharing electrons that are farther from the nucleus (these outer electrons govern the chemical properties of the element).   |
| 8-3l.                             | Understand that atoms consist of negative electrons (which occupy most of the space in the atom) and very tiny nuclei (consisting of neutrons and positive protons, each almost 2000 times heavier than an electron). The electric force between nucleus and electrons holds the atom together. |
| 8-3m.                             | Understand that usually the number of electrons will equal the number of protons. The neutron has no charge, so the atom overall is electrically neutral, but an atom may acquire an unbalance charge by gaining or losing electrons.   |
| 8-3n.                             | Demonstrate the methods used to separate mixtures into their component parts (boiling, filtering, chromatography, and screening).   |
|                                   | Standard 4: EARTH & SPACE SCIENCE<br>Demonstrate an understanding of the structure and systems of the Earth, other bodies in the universe, and their interactions.  |
| 8-4a.                             | Explain how clouds, which are formed by condensation of water vapor, affect weather and climate.  |
| 8-4b.                             | Describe how the water cycle plays an important role in determining climatic  |

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|                                   | patterns.   |
| 8-4c.                             | Explain how the sun is the major source of energy for phenomena on the Earth's surface, such as winds, ocean currents, the water cycle, and the growth of plants.   |
|                                   | <b>Standard 5: LIFE &amp; ENVIRONMENTAL SCIENCE</b><br>Demonstrate an understanding of the characteristics and structures of living things, the processes of life, and how living things interact with one another and their environment. |
| 8-5a.                             | Investigate and compare the cells of animals for the purpose of classification.   |
| 8-5b.                             | Differentiate between single-celled and multiple-celled organisms (including humans) through investigation, comparing the cell functions of specialized cells for each type of organism.  |
| 8-5c.                             | Explain how an organism is regulated internally through a biological clock and externally through stimuli.  |
| 8-5d.                             | Understand that an organism's behavior evolves through adaptation to its environment.   |
| 8-5e.                             | Investigate and explain that heredity is comprised of the characteristics and traits found in genes.  |
| 8-5f.                             | Explain that animals have a variety of body parts and internal structures that contribute to their being able to make or find food, reproduce, and adapt to their environment.  |
| 8-5g.                             | Analyze how current trends in human resource use and population growth will influence the ecosystems, and show how current policies affect those trends.  |
| 8-5h.                             | Explain that although different species look very different, the unity among organisms becomes apparent from an analysis of internal structures and observation of similarity of their anatomy (for kingdoms of living things).           |
|                                   | <b>Standard 6: SCIENCE APPLICATIONS</b><br>Demonstrate an understanding of the relationship between science and technology and the ways in which that relationship influences human activities.   |
| 8-6a.                             | Identify new careers that have been created due to discoveries in science and technology.   |
| 8-6b.                             | Explain how scientific and technological discoveries have altered careers from past to present.   |
| 8-6c.                             | Illustrate the positive and negative effects of science and technology on careers and technology.   |
| 8-6d.                             | Design a model or machine that could be used to solve a problem and be able to discuss potential side effects of its use.   |
| 8-6e.                             | Apply (through a simulation) problem-solving skills to solve a specific local, state, or regional problem by generating several courses of action and debating the positive and negative impacts of those solutions.                      |

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|       | <b>Science Benchmarks</b><br><b>Grade Eight</b>  |
|       | <b>Standard 7: SCIENCE IN SOCIAL &amp; PERSONAL PERSPECTIVES</b><br>Use scientific information and skills to make decisions about themselves, Wisconsin, and the world in which they live.   |
| 8-7a. | Evaluate the scientific evidence used in various media (i.e., television, radio, internet, popular press, and scientific journals) to address a social issue using criteria of accuracy, logic, bias, relevance of data, and credible sources. |
| 8-7b. | Present a scientific solution to a problem involving the Earth and space, life, and environmental or physical sciences and participate in a consensus building discussion to arrive at a group decision.                                       |
| 8-7c. | Demonstrate appropriate lab safety techniques and skills during laboratory activities.   |