

SCIENCE

Standards adopted April 2001. Student accountability on these standards begins with statewide assessments in 2002-03.

Science is the rational and systematic observation, identification, description, experimental investigation, and theoretical explanation of natural events. The interrelated areas of scientific study attempt to answer questions about the physical and living universe.

PHYSICAL SCIENCE: Understand structures and properties of matter and changes that occur in the physical world.

Common Curriculum Goals	Content Standards	CIM/CAM* (Grade 10)	Investigation
MATTER Understand structure and properties of matter.	Understand structure and properties of matter.	Describe properties of elements and their relationship to the periodic table. <i>Explain atoms and their base components (protons, neutrons, and electrons) as a basis for all matter.</i> <i>Read and interpret the periodic table, recognizing the relationship of the chemical and physical properties of the elements to their position on the periodic table.</i> <i>Recognize that the historical development of atomic theory demonstrates how scientific knowledge changes over time, and how those changes have had an impact on society.</i>	3
Understand chemical and physical changes.	Describe and analyze chemical and physical changes.	Analyze the effects of various factors on physical changes and chemical reactions. <i>Describe how transformations among solids, liquids, and gases occur (change of state).</i> <i>Identify factors that can influence change of state, including temperature, pressure, and concentration.</i> <i>Describe chemical reactions in terms of reactants and products.</i> <i>Describe the factors that affect the rate of chemical reactions.</i> <i>Recognize examples that show when substances combine or break apart in a chemical reaction, the total mass remains the same (conservation of mass).</i>	3,4,5 3,4 3,4

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PHYSICAL SCIENCE, continued

Common Curriculum Goals	Content Standards	CIM/CAM* (Grade 10)	Investigation
<p>ENERGY</p> <p>Understand energy, its transformations, and interactions with matter.</p>	<p>Explain and analyze the interaction of energy and matter.</p>	<p>Describe differences and similarities between kinds of waves, including sound, seismic, and electromagnetic, as a means of transmitting energy.</p> <p><i>Recognize that waves of all kinds have energy that can be transferred when the waves interact with matter.</i></p> <p><i>Apply the concepts of frequency, wavelength, amplitude, and energy to electromagnetic and mechanical waves.</i></p> <p>Describe and analyze examples of conservation of energy.</p>	<p>2</p> <p>2</p> <p>7</p>
		<p><i>Recognize that heat energy is a by-product of most energy transformations.</i></p> <p><i>Describe ways in which energy can be transferred, including chemical reactions, nuclear reactions, and light waves.</i></p> <p><i>Explain the difference between potential and kinetic energy.</i></p> <p><i>Analyze the flow of energy through a system by applying the law of conservation of energy.</i></p>	<p>7</p> <p>2,5,7</p> <p>2</p> <p>2,7</p>

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EARTH AND SPACE SCIENCE: Understand physical properties of the Earth, how those properties change, and the Earth’s relationship to other celestial bodies.

Common Curriculum Goals	Content Standards	CIM/CAM* (Grade 10)	Investigation
<p>THE DYNAMIC EARTH Understand the properties and limited availability of the materials, which make up the Earth.</p>	<p>Identify the structure of the Earth system and the availability and use of the materials that make up that system.</p>	<p>Describe how the importance and use of resources has changed over time with changes in economic and technological systems.</p> <p><i>Predict consequences of increased consumption of renewable and non-renewable resources.</i></p>	
<p>Understand changes occurring within the lithosphere, hydrosphere, and atmosphere of the Earth.</p>	<p>Explain and analyze changes occurring within the lithosphere, hydrosphere, and atmosphere of the Earth.</p>	<p>Analyze the relationship between global energy transfer and climate.</p> <p><i>Describe the effect of various gases in the atmosphere on the amount of energy retained by the Earth system.</i></p> <p><i>Describe how solar radiation and the amount that reaches Earth is affected by stratospheric ozone.</i></p> <p><i>Describe how differential heating of the Earth’s surface, atmosphere, and oceans produces wind and ocean currents.</i></p> <p>Analyze evidence of ongoing evolution of the Earth system.</p>	<p>2</p> <p>2</p>

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SCIENTIFIC INQUIRY: Use interrelated processes to pose questions and investigate the physical and living world.

Common Curriculum Goals	Content Standards	CIM/CAM* (Grade 10)	Investigation
<p>FORMING THE QUESTION/HYPOTHESIS Formulate and express scientific questions or hypotheses to be investigated.</p>	<p>Make observations. Formulate and express scientific questions or hypotheses to be investigated based on the observations.</p>	<p>Based on observations and scientific concepts, ask questions or form hypotheses that can be answered or tested through scientific investigations.</p> <p><i>See 2002-03 Scientific Inquiry CIM Scoring Guide Level 4.</i></p>	<p>1-8</p>
<p>DESIGNING THE INVESTIGATION Design safe and ethical scientific investigations to address questions or hypotheses.</p>	<p>Design scientific investigations to address and explain questions or hypotheses.</p>	<p>Design a scientific investigation that provides sufficient data to answer a question or test a hypothesis.</p> <p><i>See 2002-03 Scientific Inquiry CIM Scoring Guide Level 4.</i></p>	<p>2,5,6,8</p>

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Common Curriculum Goals	Content Standards	CIM/CAM* (Grade 10)	Investigation
<p>COLLECTING AND PRESENTING DATA</p> <p>Conduct procedures to collect, organize, and display scientific data.</p>	<p>Collect, organize, and display scientific data.</p>	<p>Collect, organize, and display sufficient data to facilitate scientific analysis and interpretation.</p> <p><i>See 2002-03 Scientific Inquiry CIM Scoring Guide Level 4.</i></p>	<p>2,4-8</p>
<p>ANALYZING AND INTERPRETING RESULTS</p> <p>Analyze scientific information to develop and present conclusions.</p>	<p>Analyze scientific information to develop and present conclusions.</p>	<p>Summarize and analyze data, evaluating sources of error or bias. Propose explanations that are supported by data and knowledge of scientific terminology.</p> <p><i>See 2002-03 Scientific Inquiry CIM Scoring Guide Level 4.</i></p>	<p>2-6,8</p>

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Instruction in the Common Curriculum Goals of Unifying Concepts and Processes, History and Nature of Science, Science in Personal and Social Perspectives, and Science and Technology is required in all Oregon school districts; however, they are not included on the statewide assessment except as specifically indicated in the eligible content in Earth/Space Science, Life Science, or Physical Science.

UNIFYING CONCEPTS AND PROCESSES: Understand and apply major concepts and processes common to all sciences.

COMMON CURRICULUM GOALS:

- Understand that any collection of things that have an influence on one another can be thought of as a system.
- Understand that a model is a tentative scheme or structure with explanatory power. **2**
- Understand that both patterns of change and stability are important in the natural world.
- Understand that changes in scale influence the characteristics, properties and relationships within a system.

HISTORY AND NATURE OF SCIENCE: Understand science as a human endeavor, the nature of scientific knowledge and the history of science as it relates to and clarifies scientific inquiries.

COMMON CURRICULUM GOALS:

- Understand that science is a human endeavor practiced by individuals from many different cultures. **1, 8**
- Understand that scientific knowledge is subject to change based on new findings and results of scientific observation and experimentation. **1**
- Understand that scientific knowledge distinguishes itself through the use of empirical standards, logical arguments, and skepticism. **1, 8**

SCIENCE IN PERSONAL AND SOCIAL PERSPECTIVES: Understand that science provides a basis for understanding and acting on personal and social issues.

COMMON CURRICULUM GOALS:

- Describe the role of science and technology in local, national, and global issues. **5, 7**
- Describe how daily choices of individuals, taken together, affect global resource cycles, ecosystems, and natural resource supplies. **5, 7**
- Explain risks and benefits in personal and community health from a science perspective.

SCIENCE AND TECHNOLOGY: Understand the interconnections among science, technology, and society.

COMMON CURRICULUM GOALS:

- Understand the relationship that exists between science and technology. **2, 5, 7, 8**
- Understand the process of technological design to solve problems and meet needs.

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