

SCIENCE Standards for 2005-06

TRANSITIONS



**A Framework of Oregon Standards
to Prepare Middle- and High-School Students
for College Success**

SPONSORED BY:

Oregon University System

Oregon Department of Education

Department of Community Colleges
& Workforce Development



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June 2005



This document and the *Transitions* documents for other content areas are available as PDFs on the PASS website, www.ous.edu/pass

Introduction

This *Transitions* document illustrates the aligned academic standards for science that Oregon educators have identified for Grade 8 through college entry.

- The Grade 8 standards describe what students should know to move successfully into high school coursework and meet the expectations of an increasingly complex curriculum.
- The High School standards define initial mastery of basic high school knowledge and skills. These standards support students as they move from high school to their future roles as family members, college students, workforce participants, and citizens.
- The High School-to-College standards are based on the Proficiency-based Admission Standards System (PASS) used by the Oregon University System (OUS). OUS uses the PASS standards and assessments to define and measure the knowledge and skills students need for a successful transition from high school to college.

Each document in the *Transitions* series supplements:

1. the *PASS Guides to Teaching and Assessing Proficiency for University Admission* in each academic content area (available at the *documents/standards-assess* link at <<http://pass.ous.edu/>>) and
2. the *Oregon Standards Newspaper* (available from the *Publications* link at <<http://www.ode.state.or.us/>>). Note that in the columns for Grade 8 and High School standards, the italicized text defines eligible content that may appear on the Oregon Statewide Assessments.

Oregon is a leader among states in identifying and adopting an aligned framework of K-16 academic standards. The *Transitions* documents will be useful to those who guide students through their transitions from middle school to high school and from high school to community college, the university, and beyond.

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OREGON GRADE-LEVEL STANDARDS Grade 8

HIGH SCHOOL STANDARDS (CERTIFICATES OF INITIAL AND ADVANCED MASTERY)

OREGON HIGH SCHOOL-TO-COLLEGE STANDARDS (PASS)

PHYSICAL SCIENCE

MATTER

Compare properties of specific substances.

Describe how to measure characteristic properties including boiling and melting points, solubility, and density.

Recognize that substances may be grouped by their physical properties.

Use the concept of density to evaluate which objects will float or sink in water.

Compare physical and chemical changes.

Distinguish between examples of chemical changes and physical changes.

Describe processes that will separate the components of physical mixtures.

Describe events that accompany chemical changes, but not physical changes.

Explain how our understanding of the nature of matter and chemical reactions has changed over time.

FORCE

Explain interactions between force and matter and relationships among force, mass, and motion.

Recognize and describe the motion of an object based on its mass and the force exerted on it.

Predict the change in direction or speed of an object by changing the forces acting on it.

Explain inertia.

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MATTER

Describe properties of elements and their relationship to the periodic table.

Explain atoms and their base components (protons, neutrons, and electrons) as a basis for all matter.

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.

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.

Analyze the effects of various factors on physical changes and chemical reactions.

Describe how transformations among solids, liquids, and gases occur (change of state).

Identify factors that can influence change of state, including temperature, pressure, and concentration.

Describe chemical reactions in terms of reactants and products.

Describe the factors that affect the rate of chemical reactions.

Recognize examples that show when substances combine or break apart in a chemical reaction, the total mass remains the same (conservation of mass).

FORCE

Describe and explain the effects of multiple forces acting on an object.

Understand and apply the relationship $F=ma$ in situations in which one force acts on an object.

Recognize that equal and opposite forces occur when one object exerts a force on another.

Describe the forces acting on an object, based on the motion of that object.

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The Physical Sciences are addressed by criterion A2 of PASS Standard A (Know Fundamental Concepts of the Sciences) and by the three criteria of PASS Standard D (Understand, Use, and Investigate a Field of Science), which are listed on page 5.

KNOW FUNDAMENTAL CONCEPTS OF THE SCIENCES (PASS Standard A)

Know and apply fundamental and unifying concepts from the physical, life, and earth and space sciences, demonstrating general scientific literacy.

Criterion A2: KNOWLEDGE OF PHYSICAL SCIENCE CONCEPTS

Know and apply fundamental concepts of the physical sciences.

Descriptions of Proficient Performance for A2:

- demonstrates knowledge and applied understanding of concepts in the following areas: *
- structures and properties of matter
- chemical and physical change
- motions and forces
- interaction of energy and matter
- achieves a level of scientific literacy that is a foundation for informed citizenship and further learning in the sciences and other disciplines

** Note: Concepts to be learned are defined within the Oregon Content Standards, the test specifications for the Oregon Statewide Assessment, and the National Science Education Standards.*

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OREGON GRADE-LEVEL STANDARDS Grade 8

HIGH SCHOOL STANDARDS (CERTIFICATES OF INITIAL AND ADVANCED MASTERY)

OREGON HIGH SCHOOL-TO-COLLEGE STANDARDS (PASS)

PHYSICAL SCIENCE, *cont.*

Recognize that every object exerts gravitational force on every other object.
Describe the effect of gravitational force on objects at the Earth's surface.

ENERGY

Compare forms and behaviors of various types of energy.
Distinguish between the forms of energy including heat, chemical, mechanical, and gravitational potential energy.

Describe and explain various energy transfers and resulting transformations.
Trace the flow of energy transformations in a system.
Explain the principle that energy is conserved, neither created nor destroyed.
Identify how technological advances have changed humankind's use of energy.



Recognize that gravity is a universal force.
Describe the relationship of mass and distance to gravitational force.

ENERGY

Describe differences and similarities between kinds of waves, including sound, seismic, and electromagnetic, as a means of transmitting energy.
Recognize that waves of all kinds have energy that can be transferred when the waves interact with matter.
Apply the concepts of frequency, wavelength, amplitude, and energy to electromagnetic and mechanical waves.

Describe and analyze examples of conservation of energy.
Recognize that heat energy is a by-product of most energy transformations.
Describe ways in which energy can be transferred, including chemical reactions, nuclear reactions, and light waves.
Explain the difference between potential and kinetic energy.
Analyze the flow of energy through a system by applying the law of conservation of energy.



UNDERSTAND, USE, AND INVESTIGATE A FIELD OF SCIENCE (PASS Standard D)

Understand, use, and investigate essential concepts, principles, theories, relationships, and experimental processes in a field of science, exhibiting specialized scientific competency.

Criterion D1: UNDERSTANDING OF CONCEPTS, TERMS, AND PRINCIPLES

Understand and correctly use essential principles, organizations, concepts, terminology, and notations from a field of science.*

Descriptions of Proficient Performance for D1:

- Specific principles, organizations, concepts, terminology, and notations are dependent on the field of science selected.

Criterion D2: USE OF INFORMATION, SKILLS, AND PROCESSES

Use information, skills, and investigative processes employed in a field of science.*

Descriptions of Proficient Performance for D2:

- Specific principles, organizations, concepts, terminology, and notations are dependent on the field of science selected.

Criterion D3: INVESTIGATION OF PRINCIPLES, THEORIES, AND RELATIONSHIPS

Investigate, through research and/or inquiry, important principles, theories, and relationships from a field of science.*

Descriptions of Proficient Performance for D3:

- Specific principles, organizations, concepts, terminology, and notations are dependent on the field of science selected.

** Note: In many fields of science, the National Science Education Standards define appropriate content.*

Italicized text defines eligible content that may appear on Oregon Statewide Assessments.



OREGON GRADE-LEVEL STANDARDS Grade 8

HIGH SCHOOL STANDARDS (CERTIFICATES OF INITIAL AND ADVANCED MASTERY)

OREGON HIGH SCHOOL-TO-COLLEGE STANDARDS (PASS)

LIFE SCIENCE

ORGANISMS

Describe and explain the relationship and interaction of organ systems.

Identify organ systems at work during a particular activity and describe their effect on each other.

Describe and explain the structure and functions of an organism in terms of cells, tissues, and organs.

Identify differences and similarities between plant and animal cells.

Recognize how structural differences among organisms at the cellular, tissue, and organ level are related to their habitat and life requirements.

Identify photosynthesis as the process by which plants use the energy from light to make sugars out of carbon dioxide and water, and that this food can be used immediately for fuel or materials or it may be stored for later use.

Explain how our understanding of cells and microbes has changed over time.

HEREDITY

Describe how the traits of an organism are passed from generation to generation.

Distinguish between asexual and sexual reproduction.

Identify traits inherited through genes and those resulting from interactions with the environment.

Use simple laws of probability to predict patterns of heredity with the use of Punnett squares.

Explain how our understanding of heredity has changed over time.

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ORGANISMS

Describe, explain, and compare the structure and functions of cells in organisms.

Describe how biological systems can maintain equilibrium (homeostasis).

Identify unique structures in cells from plants, animals, and prokaryotes.

Identify cell organelles and state how their activities contribute to a particular type of cell carrying out its functions.

Explain the role of the cell membrane in cell transport.

Distinguish between active and passive transport, including diffusion and osmosis, explaining the mechanics of each.

Describe photosynthesis as a chemical process and part of the carbon cycle.

Explain how the development of tools and technology, including microscopes, has aided in the understanding of cells and microbes.

HEREDITY

Explain laws of heredity and their relationship to the structure and function of DNA.

Describe the structure of DNA and the way that DNA functions to control protein synthesis.

Recognize and understand the differences between meiosis and mitosis in cellular reproduction.

Recognize that changes in DNA (mutations) and anomalies in chromosomes create changes in organisms.

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The Life Sciences are addressed by criterion A3 of PASS Standard A (Know Fundamental Concepts of the Sciences) and by the three criteria of Standard D (Understand, Use, and Investigate a Field of Science), which are listed on page 5.

KNOW FUNDAMENTAL CONCEPTS OF THE SCIENCES (PASS Standard A)

Know and apply fundamental and unifying concepts from the physical, life, and earth and space sciences, demonstrating general scientific literacy.

Criterion A3: KNOWLEDGE OF LIFE SCIENCE CONCEPTS

Know and apply fundamental concepts of the life sciences.

Descriptions of Proficient Performance for A3:

- demonstrates knowledge and applied understanding of concepts in the following areas: *
- characteristics, structures, and functions of organisms
- heredity and biological evolution
- behavior and interdependence of organisms
- natural selection and adaptation
- achieves a level of scientific literacy that is a foundation for informed citizenship and further learning in the sciences and other disciplines

** Note: Concepts to be learned are defined within the Oregon Content Standards, the test specifications for the Oregon Statewide Assessment, and the National Science Education Standards.*



OREGON GRADE-LEVEL STANDARDS Grade 8

HIGH SCHOOL STANDARDS (CERTIFICATES OF INITIAL AND ADVANCED MASTERY)

OREGON HIGH SCHOOL-TO-COLLEGE STANDARDS (PASS)

LIFE SCIENCE, *cont.*

DIVERSITY/INTERDEPENDENCE

Identify and describe the factors that influence or change the balance of populations in their environment.

Identify that sunlight is the major source of energy in most ecosystems and that energy then passes from organism to organism in food webs.

Identify populations of organisms within an ecosystem by the function that they serve.

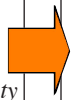
Differentiate between relationships among organisms including predator-prey, producer-consumer, and parasite-host.

Explain the importance of niche to an organism's ability to avoid direct competition for resources.

Describe and explain the theory of natural selection as a mechanism for evolution.

Identify and explain how random variations in species can be preserved through natural selection.

Describe how animal and plant structures adapt to environmental change.



Apply concepts of inheritance of traits, including Mendel's laws, Punnett squares, and pedigrees, to determine the characteristics of offspring.

Recognize the existence of technology that can alter and/or determine inherited traits.

DIVERSITY/INTERDEPENDENCE

Describe and analyze the effect of species, including humans, on an ecosystem.

Predict outcomes of changes in resources and energy flow in an ecosystem.

Explain how humans and other species can impact an ecosystem.

Explain how the balance of resources will change with the introduction or loss of a new species within an ecosystem.



Analyze how living things have changed over geological time, using fossils and other scientific evidence.

Recognize that, over time, natural selection may result in development of a new species or subspecies.

Recognize that natural selection and its evolutionary consequences provide an explanation for the fossil record as well as an explanation for the molecular similarities among varied species.

Explain how biological evolution can account for the diversity of species developed over time.

Explain the relationship between genetics, mutations, and biological evolution.

Explain how our understanding of evolution has changed over time.



OREGON GRADE-LEVEL STANDARDS Grade 8

HIGH SCHOOL STANDARDS (CERTIFICATES OF INITIAL AND ADVANCED MASTERY)

OREGON HIGH SCHOOL-TO-COLLEGE STANDARDS (PASS)

EARTH AND SPACE SCIENCE

THE DYNAMIC EARTH

Recognize that Earth materials are limited, and explore strategies for addressing this problem.

Identify ways in which various resources can be recycled and reused.

Explain the water cycle and its relationship to weather and climatic patterns.

Explain the water cycle.

Identify factors that cause or affect weather patterns.

Identify factors that affect the rate of evaporation, condensation, and cloud formation.

Identify the difference between weather and climate.

Explain how geography affects climate.

Describe the Earth's structure and how it changes over time.

Recognize the solid Earth is layered with a lithosphere, a hot convecting mantle, and a dense metallic core.

Identify the processes that result in different kinds of landforms.

Identify factors affecting water flow, soil erosion, and deposition.

Give examples of landform changes that occur at different rates.

Describe the evidence for and the development of the theory of plate tectonics.

Explain the rock cycle in terms of constructive (crustal deformation, volcanic eruption, and sediment deposition) and destructive (weathering and erosion) forces in land formation.

Describe that the total amount of Earth material stays the same as its forms change in the rock cycle.

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THE DYNAMIC EARTH

Describe how the importance and use of resources has changed over time with changes in economic and technological systems.

Predict consequences of increased consumption of renewable and non-renewable resources.

Analyze the relationship between global energy transfer and climate.

Describe the effect of various gases in the atmosphere on the amount of energy retained by the Earth system.

Describe how solar radiation and the amount that reaches Earth is affected by stratospheric ozone.

Describe how differential heating of the Earth's surface, atmosphere, and oceans produces wind and ocean currents.

Analyze evidence of ongoing evolution of the Earth system.

Describe methods of determining ages of rocks and fossils.

Use rock sequences and fossil evidence to determine geologic history.

Describe and analyze theories of Earth's origin and early history using scientific evidence.

Describe how earthquakes, volcanic eruptions, mountain building, and continental movements result from slow plate motions.

Describe how the evolution of life caused dramatic changes in the composition of the Earth's atmosphere, which did not originally contain oxygen.

Identify how volcanic eruptions and impacts of huge rocks from space can cause widespread effects on climate.

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The Earth and Space Sciences are addressed by criterion A4 of PASS Standard A (Know Fundamental Concepts of the Sciences) and by all three criteria of Standard D (Understand, Use, and Investigate a Field of Science), which are listed on page 5.

KNOW FUNDAMENTAL CONCEPTS OF THE SCIENCES (PASS Standard A)

Know and apply fundamental and unifying concepts from the physical, life, and earth and space sciences, demonstrating general scientific literacy.

Criterion A4: KNOWLEDGE OF EARTH AND SPACE SCIENCE CONCEPTS

Know and apply fundamental concepts of the earth and space sciences.

Descriptions of Proficient Performance for A4:

- demonstrates knowledge and applied understanding of concepts in the following areas: *
- structure, energy, and change in the earth's system
- relationships within the solar system
- achieves a level of scientific literacy that is a foundation for informed citizenship and further learning in the sciences and other disciplines

** Note: Concepts to be learned are defined within the Oregon Content Standards, the test specifications for the Oregon Statewide Assessment, and the National Science Education Standards.*



OREGON GRADE-LEVEL STANDARDS Grade 8

HIGH SCHOOL STANDARDS (CERTIFICATES OF INITIAL AND ADVANCED MASTERY)

OREGON HIGH SCHOOL-TO-COLLEGE STANDARDS (PASS)

EARTH AND SPACE SCIENCE, *cont.*

THE EARTH IN SPACE

Explain the relationship of the Earth's motion to the day, season, year, phases of the moon, and eclipses.

Explain the relationship between the cycle of seasons and the tilt of the Earth on its axis.



THE EARTH IN SPACE

Explain how mass and distance affect the interaction between Earth and other objects in space.

Recognize that the sun's gravitational pull holds the Earth and other planets in their orbits, just as the planets' gravitational pull keeps their moons in orbit around them.

Explain that the force of gravity between Earth and other objects in space depends only upon their masses and the distances between them.





OREGON GRADE-LEVEL STANDARDS Grade 8

HIGH SCHOOL STANDARDS (CERTIFICATES OF INITIAL AND ADVANCED MASTERY)

OREGON HIGH SCHOOL-TO-COLLEGE STANDARDS (PASS)

SCIENTIFIC INQUIRY

FORMING THE QUESTION/HYPOTHESIS

Based on observations and scientific concepts, ask questions or form hypotheses that can be explored through scientific investigations.

DESIGNING THE INVESTIGATION

Design a scientific investigation to answer questions or test hypotheses.

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FORMING THE QUESTION/HYPOTHESIS

Based on observations and scientific concepts, ask questions or form hypotheses that can be answered or tested through scientific investigations.

DESIGNING THE INVESTIGATION

Design a scientific investigation that provides sufficient data to answer a question or test a hypothesis.

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DESIGN AND CONDUCT SCIENTIFIC INQUIRY (PASS Standard B)

Design and conduct investigations using principles of scientific inquiry, investigative processes of the sciences, scientific instruments, and technology. Collect and analyze data, critique experimental designs, and communicate scientific problems, results, and arguments.

Criterion B1: FORMULATION OF QUESTIONS AND HYPOTHESES

Determine areas of inquiry, frame scientific problems, and pose research questions and hypotheses involving scientific relationships.

Descriptions of Proficient Performance for B1:

- determines areas of inquiry and frames scientific problems that are focused, worthy of investigation, able to be investigated, and representative of a chosen field of science
- independently develops clear and concise questions and/or hypotheses (or re-frames them from general topics) that address and apply concepts, data, and research appropriate to a field of science
- focuses investigations on relationships involving interaction, dependency, correlation, or causation
- provides focused rationale for investigation using relevant background information, appropriately applying terminology, concepts, theories, and research
- suggests investigative design through clarity of questions/hypotheses and supporting background information
- communicates questions, hypotheses and rationale with clarity, coherence, and conciseness

Criterion B2: DESIGN OF INVESTIGATIONS

Design scientific investigations that use precise and appropriate methodology to address questions, examine scientific relationships, and test hypotheses.

Descriptions of Proficient Performance for B2:

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OREGON GRADE-LEVEL STANDARDS Grade 8

HIGH SCHOOL STANDARDS (CERTIFICATES OF INITIAL AND ADVANCED MASTERY)

OREGON HIGH SCHOOL-TO-COLLEGE STANDARDS (PASS)

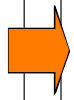
SCIENTIFIC INQUIRY, *cont.*

COLLECTING AND PRESENTING DATA

Collect, organize, and display sufficient data to support analysis.

ANALYZING AND INTERPRETING RESULTS

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COLLECTING AND PRESENTING DATA

Collect, organize, and display sufficient data to facilitate scientific analysis and interpretation.

ANALYZING AND INTERPRETING RESULTS

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- describes and explains practical investigative designs that provide data sufficient to address questions, examine scientific relationships, and/or validly test hypotheses
- clearly describes scientific methods that are logical, precise, safe, ethical, and consistent with accepted scientific practices
- describes procedures that can be followed, replicated, and analyzed for sources of bias and error
- builds precision, flexibility, and appropriate adjustments into the structure of investigative designs, which can be monitored and adjusted when appropriate
- evaluates technology-based means of data collection and makes appropriate decisions about their use and limitations
- applies logical scientific models and methods
- communicates investigative methods with clarity, coherence, and conciseness

Criterion B3: COLLECTION AND PRESENTATION OF DATA

Conduct scientifically accepted procedures to collect, organize, and display data.

Descriptions of Proficient Performance for B3:

- uses scientifically accepted methods, procedures, and equipment or resources precisely to generate accurate data sets from complex procedures
- organizes and transforms data in scientifically accepted displays, with formats, layouts, scales, and graphics that highlight data and emphasize relationships to be analyzed and interpreted
- collects sufficient data to study questions, relationships, or hypotheses
- objectively observes and records details, properties, and patterns, avoiding interpretation and opinion (in most cases)
- correctly uses appropriate measurement tools and units to clarify observable characteristics and make comparisons

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OREGON GRADE-LEVEL STANDARDS Grade 8

HIGH SCHOOL STANDARDS (CERTIFICATES OF INITIAL AND ADVANCED MASTERY)

OREGON HIGH SCHOOL-TO-COLLEGE STANDARDS (PASS)

SCIENTIFIC INQUIRY, *cont.*

Summarize and analyze data including possible sources of error. Explain results and offer reasonable and accurate interpretations and implications.



Summarize and analyze data, evaluating sources of error or bias. Propose explanations that are supported by data and knowledge of scientific terminology.



- uses instruments and equipment correctly and responsibly
- uses technology/software to accurately collect, analyze and display data
- communicates results using pictures, diagrams, and graphic displays that are clear, neat, accurate, and informative

Criterion B4: **ANALYSIS AND INTERPRETATION**
Analyze and interpret data and relationships, evaluate investigations, and develop supported explanations.

Descriptions of Proficient Performance for B4:

- provides clear and detailed scientific analyses and interpretations of relationships, including those involving interaction, dependency, correlation, or causation
- explicitly analyzes patterns in results to explain questions, hypotheses, and relationships, and to support conclusions
- orders and classifies objects/events using logical comparisons of similarities and/or differences in properties
- supports and justifies interpretations with specific data and results
- analyzes and critiques investigations for flaws, limitations, and sources of error or bias
- recognizes and explains the limitations of the observed relationships and the potential influences of other factors
- precisely uses terminology, symbols, notations, and formulas to report results, identify patterns in data, and propose explanations
- correctly applies concepts, information, theories, and research specific to a field of science to justify and explain relationships investigated
- communicates findings with clarity, coherence, and conciseness

SCIENCE



**OREGON GRADE-LEVEL STANDARDS
Grade 8**

**HIGH SCHOOL STANDARDS (CERTIFICATES OF
INITIAL AND ADVANCED MASTERY)**

**OREGON HIGH SCHOOL-TO-COLLEGE STANDARDS
(PASS)**

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INSTRUCTIONAL STANDARDS IN SCIENCE

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 (the italicized text in the preceding pages) 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.
- 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.
- Understand that scientific knowledge is subject to change based on new findings and results of scientific observation and experimentation.
- Understand that scientific knowledge distinguishes itself through the use of empirical standards, logical arguments, and skepticism.

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KNOW FUNDAMENTAL CONCEPTS OF THE SCIENCES (PASS Standard A)

Know and apply fundamental and unifying concepts from the physical, life, and earth and space sciences, demonstrating general scientific literacy.

Criterion A1: KNOWLEDGE OF UNIFYING SCIENTIFIC CONCEPTS

Know and apply fundamental concepts that unify the sciences.

Descriptions of Proficient Performance for A1:

- demonstrates knowledge and applied understanding of concepts in the following areas:*
 - change, constancy, and measurement
 - systems, order, and organization
 - evidence, models, and explanation
 - evolution and equilibrium
 - structure and function
- achieves a level of scientific literacy that is a foundation for informed citizenship and further learning in the sciences and other disciplines

* *Note: Concepts to be learned are defined within the Oregon Content Standards, the test specifications for the Oregon Statewide Assessment, and the National Science Education Standards.*

ANALYZE SCIENTIFIC KNOWLEDGE, THEORIES, AND RESEARCH (PASS Standard C)

Analyze and evaluate scientific information and claims to understand the nature of scientific knowledge, the context in which scientific theories and concepts develop, and the implications of scientific research for society.

Criterion C1: ANALYSIS OF SCIENTIFIC THEORIES AND WRITINGS

Informally analyze scientific writings, theories, research, and arguments.

Descriptions of Proficient Performance for C1:

- summarizes information, allowing readers to understand the essence of the article, study, report, theory, presentation, or text in a brief reading
- correctly identifies and explains the scientific concepts, principles, or theories involved and applied

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INSTRUCTIONAL STANDARDS IN SCIENCE, *cont.*

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.
- Describe how daily choices of individuals, taken together, affect global resource cycles, ecosystems, and natural resource supplies.
- 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.
- Understand the process of technological design to solve problems and meet needs.



- clearly and completely restates scientific claims or arguments presented
- identifies observations, information, data, and/or assumptions used to support scientific claims or arguments
- identifies scientists, authors, or organizations cited or quoted in text in support of scientific claims or arguments
- uses own words, avoiding plagiarism

Criterion C2: UNDERSTANDING OF SCIENTIFIC KNOWLEDGE AND RESEARCH

Examine the work of scientists and the development of scientific theories or bodies of research.

Descriptions of Proficient Performance for C2:

- examines the thinking and processes used by scientists to investigate a phenomenon, develop a theory, or test a hypothesis
- correctly and completely identifies the major components or ideas of a scientific theory (or body of research)
- correctly outlines the general historical development of a theory (or body of research)
- correctly describes influential aspects of the scientific, historical, social, and/or cultural context in which a scientific theory (or body of research) was developed
- correctly identifies major contributors and proponents and their contributions or support
- objectively identifies major critics and criticisms

Criterion C3: EVALUATION OF SCIENTIFIC AND SOCIAL IMPLICATIONS

Evaluate scientific, social, or ethical implications of scientific research and writings.

Descriptions of Proficient Performance for C3:

- evaluates opposing views of a controversial scientific issue, using scientific criteria as a basis for judgments
- identifies the major scientific implications of a theory, discovery, body of research, or scientific writing
- discusses important social, cultural, or historical implications of a scientific theory, discovery, body of research, or scientific writing (when applicable)
- identifies philosophical or ethical questions and issues associated with a scientific theory, discovery, body of research, or scientific writing (when applicable)
- compares and analyzes opposing views of a controversial scientific issue



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June 2005

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