



Standards By Design:

Fourth Grade, Fifth Grade and Sixth Grade for Science



Acknowledgment

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Message to Students

Dear Student,

The world is changing quickly. For you to succeed in school, at work, and in the community, you will need more skills and knowledge than ever before. These days, “ready for college” and “ready for work” essentially mean the same thing: “ready for life.”

Getting in shape academically is one of the most important things you can do to prepare for a successful future. Your future starts with Oregon’s academic standards. This booklet explains what you should know and be able to do in each subject, at your grade level.

Please review this guide with your teachers and share it with your parents and family. To be ready for tomorrow, get in top academic shape today. You can use this guide year round to check your progress.



Message to Parents

Dear Parent,

Education is the building block of every student's future. To ensure all students have the opportunity to succeed, Oregon has adopted world-class academic standards in English/language arts, mathematics, science, social studies, the arts, health education, physical education and second languages. The academic content standards clearly outline what students should know and be able to do in each subject, at each grade level. Oregon's teachers are dedicated to helping all students meet these expectations.

Moreover, these standards are the cornerstone of the state's plan for improving student achievement. They provide a comprehensive blueprint for what we must do to support students every step of the way – from their earliest years through post-high school education. To be competitive in today's economy and to earn enough to support a family, all students need to continue their education beyond high school, whether at a two- or four-year college, in an apprenticeship program, or in the military.

How can you help your student meet these challenges? Learning occurs many places, not only in the classroom. Students spend far more time at home than they do in school. How they spend their time can make a real difference. Nothing will have a bigger impact on your student's success than your involvement in his or her education.

On the next page is a list of 12 things you can do to help ensure your child has the best education possible – from preschool to post-high school opportunities. We hope you will use this guide as a tool to help your child succeed today and in the future.

Sincerely,

A handwritten signature in black ink that reads "Susan Castillo". The signature is fluid and cursive, with the first name "Susan" and last name "Castillo" clearly legible.

Susan Castillo
Superintendent of Public Instruction

Twelve things parents can do to help students succeed

- 1. Promote education beyond high school.** Make sure your child knows you expect him or her to continue learning after high school – it's never too early to start raising these expectations. To keep our families, communities, and economy strong, all students need to keep learning.
- 2. Build relationships with your child's teachers.** Find out what each teacher expects of your child. Learn how you can help your child prepare to meet these expectations.
- 3. Read to your child.** Reading is the foundation for all learning and is one of the most important contributions you can make to your child's education. Read to your young child, encourage your older child to read to you, or spend time together as a family reading. All this helps your child develop strong reading habits and skills from the beginning and reinforces these habits and skills as your child grows.
- 4. Practice writing at home.** Letters, journal entries, e-mail messages, and grocery lists are all writing opportunities. Show that writing is an effective form of communication and that you write for a variety of purposes.
- 5. Make math part of everyday life.** Paying bills, cooking, gardening, and even playing games are all good ways to help your child understand and use mathematics skills. Show that there may be many ways to get to the right answer and encourage your child to explain his or her method.
- 6. Ask your child to explain his or her thinking.** Ask lots of "why" questions. Children should be able to explain their reasoning, how they came up with their answer, and why they chose one answer over another.
- 7. Expect that homework will be done.** Keep track of your child's homework assignments and regularly look at his or her completed work. Some teachers give parents a number to call for a recorded message of that day's homework; others put the assignments on the Internet. If your school doesn't offer these features, talk to the teacher about how you can get this important information. Even if there aren't specific assignments, stay informed about what your child is working on so that you can help at home.
- 8. Use the community as a classroom.** Feed your child's curiosity about the world 365 days a year. Use the library to learn more about the history of your town. A visit to a farmer's market can help your child picture our state's rich agricultural tradition. Take your young child to zoos and parks and your older child to museums and workplaces to show how learning connects to the real world.
- 9. Encourage group study.** Open your home to your child's friends for informal study sessions. Promote outside formal study groups through church, school organizations, or other groups. Study groups will be especially important as your child becomes older and more independent. The study habits your child learns now will carry over into college and beyond.
- 10. Spend time at school.** The best way to know what goes on in your child's school is to spend time there. If you're a working parent, this isn't easy, and you may not be able to do it very often. Even so, "once in awhile" is better than "never."
- 11. Start a college savings plan as soon as possible.** Investigate Oregon's College Savings Plan and other investment vehicles and contribute as much as you can.

12. Promote high standards for all. To ensure the academic success of our children, everyone must work toward the same goal. Discuss academic expectations with parents and other people in your community. Use your school and employee newsletters, athletic associations, booster clubs, a PTA or PTO meeting, or just a casual conversation to explain why academic standards are important and what they mean to you and your family. Share your tips for helping your own son or daughter succeed in school and encourage others to share their suggestions as well.

Remember: You are the most important influence on your child. Oregon's academic standards give you important tools to ensure your child gets the best education possible and is well prepared for the future.



Measuring Student Learning

Children develop at different rates. Some take longer and need more help to learn certain skills.

Assessments at the state level provide a measure of school accountability – assisting schools in their efforts to align curriculum and instruction with the state’s academic standards and reporting progress to parents and the public.

Assessments at the classroom level help teachers and parents understand how students are progressing and assist in identifying academic areas where students may need additional attention.

The Oregon Assessment of Knowledge and Skills (OAKS) consists of three broad areas:

1. Multiple Choice Tests present the student with a series of questions or problems. The student responds on an answer sheet and responses are scored by machine. These tests are required in grades 3-8 and high school/CIM for English Language Arts and mathematics and for grades 5, 8, and high school/CIM in science. An optional multiple choice test is also available for Social Sciences in grades 5, 8 and high school/CIM.

2. State Writing Assessments require students to give extended written responses to open-ended topics provided by the state in a supervised testing situation. Trained raters at state-run scoring sites judge student work using the state scoring guide. These performance assessments are required for grades 4, 7 and high school/CIM.

3. Classroom Work Samples are a series of formal classroom assessments available to Oregon teachers in grades 3 to high school/CIM that allow students to respond to locally provided topics or complex problems. Student work is rated by teachers in their own schools or districts using state scoring guides. Work samples are collected in Writing, Speaking, Mathematics Problem Solving, Scientific Inquiry and Social Science Analysis.

Who is required to take state assessments?

Third grade is the first time that many students will be taking a statewide assessment. Third grade students take tests in Reading/Literature and Mathematics that are delivered through TESA (Technology Enhanced State Assessment) a computerized adaptive testing system.

The table below lists the statewide assessment schedule, by grade.

Required Statewide Testing

	3	4	5	6	7	8	10/CIM
Reading/Literature	X	X	X	X	X	X	X
Writing		X			X		X
Mathematics	X	X	X	X	X	X	X
Science			X			X	X
Social Sciences (optional)			X			X	X

How is student performance measured on these assessments?

Content Standards describe what students in Oregon should learn. How well they learn the content is determined by Achievement Standards. These Achievement Standards, or “cut scores”, identify the score needed to demonstrate solid understanding of the Content Standards. The following table shows the current Achievement Standards in Reading/Literature and Mathematics for grades 3-8 and 10/CIM.

Grade	<u>Reading/Literature</u>		<u>Mathematics</u>		<u>Science</u>	
	Meet	Exceed	Meet	Exceed	Meet	Exceed
3	204	218	205	217	----	----
4	211	223	212	225	----	----
5	218	230	218	229	225	238
6	222	234	221	232	----	----
7	227	239	226	238	----	----
8	231	241	230	241	234	246
10/CIM	236	248	236	246	239	249

The state writing assessment and classroom work samples are scored using state scoring guides. As an assessment tool, scoring guides provide specific criteria to describe a range of possible student responses and a consistent set of guidelines to rate student work. For the state writing assessment, student work is scored by two different raters and their scores combined to create a “composite score.”

Since the scoring guide serves as the primary assessment tool to determine whether students have met the standards through a collection of work samples, teachers are asked to align their classroom assessments carefully to the criteria described on the scoring guide. **Composite scores are not required for classroom work samples.**

For more information on assessments, please visit <http://www.ode.state.or.us/search/results/?id=169>

Science

Benchmark 2

Benchmark 2 (Grades 4-5) students learn to identify different states of matter and the causes of change in states, to describe and compare the motion of objects, to identify examples of forces on objects and forms of various types of energy and their effects on matter, and to describe examples of energy transfer. Life science study includes grouping or classifying organisms based on a variety of characteristics and studying the function of organ systems and basic plant and animal structures. They study the life cycle of an organism, the relationship between characteristics of specific habitats and the organisms that live there, and how adaptations help a species survive. Students learn to identify properties and uses of Earth materials, patterns of seasonal weather and causes of Earth surface changes. They use pictorial models to describe the Earth's place in the solar system and the patterns of movement of objects within the solar system. Students extend their work with Scientific Inquiry, designing and conducting simple investigations to answer questions or test hypotheses, and collecting, organizing, summarizing, analyzing, and interpreting data from investigations.

Physical Science

CCG: Matter :
Understand structure and properties of matter.

Fifth Grade

SC.05.PS.01

Identify substances as they exist in different states of matter.

SC.05.PS.01.01

Distinguish among solids, liquids, and gases.

SC.05.PS.01.02

Identify unique properties of each state of matter.

Eighth Grade

SC.08.PS.01

Compare properties of specific substances.

SC.08.PS.01.01

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

SC.08.PS.01.02

Recognize that substances may be grouped by their physical properties.

SC.08.PS.01.03

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

CCG: Matter :
Understand chemical and physical changes.

Fifth Grade

SC.05.PS.02

Describe the ability of matter to change state by heating and cooling.

SC.05.PS.02.01

Recognize that heating and cooling cause changes in states of matter.

SC.05.PS.02.02

Plain text denotes benchmark standards. Material in *Italics* is eligible for statewide assessment.

Identify changes in states of matter seen in the environment.

Eighth Grade

SC.08.PS.02

Compare physical and chemical changes.

SC.08.PS.02.01

Distinguish between examples of chemical changes and physical changes.

SC.08.PS.02.02

Describe processes that will separate the components of physical mixtures.

SC.08.PS.02.03

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

SC.08.PS.02.04

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

CCG: Force :

Understand fundamental forces, their forms, and their effects on motion.

Fifth Grade

SC.05.PS.03

Describe and compare the motion of objects.

SC.05.PS.03.01

Recognize and describe the motion of an object in terms of one or more forces acting on it.

SC.05.PS.04

Identify examples of magnetism and gravity exerting force on an object.

SC.05.PS.04.01

Recognize that magnets attract and repel each other and other materials.

SC.05.PS.04.02

Recognize that things on or near Earth are pulled toward it by Earth's gravity.

Eighth Grade

SC.08.PS.03

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

SC.08.PS.03.01

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

SC.08.PS.03.02

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

SC.08.PS.03.03

Explain inertia.

SC.08.PS.04

Recognize that every object exerts gravitational force on every other object.

SC.08.PS.04.01

Describe the effect of gravitational force on objects at the Earth's surface.

CCG: Energy :

Understand energy, its transformations, and interactions with matter.

Fifth Grade

SC.05.PS.05

Identify forms of various types of energy and their effects on matter.

SC.05.PS.05.01

Identify various forms of energy including heat, light, sound, and electricity.

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SC.05.PS.06

Describe examples of energy transfer.

SC.05.PS.06.01

Identify the direction of heat transfer on a diagram showing objects at different temperatures.

SC.05.PS.06.02

Identify ways to produce heat including light, burning, electricity, friction, and as a by-product of mechanical and electrical machines.

SC.05.PS.06.03

Identify examples of energy transfer in the environment.

Eighth Grade

SC.08.PS.05

Compare forms and behaviors of various types of energy.

SC.08.PS.05.01

Distinguish between the forms of energy including heat, chemical, mechanical, and gravitational potential energy.

SC.08.PS.06

Describe and explain various energy transfers and resulting transformations.

SC.08.PS.06.01

Trace the flow of energy transformations in a system.

SC.08.PS.06.02

Explain the principle that energy is conserved, neither created nor destroyed.

SC.08.PS.06.03

Identify how technological advances have changed humankind's use of energy.

Life Science

CCG: Organisms :

Understand the characteristics, structure, and functions of organisms.

Fifth Grade

SC.05.LS.01

Group or classify organisms based on a variety of characteristics.

SC.05.LS.01.01

Classify a variety of living things into groups using various characteristics.

SC.05.LS.02

Describe the function of organ systems.

SC.05.LS.02.01

Classify organs by the system to which they belong.

SC.05.LS.03

Describe basic plant and animal structures and their functions.

SC.05.LS.03.01

Associate specific structures with their functions in the survival of the organism.

Eighth Grade

SC.08.LS.01

Describe and explain the relationship and interaction of organ systems.

SC.08.LS.01.01

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

SC.08.LS.02

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

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SC.08.LS.02.01

Identify differences and similarities between plant and animal cells.

SC.08.LS.02.02

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

SC.08.LS.02.03

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.

SC.08.LS.02.04

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

CCG: Heredity :
Understand the transmission of traits in living things.

Fifth Grade

SC.05.LS.04

Describe the life cycle of an organism.

SC.05.LS.04.01

Describe the life cycle of common organisms.

SC.05.LS.04.02

Recognize that organisms are produced by living organisms of similar kind, and do not appear spontaneously from inanimate materials.

Eighth Grade

SC.08.LS.03

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

SC.08.LS.03.01

Distinguish between asexual and sexual reproduction.

SC.08.LS.03.02

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

SC.08.LS.03.03

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

SC.08.LS.03.04

Explain how our understanding of heredity has changed over time.

CCG: Diversity/Interdependence :
Understand the relationships among living things and between living things and their environments.

Fifth Grade

SC.05.LS.05

Describe the relationship between characteristics of specific habitats and the organisms that live there.

SC.05.LS.05.01

Use drawings or models to represent a series of food chains for specific habitats.

SC.05.LS.05.02

Identify the producers, consumers, and decomposers in a given habitat.

SC.05.LS.05.03

Recognize how all animals depend upon plants whether or not they eat the plants directly.

SC.05.LS.05.04

Explain the relationship between animal behavior and species survival.

Plain text denotes benchmark standards. Material in *Italics* is eligible for statewide assessment.

SC.05.LS.05.05

Describe the living and nonliving resources in a specific habitat and the adaptations of organisms to that habitat.

SC.05.LS.06

Describe how adaptations help a species survive.

SC.05.LS.06.01

Describe changes to the environment that have caused the population of some species to change.

SC.05.LS.06.02

Identify conditions that might cause a species to become endangered or extinct.

Eighth Grade

SC.08.LS.04

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

SC.08.LS.04.01

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

SC.08.LS.04.02

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

SC.08.LS.04.03

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

SC.08.LS.04.04

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

SC.08.LS.05

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

SC.08.LS.05.01

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

SC.08.LS.05.02

Describe how animal and plant structures adapt to environmental change.

Earth and Space Science

CCG: The Dynamic Earth :

Understand the properties and limited availability of the materials which make up the Earth.

Fifth Grade

SC.05.ES.01

Identify properties and uses of Earth materials.

SC.05.ES.01.01

Recognize that Earth materials are used in different ways based on differences in their physical and chemical properties.

SC.05.ES.01.02

Recognize that soils vary in color, texture, components, reaction to water, and ability to support the growth of plants.

SC.05.ES.01.03

Recognize that the supply of resources is limited, and that resources can be extended through recycling and decreased use.

SC.05.ES.01.04

Recognize that discarded products contribute to the problem of waste disposal.

Eighth Grade

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SC.08.ES.01

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

SC.08.ES.01.01

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

CCG: The Dynamic Earth :

Understand changes occurring within the lithosphere, hydrosphere, and atmosphere of the Earth.

Fifth Grade

SC.05.ES.02

Describe patterns of seasonal weather.

SC.05.ES.02.01

Describe weather in measurable quantities including temperature, wind direction, wind speed, and precipitation.

SC.05.ES.02.02

Interpret data over a period of time and use information to describe changes in weather from day to day, week to week, and season to season.

SC.05.ES.03

Identify causes of Earth surface changes.

SC.05.ES.03.01

Identify effects of wind and water on Earth materials using appropriate models.

SC.05.ES.03.02

Identify effects of rapid changes on Earth's surface features including earthquakes and volcanoes.

Eighth Grade

SC.08.ES.02

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

SC.08.ES.02.01

Explain the water cycle.

SC.08.ES.02.02

Identify factors that cause or affect weather patterns.

SC.08.ES.02.03

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

SC.08.ES.02.04

Identify the difference between weather and climate.

SC.08.ES.02.05

Explain how geography affects climate.

SC.08.ES.03

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

SC.08.ES.03.01

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

SC.08.ES.03.02

Identify the processes that result in different kinds of landforms.

SC.08.ES.03.03

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

SC.08.ES.03.04

Give examples of landform changes that occur at different rates.

SC.08.ES.03.05

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

SC.08.ES.03.06

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

SC.08.ES.03.07

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

CCG: The Earth in Space :
Understand the Earth's place in the solar system and the universe.

Fifth Grade

SC.05.ES.04

Describe the Earth's place in the solar system and the patterns of movement of objects within the solar system using pictorial models.

SC.05.ES.04.01

Describe Earth's position and movement in the solar system.

SC.05.ES.04.02

Recognize that the rotation of the Earth on its axis every 24 hours produces the night-and-day cycle.

Eighth Grade

SC.08.ES.04

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

SC.08.ES.04.01

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

Scientific Inquiry

CCG: Forming the Question/Hypothesis :
Formulate and express scientific questions or hypotheses to be investigated.

Fifth Grade

SC.05.SI.01

Make observations. Ask questions or form hypotheses based on those observations, which can be explored through scientific investigations.

Eighth Grade

SC.08.SI.01

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

CCG: Designing the Investigation :
Design safe and ethical scientific investigations to address questions or hypotheses.

Fifth Grade

SC.05.SI.02

Design a simple scientific investigation to answer questions or test hypotheses.

Eighth Grade

SC.08.SI.02

Design a scientific investigation to answer questions or test hypotheses.

Plain text denotes benchmark standards. Material in *Italics* is eligible for statewide assessment.

CCG: Collecting and Presenting Data :
Conduct procedures to collect, organize, and display scientific data.

Fifth Grade

SC.05.SI.03

Collect, organize, and summarize data from investigations.

Eighth Grade

SC.08.SI.03

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

CCG: Analyzing Data and Interpreting Results :
Analyze scientific information to develop and present conclusions.

Fifth Grade

SC.05.SI.04

Summarize, analyze, and interpret data from investigations.

Eighth Grade

SC.08.SI.04

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