

# STANDARDS FOR

## Literacy in Science and Technical Subjects

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Grades 9-12



## Introduction to the Common Core State Standards for Literacy in Science and Technical Subjects

### Preparing Oregon’s Students

When Oregon adopted the Common Core in October 2010, our state joined other states in the pursuit of a common, standards-based education for our students, kindergarten through high school. Common standards can increase the likelihood that all students, no matter where they live, are prepared for success in college and the work place. Because skillful reading and writing are similar across the states, common standards make sense.

The *Common Core State Standards (CCSS) for English Language Arts (ELA) & Literacy in History/Social Studies, Science, and Technical Subjects*—“the Standards”—will prepare Oregon students and students in other CCSS states to be proficient readers and writers.

Because students need grade-level literacy skills to access full content in school, the emphasis in the Standards is to *learn to read and write* in ELA and to *apply and develop those skills*, specific to the content, in all other classes. The name of the Standards reflects this expectation.

The grades K-5 ELA and literacy standards for science and technical subjects are combined for classroom teachers. However, the grades 6-11/12 ELA and literacy standards for science and technical subjects are separate but parallel; subject area teachers integrate the literacy standards into science and technical subjects’ Academic Content Standards or the Career-Related Learning Standards.

### Utilizing Content Area Expertise

Instruction in the reading and writing standards customized for literacy in science and technical subjects (and also history/social studies), in addition to instruction in the English language arts standards, will make a critical difference for students. That is because the Standards for grade 6 and above are predicated on all teachers using their content area expertise to help students meet the particular challenges of reading and writing in their respective fields.

It is important to note that the 6-12 literacy standards are not meant to replace content standards in science and technical subjects but rather to supplement them. For example, because Scientific Inquiry in Oregon already includes a number of these standards, the cross-referenced reading and writing Common Core Standards, linked for instruction, are likely to support what science teachers are already doing.

### Incorporating a Unique Design

The College and Career Readiness (CCR) Anchor Standards, the “backbone” of the Standards, describe the literacy skills which *all students need when they graduate*. The grade-specific standards describe the literacy skills, corresponding to the CCR Anchor Standards by number, which *all students need when they finish each grade*.

Keeping the college and career focus at the forefront of Kindergarten through grade 11/12 implementation is critical; that is why the CCRs are placed *before* the grade-specific standards in the CCSS. It is this unique design that supports the preparation of all students to be successful in school, from the beginning of school, and proficient in the Essential Skills of Reading, Writing, and Speaking and Listening required for an Oregon Diploma.

## Focusing on Key Features

- Reading: *Text complexity and the growth of comprehension\**
- Writing: *Text types, responding to reading, and research\**
- Appendices\*\*
  - *Appendix A*: Supplementary material on the four strands; glossary of key terms included
  - *Appendix B*: *Text Exemplars and Sample Performance Tasks*, illustrating the complexity, quality, and range of reading appropriate for various grade levels
  - *Appendix C*: Annotated examples of *Argument (Opinion) and Informative/Explanatory* demonstrating at least adequate student grade-level performance

## Reading this Document

Because the CCR Anchor Standards are the backbone of the Standards, the CCRs for each strand are featured on a separate page *before* the grade-specific standards for that strand; this placement underscores the importance of the CCR connection to every standard. The order is as follows:

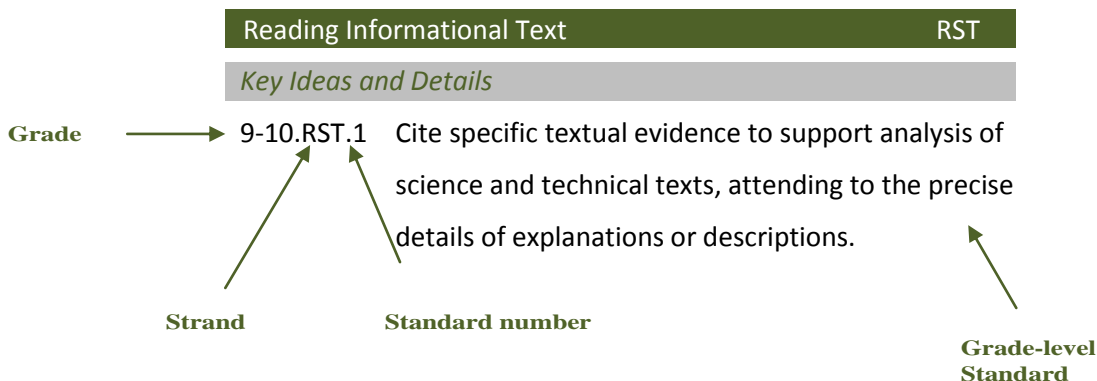
### Reading CCRs

- Informational Text Standards

### Writing CCRs

- Writing Standards

Individual grade-specific standards are identified by grade, strand, and number (or number and letter, where applicable); for example, **9-10.RST.1**, means *grades 9-10, Reading Science and Technical Subjects, standard 1*.



\*See [Appendix A](#)

\*See [Appendices A, B, and C](#)

## College and Career Readiness Anchor Standards for Reading

The grades 6 -12 standards define what students should understand and be able to do by the end of each grade. Each grade-specific standard corresponds to the same College and Career Readiness (CCR) Anchor Standard below by number. The CCR and grade-specific standards are necessary complements—the former providing broad standards, the latter providing additional specificity—that together define the skills and understandings that all students must demonstrate.

### Key Ideas and Details

1. Read closely to determine what the text says explicitly and to make logical inferences from it; cite specific textual evidence when writing or speaking to support conclusions drawn from the text.
2. Determine central ideas or themes of a text and analyze their development; summarize the key supporting details and ideas.
3. Analyze how and why individuals, events, and ideas develop and interact over the course of a text.

### Craft and Structure

4. Interpret words and phrases as they are used in a text, including determining technical, connotative, and figurative meanings, and analyze how specific word choices shape meaning or tone.
5. Analyze the structure of texts, including how specific sentences, paragraphs, and larger portions of the text (e.g., a section, chapter, scene, or stanza) relate to each other and the whole.
6. Assess how point of view or purpose shapes the content and style of a text.

### Integration of Knowledge and Ideas

7. Integrate and evaluate content presented in diverse media and formats, including visually and quantitatively, as well as in words.\*
8. Delineate and evaluate the argument and specific claims in a text, including the validity of the reasoning as well as the relevance and sufficiency of the evidence.
9. Analyze how two or more texts address similar themes or topics in order to build knowledge or to compare the approaches the authors take.

### Range of Reading and Level of Text Complexity

10. Read and comprehend complex literary and informational texts independently and proficiently.

### Note on range and content of student reading

*Reading is critical to building knowledge in history/social studies as well as in science and technical subjects. College and career ready reading in these fields requires an appreciation of the norms and conventions of each discipline, such as the kinds of evidence used in history and science; an understanding of domain-specific words and phrases; an attention to precise details; and the capacity to evaluate intricate arguments, synthesize complex information, and follow detailed descriptions of events and concepts. In history/social studies, for example, students need to be able to analyze, evaluate, and differentiate primary and secondary sources. When reading scientific and technical texts, students need to be able to gain knowledge from challenging texts that often make extensive use of elaborate diagrams and data to convey information and illustrate concepts. Students must be able to read complex informational texts in these fields with independence and confidence because the vast majority of reading in college and workforce training programs will be sophisticated nonfiction. It is important to note that these Reading standards are meant to complement the specific content demands of the disciplines, not replace them.*

\*Please see “Research to Build and Present Knowledge” in Writing for additional standards relevant to gathering, assessing, and applying information from print and digital sources.

## Reading Standards for Literacy in Science and Technical Subjects

The Reading standards specific to the content areas begin at grade 6; standards for K–5 reading in history/social studies, science, and technical subjects are integrated into the K–5 Reading standards. The CCR anchor standards and high school standards in literacy work in tandem to define college and career readiness expectations—the former providing broad standards, the latter providing additional specificity.

### Reading Informational Text

RST

#### *Key Ideas and Details*

- 9-10.RST.1 Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions.
- 9-10.RST.2 Determine the central ideas or conclusions of a text; trace the text’s explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text.
- 9-10.RST.3 Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text.

#### *Craft and Structure*

- 9-10.RST.4 Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to *grades 9–10 texts and topics*.
- 9-10.RST.5 Analyze the structure of the relationships among concepts in a text, including relationships among key terms (e.g., *force, friction, reaction force, energy*).
- 9-10.RST.6 Analyze the author’s purpose in providing an explanation, describing a procedure, or discussing an experiment in a text, defining the question the author seeks to address.

#### *Integration of Knowledge and Ideas*

- 9-10.RST.7 Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words.
- 9-10.RST.8 Assess the extent to which the reasoning and evidence in a text support the author’s claim or a recommendation for solving a scientific or technical problem.
- 9-10.RST.9 Compare and contrast findings presented in a text to those from other sources (including their own experiments), noting when the findings support or contradict previous explanations or accounts.

#### *Range of Reading and Level of Text Complexity*

- 9-10.RST.10 By the end of grade 10, read and comprehend science/technical texts in the grades 9–10 text complexity band independently and proficiently.

## College and Career Readiness Anchor Standards for Writing

The grade 6-12 standards define what students should understand and be able to do by the end of each grade. Each grade-specific standard corresponds to the same College and Career Readiness (CCR) Anchor Standard below by number. The CCR and grade-specific standards are necessary complements—the former providing broad standards, the latter providing additional specificity—that together define the skills and understandings that all students must demonstrate.

### ***Text Types and Purposes\****

1. Write arguments to support claims in an analysis of substantive topics or texts, using valid reasoning and relevant and sufficient evidence.
2. Write informative/explanatory texts to examine and convey complex ideas and information clearly and accurately through the effective selection, organization, and analysis of content.
3. Write narratives to develop real or imagined experiences or events using effective technique, well-chosen details, and well-structured event sequences.

### ***Production and Distribution of Writing***

4. Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.
5. Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach.
6. Use technology, including the Internet, to produce and publish writing and to interact and collaborate with others.

### ***Research to Build and Present Knowledge***

7. Conduct short as well as more sustained research projects based on focused questions, demonstrating understanding of the subject under investigation.
8. Gather relevant information from multiple print and digital sources, assess the credibility and accuracy of each source, and integrate the information while avoiding plagiarism.
9. Draw evidence from literary or informational texts to support analysis, reflection, and research.

### ***Range of Writing***

10. Write routinely over extended time frames (time for research, reflection, and revision) and shorter time frames (a single sitting or a day or two) for a range of tasks, purposes, and audiences.

### **Note on range and content of student writing**

*For students, writing is a key means of asserting and defending claims, showing what they know about a subject, and conveying what they have experienced, imagined, thought, and felt. To be college and career ready writers, students must take task, purpose, and audience into careful consideration, choosing words, information, structures, and formats deliberately. They need to be able to use technology strategically when creating, refining, and collaborating on writing. They have to become adept at gathering information, evaluating sources, and citing material accurately, reporting findings from their research and analysis of sources in a clear and cogent manner. They must have the flexibility, concentration, and fluency to produce high-quality first-draft text under a tight deadline and the capacity to revisit and make improvements to a piece of writing over multiple drafts when circumstances encourage or require it. To meet these goals, students must devote significant time and effort to writing, producing numerous pieces over short and long time frames throughout the year.*

\*These broad types of writing include many subgenres. See Appendix A for definitions of key writing types.

## Writing Standards for Literacy in Science and Technical Subjects

The Writing standards specific to the content areas begin at grade 6; standards for K–5 writing in history/social studies, science, and technical subjects are integrated into the K–5 Writing standards. The CCR anchor standards and high school standards in literacy work in tandem to define college and career readiness expectations—the former providing broad standards, the latter providing additional specificity.

### Writing

### WHST

#### Text Types and Purposes

9-10.WHST.1 Write arguments focused on *discipline-specific content*.

- a. Introduce precise claim(s), distinguish the claim(s) from alternate or opposing claims, and create an organization that establishes clear relationships among the claim(s), counterclaims, reasons, and evidence.
- b. Develop claim(s) and counterclaims fairly, supplying data and evidence for each while pointing out the strengths and limitations of both claim(s) and counterclaims in a discipline-appropriate form and in a manner that anticipates the audience’s knowledge level and concerns.
- c. Use words, phrases, and clauses to link the major sections of the text, create cohesion, and clarify the relationships between claim(s) and reasons, between reasons and evidence, and between claim(s) and counterclaims.
- d. Establish and maintain a formal style and objective tone while attending to the norms and conventions of the discipline in which they are writing.
- e. Provide a concluding statement or section that follows from or supports the argument presented.

9-10.WHST.2 Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.

- a. Introduce a topic and organize ideas, concepts, and information to make important connections and distinctions; include formatting (e.g., headings), graphics (e.g., figures, tables), and multimedia when useful to aiding comprehension.
- b. Develop the topic with well-chosen, relevant, and sufficient facts, extended definitions, concrete details, quotations, or other information and examples appropriate to the audience’s knowledge of the topic.
- c. Use varied transitions and sentence structures to link the major sections of the text, create cohesion, and clarify the relationships among ideas and concepts.
- d. Use precise language and domain-specific vocabulary to manage the complexity of the topic and convey a style appropriate to the discipline and context as well as to the expertise of likely readers.
- e. Establish and maintain a formal style and objective tone while attending to the norms and conventions of the discipline in which they are writing.
- f. Provide a concluding statement or section that follows from and supports the information or explanation presented (e.g., articulating implications or the significance of the topic).



9-10.WHST.3 (See note below; not applicable as a separate requirement)

**Note:** Students' narrative skills continue to grow in these grades. The Standards require that students be able to incorporate narrative elements effectively into arguments and informative/explanatory texts. In history/social studies, students must be able to incorporate narrative accounts into their analyses of individuals or events of historical import. In science and technical subjects, students must be able to write precise enough descriptions of the step-by-step procedures they use in their investigations or technical work that others can replicate them and (possibly) reach the same results.

*Production and Distribution of Writing*

- 9-10.WHST.4 Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.
- 9-10.WHST.5 Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience.
- 9-10.WHST.6 Use technology, including the Internet, to produce, publish, and update individual or shared writing products, taking advantage of technology's capacity to link to other information and to display information flexibly and dynamically.

*Research to Build and Present Knowledge*

- 9-10.WHST.7 Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation.
- 9-10.WHST.8 Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the usefulness of each source in answering the research question; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and following a standard format for citation.
- 9-10.WHST.9 Draw evidence from informational texts to support analysis, reflection, and research.

*Range of Writing*

- 9-10.WHST.10 Write routinely over extended time frames (time for reflection and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences.

## Reading Standards for Literacy in Science and Technical Subjects

The Reading standards specific to the content areas begin at grade 6; standards for K–5 reading in history/social studies, science, and technical subjects are integrated into the K–5 Reading standards. The CCR anchor standards and high school standards in literacy work in tandem to define college and career readiness expectations—the former providing broad standards, the latter providing additional specificity.

### Reading Informational Text

RST

#### *Key Ideas and Details*

- 11-12.RST.1 Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account.
- 11-12.RST.2 Determine the central ideas or conclusions of a text; summarize complex concepts, processes, or information presented in a text by paraphrasing them in simpler but still accurate terms.
- 11-12.RST.3 Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text.

#### *Craft and Structure*

- 11-12.RST.4 Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to *grades 11–12 texts and topics*.
- 11-12.RST.5 Analyze how the text structures information or ideas into categories or hierarchies, demonstrating understanding of the information or ideas.
- 11-12.RST.6 Analyze the author’s purpose in providing an explanation, describing a procedure, or discussing an experiment in a text, identifying important issues that remain unresolved.

#### *Integration of Knowledge and Ideas*

- 11-12.RST.7 Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g., quantitative data, video, multimedia) in order to address a question or solve a problem.
- 11-12.RST.8 Evaluate the hypotheses, data, analysis, and conclusions in a science or technical text, verifying the data when possible and corroborating or challenging conclusions with other sources of information.
- 11-12.RST.9 Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible.

#### *Range of Reading and Level of Text Complexity*

- 11-12.RST.10 By the end of grade 12, read and comprehend science/technical texts in the grades 11-CCR text complexity band independently and proficiently.

## Writing Standards for Literacy in Science and Technical Subjects

The Writing standards specific to the content areas begin at grade 6; standards for K–5 writing in history/social studies, science, and technical subjects are integrated into the K–5 Writing standards. The CCR anchor standards and high school standards in literacy work in tandem to define college and career readiness expectations—the former providing broad standards, the latter providing additional specificity.

### Writing

### WHST

#### Text Types and Purposes

11-12.WHST.1 Write arguments focused on *discipline-specific content*.

- a. Introduce precise, knowledgeable claim(s), establish the significance of the claim(s), distinguish the claim(s) from alternate or opposing claims, and create an organization that logically sequences the claim(s), counterclaims, reasons, and evidence.
- b. Develop claim(s) and counterclaims fairly and thoroughly, supplying the most relevant data and evidence for each while pointing out the strengths and limitations of both claim(s) and counterclaims in a discipline-appropriate form that anticipates the audience’s knowledge level, concerns, values, and possible biases.
- c. Use words, phrases, and clauses as well as varied syntax to link the major sections of the text, create cohesion, and clarify the relationships between claim(s) and reasons, between reasons and evidence, and between claim(s) and counterclaims.
- d. Establish and maintain a formal style and objective tone while attending to the norms and conventions of the discipline in which they are writing.
- e. Provide a concluding statement or section that follows from or supports the argument presented.

11-12.WHST.2 Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.

- a. Introduce a topic and organize complex ideas, concepts, and information so that each new element builds on that which precedes it to create a unified whole; include formatting (e.g., headings), graphics (e.g., figures, tables), and multimedia when useful to aiding comprehension.
- b. Develop the topic thoroughly by selecting the most significant and relevant facts, extended definitions, concrete details, quotations, or other information and examples appropriate to the audience’s knowledge of the topic.
- c. Use varied transitions and sentence structures to link the major sections of the text, create cohesion, and clarify the relationships among complex ideas and concepts.
- d. Use precise language, domain-specific vocabulary and techniques such as metaphor, simile, and analogy to manage the complexity of the topic; convey a knowledgeable stance in a style that responds to the discipline and context as well as to the expertise of likely readers.

- e. Provide a concluding statement or section that follows from and supports the information or explanation provided (e.g., articulating implications or the significance of the topic).

11-12.WHST.3 (See note below; not applicable as a separate requirement)

**Note:** Students' narrative skills continue to grow in these grades. The Standards require that students be able to incorporate narrative elements effectively into arguments and informative/explanatory texts. In history/social studies, students must be able to incorporate narrative accounts into their analyses of individuals or events of historical import. In science and technical subjects, students must be able to write precise enough descriptions of the step-by-step procedures they use in their investigations or technical work that others can replicate them and (possibly) reach the same results.

#### *Production and Distribution of Writing*

11-12.WHST.4 Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.

11-12.WHST.5 Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience.

11-12.WHST.6 Use technology, including the Internet, to produce, publish, and update individual or shared writing products in response to ongoing feedback, including new arguments or information.

#### *Research to Build and Present Knowledge*

11-12.WHST.7 Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation.

11-12.WHST.8 Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the strengths and limitations of each source in terms of the specific task, purpose, and audience; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and overreliance on any one source and following a standard format for citation.

11-12.WHST.9 Draw evidence from informational texts to support analysis, reflection, and research.

#### *Range of Writing*

11-12.WHST.10 Write routinely over extended time frames (time for reflection and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences.