

**The Online Reading Comprehension Assessment (ORCA) Project:
Preparing Students For Common Core Standards and 21st Century Literacies**

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Executive Summary

The ORCA (Online Reading Comprehension Assessment) Project

The ORCA Project, funded by the U.S. Department of Education, is designed to develop, test, and refine a set of three assessment formats for measuring online reading comprehension. Each ORCA is an authentic, problem-based scenario situated in a digital environment designed to engage middle school students in a series of online disciplinary information requests while capturing performance data about how students use the Internet to locate, critically evaluate, synthesize, and communicate information.

Aligning the ORCA Project with The Common Core State Standards (CCSS)

This document outlines the particulars of The ORCA Project research project and describes a practical framework for measuring online reading performance using three different formats. It also summarizes the ways in which our vision of online reading comprehension assessment reflects key elements of what students are expected to accomplish by seventh grade according to the Common Core State Standards Initiative (2010) for reading, writing, and literacy in science. Some of the most important connections include:

- CCSS Reading Standards for Informational Text (Grade 7)
 - Determine two or more central ideas across multiple texts and summarize text distinct from prior knowledge or opinions
 - Cite implicit and explicit textual evidence as support
 - Analyze how authors shape their presentation of key ideas by emphasizing different evidence or claims
 - Trace and evaluate argument and specific claims, assessing whether reasoning is sound and evidence is relevant and sufficient to support claims
- CCSS Reading Standards for Literacy in History/Social Studies, Science and Technical Subjects (Grade 7)
 - Read and comprehend across complex science texts
 - Follow multi-step procedures to carry out tasks
 - Determine meaning of key words and phrases in science
 - Distinguish among fact, reasoned judgment, and speculation in science texts
- CCSS Writing Standards (Grade 7)
 - Write for a disciplinary task to examine a topic and convey relevant ideas
 - Conduct short research to answer questions
 - Gather relevant information from multiple digital sources, using search terms effectively, assess credibility and accuracy of sources, and quote or paraphrase data and conclusions of others while avoiding plagiarism
 - Draw evidence from informational text to support analysis, reflection, and research
 - Use technology, including the Internet to produce and publish writing, interact with others, and link to other information

Additional details about how the ORCA aligns with Common Core State Standards (CCSS) are outlined in Appendix B. Because of the parallels between the ORCA and the CCSS, teachers, administrators, and students who participate in the ORCA project will have a preliminary snapshot of how students might perform on grade-appropriate tasks connected to college and career literacy tasks. As a result, these schools will be in a better position to address weak areas of reading, writing, and content area literacy two to three years before the two consortiums have rolled out their state standardized assessments of the common core state standards.

Introduction

To compete in a global information age, students must develop new skills, especially the ability to read and comprehend information on the Internet at high levels (International Reading Association, 2009). The largest and most recent review of research on reading comprehension concludes that the Internet requires additional comprehension skills beyond those required for reading traditional print texts (RAND Reading Study Group, 2002). Subsequent work seeks to identify these skills, such as the new comprehension demands of querying search engines, understanding search results, and critically evaluating information laden with social, commercial, and political motives. Unfortunately, we are not yet in a position to effectively teach them. We lack valid, reliable, and practical assessments of online reading comprehension to inform instruction and help students become better online readers; not a single state yet includes these new types of tasks in their state reading assessments. Thus, an important challenge for both researchers and educators in the twenty-first century is to develop valid, reliable, and practical assessments of online reading comprehension.

A second set of challenges arises from the call for states to establish a uniform set of clear, consistent, and rigorous educational standards so that all students are prepared for success in the global economy and society (see for example, Tucker's 2011 report published by the National Center on Education and the Economy). As of May 2011, the majority of states in the United States have recognized the Common Core State Standards Initiative [CCSS] (2010) as a promising step in this direction. Led by the Council of Chief State School Officers (CCSSO) and the National Governor's Association (NGA), this initiative has produced the College and Career Readiness (CCR) Standards in reading, writing, speaking, listening, and language and the Common Core State Standards (CCSS), which set requirements for K-12 students to meet the CCR anchor standards in English language arts as well as literacy in history/social studies, science, and technical subjects. Both of these documents provide a rigorous and evidence-based vision of what it means to be a literate person in the twenty-first century.

Framed in the context of these dual challenges, the purpose of this paper is twofold: first, it outlines the particulars of a research project funded by the U. S. Department of Education that seeks to address the lack of assessments in this area by developing and testing three alternative formats of online reading comprehension assessments for middle school students. Second, this paper illustrates the many ways in which our vision of online reading comprehension assessment reflects key elements of what students are expected to accomplish by seventh grade, according to the Common Core State Standards in English Language Arts & Literacy in History/Social Studies, Science, and Technical Subjects.

The Online Reading Comprehension Assessment (ORCA) Project And Implications For Policymakers And Schools

In a unique research partnership with the state education departments of Maine, Connecticut, and North Carolina, this project is designed to develop, test, and refine a set of online information problem solving scenarios that represent three alternative formats of Online Reading Comprehension Assessment (ORCA). We will then assess the practicality of each instrument with an extensive set of diverse and highly knowledgeable school leaders from New England, Puerto Rico, and the U.S. Virgin Islands who serve on the Governing Board of the Regional Educational Lab – Northeast and Islands (REL-NEI). The results will communicate to states important information about the assessment of online reading comprehension and a preliminary version of what this might look like for adolescents.

Being able to evaluate student progress in this area will prove useful to policy makers, researchers, teachers and school administrators in an age of online information and communication. For policy makers, it will provide student performance data on a new and especially important aspect of reading in our schools, online reading comprehension, that is not measured by traditional reading assessments. For researchers, it will provide an important instrument to study a new and rapidly expanding area of literacy. For teachers, it will permit the evaluation of individual students' online reading comprehension ability in order to inform new elements of classroom instruction. In addition, participation in the ORCA project can offer teachers and students exposure to performance-based reading comprehension tasks and constructed response formats that reflect many of the same skills, strategies, processes, and rigorous expectations outlined in the Common Core State Standards in English Language Arts & Literacy in History/Social Studies, Science, and Technical Subjects. Thus, teachers, administrators, and students who participate in the ORCA project will have a preliminary snapshot of how students might perform on grade-appropriate tasks connected to college and career literacy tasks. As a result, these schools will be in a better position to address weak areas of reading, writing, and content area literacy two to three years before the two consortiums have rolled out their state standardized assessments of the common core state standards. Moreover, the ORCA framework, which weaves web-based inquiry processes with content-area learning, introduces to schools one practical model of how to integrate technology into standards-based curriculum practices.

A General Framework for Measuring Online Reading Comprehension Performance

The Online Reading Comprehension Assessment (ORCA) is designed to capture "real-time" online reading products and processes while individuals read for information on the Internet. The underlying design of any ORCA is informed by a new literacies perspective of online reading comprehension that frames reading comprehension as a web-based problem-solving inquiry process involving skills and strategies for locating, critically evaluating, synthesizing, and communicating information on the Internet (Leu, Kinzer, Coiro, & Cammack, 2004; Leu, O'Byrne, Zawilinski, McVerry, & Everett-Cacopardo, 2009). Recent work suggests that previously developed assessments of the reading skills needed to comprehend printed texts do not sufficiently capture the complex and unique comprehension processes required to read for information on the Internet (see Coiro, 2007; Hartman, Morsink, & Zheng, 2010). Prompted by the absence of real-time measures of these new online reading skills, for the past six years (2005-2011), we have developed a range of ORCA's in a variety of formats and have used them to estimate the online reading comprehension abilities of over 1,000 seventh-graders in language arts and science classrooms. Scores on each of these previous assessments have demonstrated adequate validity and reliability (see Leu, Kulikowich, Sedransk, & Coiro, 2009).

Generally, each ORCA experience is designed to engage students in a series of disciplinary online information requests that are framed in a problem-based scenario relevant to middle school students. For the current ORCA Project, eight alternative scenarios have been developed to focus on human biology, a scientific domain common to most middle school curricula. Each scenario requires students to locate, evaluate, synthesize, and communicate information that focuses on a different body part (e.g., lungs, heart, eyes, or ears) and a related science topic (e.g., asthma, heart healthy snacks, decorative contact lenses, or safe music volume levels). For each ORCA experience, an inquiry question is presented to students in a Facebook-like interface (as shown in Figures 1-3 below) and students have approximately 45 minutes to use the Internet to search for, read, and evaluate information, and then synthesize and compose relevant, cohesive, and audience appropriate responses to several scenario-related tasks using evidence from their readings to support their decisions. For example, in one scenario, the guiding question is: Are energy drinks dangerous to teen heart health? In this scenario, the president of a school board is considering a ban on energy drinks sold in school and students receive an email with a request for more information. Students are then asked to play a role in the decision-making process by conducting online research and emailing the school board with relevant and reliable findings about how energy drinks affect teen heart health. During the process of each ORCA experience, students have the opportunity to engage in authentic, problem-based, and interdisciplinary tasks (in this case, combining science, reading, and writing) about topics that are relevant to adolescents and connected to most middle school curricula. Appendix A contains a brief description of all eight ORCA scenarios for the current project.

Figure 1. Screenshot of ORCA interface with Facebook-like prompts and a response capture object in which students enter their answers in the left window and an email message window on the right that presents the scenario to students and provides a reply button to compose their message

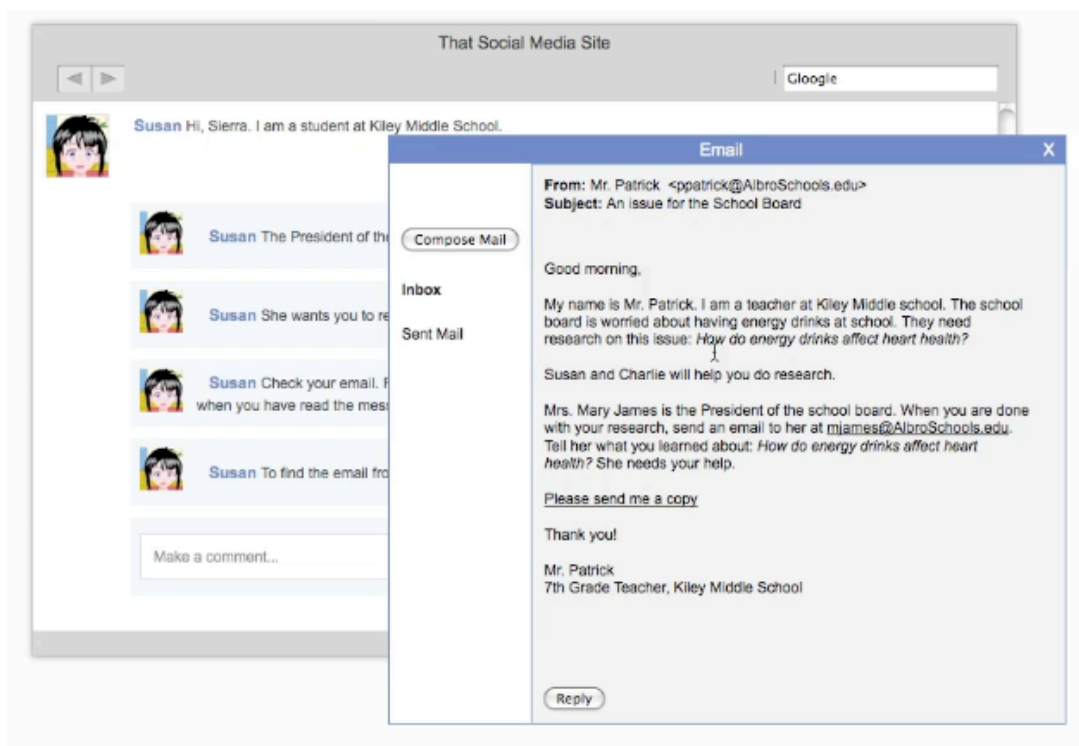


Figure 2. Screenshot of prompts to locate specific information in the background and the results of one student's "Google" search in the foreground

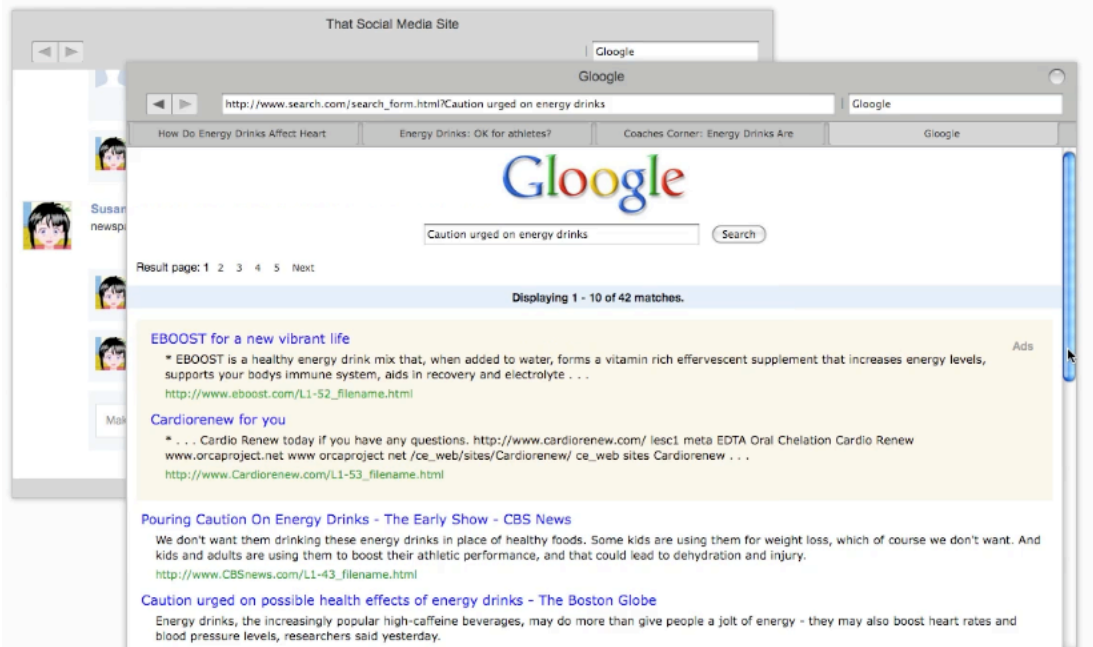
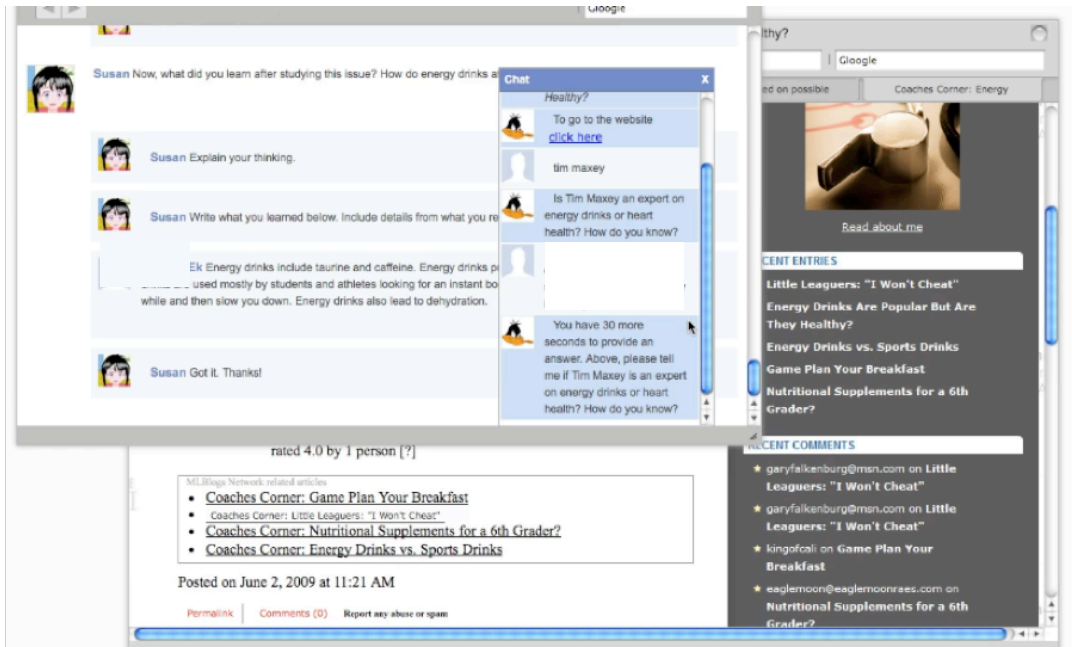


Figure 3. Screenshot of Facebook-like prompts and chat features used to ask students to synthesize information they found online and evaluate the author's expertise and point of view



Three Formats for Measuring Online Reading Comprehension Performance

For this project, each scenario is created in three assessment formats including ORCA-Open, ORCA-Closed, and ORCA-Multiple Choice. The three formats are designed to provide data about how seventh graders read across a range of more and less bounded Internet contexts. Tasks in the **ORCA-Open** format are designed to assess real-time reading processes and products required as students Locate, Evaluate, Synthesize, and Communicate (**LESC**) information while reading in the Open Internet, a dynamic and unbounded online digital information environment. For this project, ORCA-Open consists of 32 items, which are grouped into two scenarios, or LESC. Each **LESC** includes 16 items designed to measure reading processes and products in an unbounded, real-time open Internet environment related to four components of online reading comprehension:

- Reading to Locate tasks (4 items) require students to use search engines, efficiently read search results, and identify websites with information that can be used to solve the information problem scenario.
- Reading to Evaluate tasks (4 items) require students to identify a website's author and evaluate his/her level of expertise, consider the author's point of view, and evaluate the reliability of author claims and evidence related to the problem scenario.
- Reading to Synthesize tasks (4 items) require students to integrate information intratextually (across multiple claims within one website) and intertextually (across multiple websites) in their own words, take a position on the issues involved, and use evidence from multiple online sources to support their thinking.
- Reading and Writing to Communicate tasks (4 items) require students to access information in an email or wiki space and respond with information they have learned about the scenario in an appropriately crafted, visually organized, and clear message.

A complete ORCA-Open Assessment consists of one 16-item restricted task and one 16-item unrestricted task. An **ORCA-Open Restricted Task** is an online reading task for which the information space to locate relevant claims is limited to a particular set of online resources found on the Open Internet related to a topic. An **ORCA-Open Unrestricted Task** is an online reading task for which the information space to locate relevant claims is left open to any online sources found on the Open Internet related to a topic. The combination of restricted and unrestricted items in the assessment provides information about online reading comprehension proficiency when reading in both types of contexts.

A second assessment format is **ORCA-Closed**. Tasks in the ORCA-Closed format are also designed to engage students with the four LESC processes (locate, evaluate, synthesize, and communicate), but student work is conducted within the confines of a simulated, closed Internet environment. To develop this closed environment, replicas of the websites found in the ORCA-Open environment were created and linked together in a simulated closed space that also contains a fully functioning search engine known as "Gloogle". Similar to the ORCA-Open tasks, a complete ORCA-Closed assessment consists of one 16-item **ORCA-Closed Restricted Task** (for which specific online sources within the simulated environment must be used) and one 16-item **ORCA-Closed Unrestricted Task** (for which any online sources within the simulated environment can be used).

The third assessment format is **ORCA-Multiple Choice (ORCA-MC)**. This format is also designed to measure the four LESC processes. However, rather than asking students to actively use search engines and navigate within and across multiple websites in a real-time manner, screenshots of key stopping points for locating, evaluating, synthesizing, and communicating are paired with prompts and multiple choice items in a closed digital interface. Students are asked to review the screenshots

at each step of the inquiry process and respond by selecting the most appropriate choice before moving on to the next item in the scenario.

Scoring Online Reading Comprehension Performance

Two different procedures are used to collect data as students engage in the ORCA experience. First, online reading *process* data, such as cursor movement, keystrokes, clicking, scrolling, and navigating within search engine results and websites, is collected in a real-time video recording that records a digital movie of all on-screen activity. This process data provides a window into the real-time processes each individual student employs while engaged in the online reading experience without any interruption from the teacher (or test administrator). A short example of a digital recording can be viewed at <http://www.orca.uconn.edu>.

Second, students' typed responses, or the *products* of each online reading session, are collected automatically with a response-capture object designed by the ORCA research team that sits within the ORCA interface. This object is programmed to provide students with the sequence of task prompts at various points during the inquiry process as well as space to type their responses to each prompt. Each student's typed responses, timing data about how long they visited each website, and other types of information is collected and automatically distributed into individual data sheets at the end of each ORCA task.

Responses are then scored in two ways. An electronic scoring system will be used to machine-score approximately one third of a student's responses using a two-point rubric scoring system (0 or 1) and the remaining item responses will be scored by hand using that same two-point rubric. Within a few weeks after administration, performance data at the class level will be shared with schools along with a short summary report of class strengths and weaknesses in the areas of locating, critically evaluating, synthesizing, and communicating online information. Teachers will also be provided a series of companion lessons to support the design of additional learning experiences in areas for which students may need more practice. Individual student data (e.g., video recordings and/or individual item scores) collected from a random sample of students will be available at a later time after administration.

An online video library is also being developed as part of the ORCA project to link interested stakeholders to video examples of performance data from students who demonstrated higher, average, and lower levels of proficiency with respect to locating, evaluating, synthesizing, and communicating tasks for each ORCA scenario. This online video database and companion lessons will serve as a springboard for professional development opportunities for teachers and administrators seeking to learn more about how to best prepare adolescents for the challenges of reading on the Internet.

Using the ORCA Experience To Prepare Schools For The Rigor of Meeting The Common Core State Standards

In this section, we first provide an overview of the Common Core State Standards Initiative, outline the core elements of the College and Career Readiness (CCR) Standards, and briefly describe the seventh grade Common Core Standards in English Language Arts (ELA) and Literacy in History/Social Studies, Science and Technical Subjects. We focus specifically on seventh-grade literacy standards in our overview because the ORCA project is designed to measure online reading comprehension performance across a large and diverse population of seventh graders in three states. Then, we call attention to four key reading processes assessed by the ORCA to better understand how the ORCA tasks reflect many of the same skills and rigorous expectations outlined

in the seventh grade Common Core Standards in reading, writing, and literacy in science. Consequently, schools that participate in the ORCA project will be provided with a preliminary snapshot of how students might perform on grade-appropriate rigorous reading tasks connected to college and career literacy tasks.

The Common Core State Standards Initiative

The Common Core State Standards (CCSS) is an initiative designed to develop common K-12 English-Language Arts and Math standards across the U.S. in order to better prepare students for college and their careers. The intent is for the CCSS to replace the current patchwork of state standards that have resulted in a wide and varied range of academic expectations and actual student performance across all 50 states. These standards are designed to ensure that students graduating from high school are prepared to go to college or enter the workforce and that parents, teachers, and students have a clear understanding of what skills and knowledge are expected to be learned. Currently, investigations are underway to explore the development of standards for other subjects including Science and Social Studies. The CCSS initiative is not a federally mandated initiative, but a state-led effort aimed at individual states voluntarily adopting and/or adapting the standards as their own.

The CCSS initiative is a joint project of the National Governors Association (NGA) and the Council of Chief State School Officers (CCSSO) who started the initial drafts of the standards in 2009. The final standards were based on nearly 10,000 public comments and by standards in other top-performing countries. In addition, The National Education Association (NEA), American Federation of Teachers (AFT), National Council of Teachers of Mathematics (NCTM), and National Council of Teachers of English (NCTE), among other organizations, have been instrumental in bringing together teachers to provide specific, constructive feedback on the standards (see <http://corestandards.org>). As of May 2011, 44 states, the District of Columbia, and the US Virgin Islands have adopted the standards. States are asked to use the CCSS to build upon the strengths and lessons of their current state standards (Daggett, & Gendron, 2010).

College and Career Readiness (CCR) Standards

The CCSS initiative defines college and career readiness as the ability “to succeed in entry-level, credit-bearing academic college courses and in workforce-training programs” (ASCD, 2011). The College and Career Readiness (CCR) and grade-specific standards are complements. While the CCR provides broad standards, the grade specific standards provide more explicit details of what students should know and be able to do. Together, these standards define the skills and knowledge that all students must be able to demonstrate in a global economy and society.

The CCR anchor standards for English Language Arts (ELA) and Literacy in History/Social Studies, Science, and Technical Subjects are framed within four strands: (1) reading, (2) writing, (3) speaking and listening; and (4) language. To build a foundation for college and career readiness in English language arts and literacy, students must apply foundational reading skills (print concepts, phonological awareness, phonics, and fluency – emphasized in Grades K-5) and higher level reading, writing, and language skills while reading widely and deeply across increasingly challenging literary and informational texts.

The ten CCR anchor standards and grade-specific *Standards for Reading* cluster around four organizing elements: (a) key ideas and details; (b) craft and structure; (c) integration of knowledge and ideas; and (d) range of reading and level of text complexity. The Reading Standards are

separated into those needed to read literature and those needed to read informational texts across Grades K-5 and Grades 6-12.

The ten CCR anchor standards and grade-specific *Standards for Writing* cluster around four different organizing elements. These include: (a) text types and purposes; (b) production and distribution of writing; (c) research to build on and present knowledge; and (d) range of writing. The CCR anchor standards and grade-specific *Standards for Speaking & Listening* are organized around two elements: (a) comprehension and collaboration; and (b) presentation of knowledge and ideas; and the *Standards for Language* are organized around three elements: (a) conventions of Standard English; (b) knowledge of language; and (c) vocabulary acquisition and use.

Finally, in Grades 6-12, two additional sets of *Standards for Literacy in History/Social Studies, Science, and Technical Subjects* have been delineated for both the reading and writing strands. These standards are essentially parallel to the Standards for English Language Arts 6-12 in Reading and Writing but they are worded more precisely to deal with the nuances of discipline-specific texts and literacy tasks.

The skills and understandings students are expected to demonstrate in the CCR have wide applicability outside the classroom or workplace. From the Common Core State Standards website (CCSS Initiative, 2011), these skills and understandings include:

- Undertaking the close, attentive reading that is at the heart of understanding and enjoying complex works of literature and nonfiction texts
- Performing the critical reading necessary to pick carefully through the staggering amount of information available today in print and digitally
- Seeking the wide, deep, and thoughtful engagement with high-quality literary and informational texts that builds knowledge, enlarges experience, and broadens world-views
- Demonstrating the cogent reasoning and use of evidence that is essential to both private deliberation and responsible citizenship in a democratic republic.

The K–12 grade-specific standards define end-of-year expectations. As students advance through each grade they are expected to meet the year’s grade-specific standards. In addition, they must retain and further develop skills and understandings mastered in prior grades during previous years. In short, students who meet the standards, both grade-level and CCR, will not only be successful in school but will find success in college, in the workforce, and beyond.

Seventh-Grade Common Core State Standards in English Language Arts

English Language Arts (ELA), including Literacy in History/Social Studies Science and Technical Subjects, was one of the two first subjects chosen for the Common Core State Standards. ELA, along with Math, includes many of the most common foundational skills and knowledge upon which students build skill sets across all other subject areas. Like the CCR standards, the ELA standards, at the 7th grade level, are split into five main strands. The strands include reading of literature, reading of informational texts, writing, speaking and listening, and language.

Literature and informational text reading standards in the 7th grade focus students on the ability to analyze key story and text elements across a range of complex texts (stories, dramas, poems, and nonfiction), cite specific examples to support their analysis, identify the interactions between these elements, and integrate knowledge and ideas gleaned across multiple texts. With respect to literary texts, students are required to identify key themes or central ideas, and to follow their development providing objective summaries as needed. Students are also asked to identify interactions between

individuals, events, and ideas; analyze different characters and their points of view; and compare and contrast fictional and historical accounts of the same time period.

With respect to informational texts, such as the nonfiction texts students will encounter in textbooks or across informational websites, students are required to determine and summarize central ideas and key text elements; cite specific examples to support their analysis; identify the interactions between text elements and key ideas; and integrate knowledge and ideas gleaned across multiple and diverse texts. Students are also asked to analyze authors and their points of view; determine word meaning and analyze the impact of word choice on meaning and tone; and compare and contrast how different authors shape their writing by emphasizing different evidence or advancing different interpretations of facts about the same topic.

Writing standards in the 7th grade focus on three types of texts including persuasive, informative/explanatory, and narratives. Students are asked to write routinely across both short time frames (a single sitting or a day or two) while conducting short research projects that draw on several sources to answer a focused question as well to complete longer, more comprehensive writing projects in which they are explicitly planning, researching, and reflecting on their writing. They are also asked to write using technology, including the Internet, to create and publish, cite online information, and interact with and collaborate with others.

Speaking and listening standards for 7th grade involves students collaborating, comprehending, and presenting original ideas. Students are expected to participate in collaborative discussions with diverse partners and analyze main ideas and supporting details. Students must be able to identify and evaluate specific claims and explain how these claims clarify the main ideas or issues in a variety of formats including text based and multimedia. Presenting claims and findings based on research and readings is a critical standard for students. Students must adapt speech for a variety of contexts and use multimedia and visual tools and displays to effectively communicate salient points.

Language standards for 7th grade combine a range of traditional language skills and strategies. Students are asked to demonstrate proper grammar while writing and speaking. Expressing ideas in writing precisely and concisely is required through writing assignments in other standards. Students are asked to determine the meaning of unknown and multi-meaning words and they are asked to explore figurative language and nuance.

Why Are The Common Core State Standards Important?

The CCSS can become an inflection point establishing a common foundation for building excellence and equity for all students (Forgione, 2010). Based on state adoption of the CCSS to date, over 80% of the nation's public school students and teachers will be working on the same content standards (Educational Testing Services [ETS], 2011). Ideas, resources, lessons, practice tests, benchmarks, and other types of educational content and materials can be leveraged across states and shared between teachers, parents, and schools to better identify best practices and provide common content for increased student learning.

Participation in the CCSS program will enable states to work together to solve many of the problems facing most public school systems. Expectations for student achievement will become clearer to teachers, parents, and the community. The creation and dissemination of educational content, including digital content, will be enhanced. Private industry educational partners can be assured that materials will be aligned across state boundaries thereby insuring their capital investments in new types of content. Additionally, comprehensive assessment systems can be

developed that measure student performance against the CCSS and replace current individual state assessments that are often inconsistent, burdensome, and confusing (CCSS Initiative, 2011).

The U.S. government, through RTTT, has begun funding the Race to the Top Assessment Program, which has provided funds to two consortia to design, provide and build the next generation of assessments. These consortia, Partnership for Assessment of Readiness for College and Careers (PARCC) and SMARTER Balanced Assessment Consortium (SBAC), build upon shared standards for college and career readiness, measure individual growth and proficiency, and provide digital materials and testing environments to facilitate test taking, test scoring, and test data dissemination (CAF, 2010). Both PARCC and SBAC assessment initiatives plan to be in use widely across the United States by teachers and students for the 2014-2015 school year.

What Elements Of The Common Core State Standards Are Reflected In The ORCA Experience?

Table 1 on the next page identifies the set of seventh-grade common core standards reflected in each sixteen-item ORCA. To examine the similarities between ORCA tasks and the CCSS, each ORCA item was grouped with other items designed to measure particular skills associated with one of the four LESC processes (e.g., reading to *locate*, reading to *evaluate*, reading to *synthesize*, and reading and writing to *communicate*). These four clusters of online reading comprehension skills, their respective item numbers, and the purpose of each item are described in the left column of the table. The right column of the table lists specific standards addressed as students engage in each part of the ORCA. Standards are clustered by area (i.e., Standards for Reading Informational Text; Standards for Literacy in Science; Standards for Writing and Writing in Science; and Standards for Language) and then by organizing element within each area. ORCA item numbers that address a certain standard appear in superscript at the end of each standard. In cases where only a particular portion of the standard is addressed, the relevant portion is underlined. A more consolidated summary of the ORCA project and the overlap between ORCA items and the Common Core State Standards in English Language Arts and Literacy in Science (described using abbreviated phrases of the actual wording for each standard) is shown in Appendix B.

How Can The ORCA Experience Prepare Students For The Rigor Of 21st Century Literacies As Well As Future Assessments Of The Common Core State Standards?

Each ORCA is an authentic, problem-based scenario situated in a digital environment that engages seventh grade students in a series of online disciplinary information requests that link reading, writing, and biology to topics relevant to today's adolescents. Each ORCA also captures performance data (both process and product data) about how students use the Internet to compile information, investigate conflicting claims, and provide textual evidence of the information's relevance and reliability as well as the author's point of view. In addition, all of these digital inquiry-based processes require students to navigate complex and technical texts such as search engine results, multimodal representations of content, and informational websites created by multiple and disparate sources. Research indicates most adolescents are not very skilled at these new literacies (e.g., Bennet, Maton, & Kervin, 2008; Leu et al, 2007), especially the ability to locate (Bilal, 2001; Eagleton, Guinee & Langlais, 2003; Wallace, Kuperman, Krajcik, & Soloway, 2000) and critically evaluate the information they encounter online (Walraven, Brand-Gruwel, & Boshuizen, 2009; Kiili, Laurinen, & Marttunen, 2008). However, emerging work suggests that students can benefit from scaffolded and regular practice with these critical reading and writing skills in authentic online learning contexts (Castek, 2008; Leu et. al., 2008). The ORCA offers one way of engaging students with these new literacy practices at least two years prior to the release of formal assessments from the two consortiums.

(Continued on page 15)

Table 1. Identifying Elements Of The Common Core State Standards Reflected In The Online Reading Comprehension Assessment (ORCA)

ORCA Component, Item # and Purpose	Seventh Grade Common Core State Standards Addressed (Listed by Organizing Element)
<p>Reading to Locate</p> <ul style="list-style-type: none"> ➤ Locate #1. Use appropriate keywords to generate search ➤ Locate #2. Infer from search engine results ➤ Locate #3. Infer from different set of search engine results ➤ Locate #4. Locate and share address of two relevant websites with information that answers the question 	<p>Reading Informational Text</p> <ul style="list-style-type: none"> ➤ Craft and Structure 7.4 Determine meaning of words and phrases as used in text including figurative, connotative, and technical meanings; analyze impact of specific word choice on meaning & tone <small>Locate 2, 3</small> ➤ Integration of Knowledge and Ideas 7.8 Trace & evaluate argument and specific claims in a text, assessing whether reasoning is sound and evidence is relevant and sufficient to support claims <small>Locate 2, 3</small> ➤ Range of Reading and Level of Text Complexity 7.10 Read and comprehend non-fiction in grades 6-8 text complexity band <small>Locate 2, 3</small> <p>Literacy in Science</p> <ul style="list-style-type: none"> ➤ Key Ideas and Details 7.3 Follow precisely multistep procedures when carrying out experiments, taking measurements, or performing technical tasks <small>Locate 1, 2, 3, 4</small> <p>Writing (and Writing in Science)</p> <ul style="list-style-type: none"> ➤ Production and Distribution of Writing 7.6 Use technology, including the Internet, to produce and publish writing, interact with others, link to other information, and display information dynamically <small>Locate 4</small> ➤ Research To Build and Present Knowledge 7.7 Conduct short research projects to answer a question, drawing on several sources and generating additional related, focused questions for further investigation <small>Locate 1, 4</small> ➤ Research To Build and Present Knowledge 7.8 Gather relevant information from multiple print and digital sources, using search terms effectively; assess credibility and accuracy of sources; and quote or paraphrase data and conclusions of others while avoiding plagiarism and citing appropriately <small>Locate 1, 4</small> ➤ Range of Writing 7.10 Write routinely over extended and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences <small>Locate 4</small>
<p>Reading to Evaluate</p> <ul style="list-style-type: none"> ➤ Evaluate #1. Identify author of the website ➤ Evaluate #2. Evaluate author's level of expertise ➤ Evaluate #3. Evaluate author's point of view or purpose ➤ Evaluate #4. Evaluate reliability of information with logical explanation and evidence 	<p>Reading Informational Text</p> <ul style="list-style-type: none"> ➤ Key Idea and Details 7.1 Cite implicit and explicit textual evidence as support <small>Evaluate 1, 2, 3, 4</small> ➤ Craft and Structure 7.4 Determine meaning of words and phrases as used in text including figurative, connotative, and technical meanings; <u>analyze impact of specific word choice on meaning & tone</u> <small>Evaluate 2, 3, 4</small> ➤ Craft & Structure 7.6 Determine author's point of view or purpose in a text and analyze how author distinguishes position from that of others <small>Evaluate 2, 3, 4</small> ➤ Integration of Knowledge and Ideas 7.9 Analyze how authors shape their presentation of key ideas by emphasizing different evidence or claims <small>Evaluate 2, 3, 4</small> ➤ Range of Reading and Level of Text Complexity 7.10 Read and comprehend non-fiction in grades 6-8 text complexity band independently and proficiently <small>Evaluate 1, 2, 3, 4</small> <p>Literacy in Science</p> <ul style="list-style-type: none"> ➤ Key Ideas and Details 7.2 Determine theme/central idea and analyze/summarize text distinct from prior knowledge or opinions <small>Evaluate 2, 3, 4</small> ➤ Craft and Structure 7.6 Analyze author's purpose in providing an explanation, describing procedures, or discussing an experiment in a text. <small>Evaluate 3, 4</small>

<p>(Reading to Evaluate continued)</p>	<ul style="list-style-type: none"> ➤ Integration of Knowledge and Ideas 7.8 Distinguish among fact, reasoned judgment, and speculation in text <small>Evaluate 2, 3, 4</small> ➤ Range of Reading and Level of Text Complexity 7.10 Read and comprehend science/technical texts in grades 6-8 text complexity band independently and proficiently <small>Evaluate 1, 2, 3, 4</small> ➤ Writing (and Writing in Science) ➤ Text Types and Purposes 7.1 Write arguments with clear reasons and relevant evidence <small>Evaluate 2, 3, 4</small> ➤ Research To Build and Present Knowledge 7.9 Draw evidence from literary or informational texts to support analysis, reflection, and research, including evaluating argument and specific claims in a text, assessing whether the reasoning is sound and evidence is relevant and sufficient to support the claims <small>Evaluate 2, 3, 4</small> ➤ Range of Writing 7.10 Write routinely over extended and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences <small>Evaluate 2, 3, 4</small>
<p>Reading to Synthesize</p> <ul style="list-style-type: none"> ➤ Synthesize #1. Identify two key details from two websites ➤ Synthesize #2. Identify key details from two additional websites ➤ Synthesize #3. Integrate information across four websites ➤ Synthesize #4. Make a claim and support with evidence (two relevant details) 	<p>Reading Informational Text</p> <ul style="list-style-type: none"> ➤ Key Idea and Details 7.2 Determine two or more central ideas and analyze/summarize development over course of text <small>Synthesize 1, 2, 3, 4</small> ➤ Craft and Structure 7.4 Determine meaning of words and phrases as used in text including figurative, connotative, and technical meanings; analyze impact of specific word choice on meaning & tone <small>Synthesize 1, 2, 3, 4</small> ➤ Integration of Knowledge and Ideas 7.8 Trace & evaluate argument and specific claims in a text, assessing whether reasoning is sound and evidence is relevant and sufficient to support claims <small>Synthesize 1, 2, 3, 4</small> ➤ Range of Reading and Level of Text Complexity 7.10 Read and comprehend non-fiction in grades 6-8 text complexity band independently and proficiently <small>Synthesize 1, 2, 3, 4</small> ➤ Literacy in Science ➤ Integration of Knowledge and Ideas 7.8 Distinguish among fact, reasoned judgment and speculation in text <small>Synthesize 3, 4</small> ➤ Range of Reading and Level of Text Complexity 7.10 Read and comprehend science/technical texts in grades 6-8 text complexity band <small>Synthesize 1, 2, 3, 4</small> ➤ Writing (and Writing in Science) ➤ Research To Build and Present Knowledge 7.9 Draw evidence from literary or informational texts to support analysis, reflection, and research <small>Synthesize 4</small> ➤ Range of Writing 7.10 Write routinely over extended and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences <small>Synthesize 1, 2, 3, 4</small>
<p>Reading and Writing to Communicate</p> <ul style="list-style-type: none"> ➤ Communicate #1: Access relevant information within a communication interface (email, wiki) ➤ Communicate #2: 	<p>Writing (and Writing in Science)</p> <ul style="list-style-type: none"> ➤ Text Types and Purposes 7.2 Write informative/explanatory texts to examine a topic and convey ideas, concepts, and information through selection, organization, and analysis of relevant content <small>Communicate 1, 2, 3, 4</small> ➤ Production and Distribution of Writing 7.4 Produce clear and coherent writing in which development, organization, and style are appropriate to the task, purpose, and audience <small>Communicate 2, 3, 4</small> ➤ Production and Distribution of Writing 7.6 Use technology, including the Internet, to produce and publish writing, interact with others, link to other information, and display information dynamically <small>Communicate 2, 3, 4</small> ➤ Research To Build and Present Knowledge 7.7 Conduct short research projects to answer a question, drawing on several sources and generating additional related, focused questions for further investigation <small>Communicate 1, 2, 3, 4</small> ➤ Research To Build and Present Knowledge 7.8 Gather relevant information from multiple print and digital

<p>Use appropriate features of communication tool to compose message</p> <p>➤ Communicate #3: Demonstrate awareness of audience</p> <p>➤ Communicate #4: Craft explicit, unambiguous response to question</p>	<p>sources, using search terms effectively, assess credibility and accuracy of sources, and quote or paraphrase data and conclusions of others while avoiding plagiarism and citing appropriately <small>Communicate 1, 2, 3, 4</small></p> <p>➤ Research To Build and Present Knowledge 7.9 Draw evidence from literary or informational texts to support analysis, reflection, and research <small>Communicate 1, 2, 3, 4</small></p> <p>➤ Range of Writing 7.10 Write routinely over extended and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences <small>Communicate 2, 3, 4</small></p> <p>Language</p> <p>➤ Conventions of Standard English 7.1 Demonstrate command of the conventions of standard English grammar and usage when writing <small>Communicate 2, 3, 4</small></p> <p>➤ Knowledge of Language 7.3a Choose language that expresses ideas precisely and concisely <small>Communicate 2, 3, 4</small></p> <p>➤ Vocabulary Acquisition and Usage 7.6 Acquire and use grade-appropriate general academic and domain-specific words and phrases <small>Communicate 2, 3, 4</small></p>
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(Continued from page 11)

At the same time, in order to meet the expectations put forth by the Common Core State Standards Initiative (2010), school administrators and teachers need to begin planning now for how these rigorous standards will impact instruction and assessment. School districts will need a focused transition plan and a process to implement the plan. Classroom teachers and professional development providers will also need practical examples of tasks that can elicit higher-level reasoning that incorporates many of the standards in a single classroom sitting. The ORCA provides eight different versions of practical online reading experiences for teachers to explore and adapt to other inquiry-based learning scenarios across the curriculum.

And finally, work by the International Center for Leadership in Education (2010; see Daggett & Gendron's Rigor/Relevance Framework in Appendix B) indicates that assessments that include performance-based tasks and constructed response items are more *rigorous* (i.e., requiring more knowledge, synthesis, and evaluation) and more real-world *relevant* (i.e., interdisciplinary, real-world predictable or unpredictable situations) compared to typical state-wide assessments that use closed responses such as multiple-choice items that reflect low rigor and relevance. Similar to the designs of future assessments of the Common Core Standards proposed by PARCC and SBAC, our ORCA measures intentionally include both performance-based tasks and open, constructed response-items designed to capture the deep levels of thinking required of students in a global information society.

Summary

As illustrated in this paper, the skills and understandings seventh graders are expected to demonstrate during the ORCA experience overlap with those of the Common Core State Standards in a number of important ways. Consequently, participation in the ORCA project provides valuable exposure to and practice with authentic inquiry tasks and performance-based assessment formats that are likely to be new for many students and teachers in today's schools. Insights gleaned from class-based ORCA data and excerpts of individualized video data can assist teachers and administrators in identifying instructional interventions that better prepare students for the rigorous expectations of the Common Core State Standards while also offering a vision of what authentic assessment and feedback might look like for schools seeking to integrate technology into standards-based curriculum practices.

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Appendix A: Online Reading Comprehension Assessments (ORCA) Scenario Descriptions

Descriptions of 8 alternative versions of ORCA scenarios including body part focus, purpose, communication tool, topic, guiding inquiry question, format (e.g., restricted or unrestricted*), and task description

	LESC TOPIC/SCENARIO	LESC TOPIC/SCENARIO
<p>Body Part: Heart</p> <p>Purpose: Compile information</p> <p>Communication Tool: Email</p>	<p>ENERGY DRINKS (LESC 1 Restricted¹): <i>Are energy drinks dangerous to teen heart health?</i></p> <p>The president of a school board sends an email to students indicating he is considering a ban on energy drinks sold in school. Students conduct online research and email the school board with findings about how energy drinks affect teen heart health.</p>	<p>HEART HEALTHY SNACKS (LESC 5 Unrestricted²): <i>How do snacks affect heart health?</i></p> <p>The president of a school board sends an email to students indicating he is considering having only healthy snacks in the school vending machine. Students conduct online research and email the school board with findings about how snacks affect heart health.</p>
<p>Body Part: Lungs</p> <p>Purpose: Investigate conflicting claims</p> <p>Communication Tool: Wiki</p>	<p>ASTHMA CURES (LESC 2 Unrestricted²): <i>Can Chihuahua dogs cure asthma?</i></p> <p>A class studying lung health is collecting different opinions about this issue. Students are asked to conduct research and edit the class wiki with their opinion and reliable evidence to support their reasoning.</p>	<p>THIRD HAND SMOKE (LESC 6 Restricted¹): <i>Is third-hand smoke dangerous to lung health?</i></p> <p>A class studying lung health is collecting different opinions about this issue. Students are asked to conduct research and edit the class wiki with their opinion and reliable evidence to support their reasoning.</p>
<p>Body Part: Eyes</p> <p>Purpose: Investigate conflicting claims</p> <p>Communication Tool: Wiki</p>	<p>VIDEO GAMES (LESC 3 Unrestricted²): <i>Are video games helpful or harmful to your eyes?</i></p> <p>A class studying eye health is collecting different opinions about this issue. Students are asked to conduct research and edit the class wiki to offer their opinion and evidence to support their reasoning.</p>	<p>DECORATIVE LENSES (LESC 7 Restricted¹): <i>Are decorative lenses helpful or harmful to your eyes?</i></p> <p>A class studying eye health is collecting different opinions about this issue. Students are asked to conduct research and edit the class wiki to offer their opinion and evidence to support their reasoning.</p>
<p>Body Part: Ears</p> <p>Purpose: Compile information</p> <p>Communication Tool: Email</p>	<p>MP3 VOLUME LEVEL (LESC 4 Restricted¹) <i>Can listening to volume levels on an MP3 player cause hearing loss?</i></p> <p>A health teacher sends an email from his class to ask students for information about hearing loss related to MP3 players. Students conduct online research and email the teacher's class with their findings about how high volume levels on MP3 players impact hearing.</p>	<p>MOSQUITO RINGTONES (LESC 8 Unrestricted²): <i>Do mosquito ringtones really work?</i></p> <p>A science teacher sends an email from his class to ask students for information about special cell phone ringtones designed to be heard by teens but not adults. Students conduct online research and email the teacher's class with their findings about whether or not mosquito ringtones really work.</p>

For the ORCA-Open and ORCA-Closed, students will engage in one restricted¹ task for which the information space to locate relevant claims is restricted to a particular set of online sources and one unrestricted² task for which the information space is left open to any online sources related to that topic.

Appendix B Common Core Standards and The ORCA Project – June 2011

What is the ORCA (Online Reading Comprehension Assessment) Project?

The ORCA project, funded by the U.S. Department of Education, is designed to develop, test, and refine a set of three assessments formats for measuring online reading comprehension. Each ORCA is an authentic, problem-based scenario situated in a digital environment designed to engage middle school students in a series of online disciplinary information requests while capturing performance data about how students use the Internet to locate, critically evaluate, synthesize, and communicate information. For more information, visit www.orca.uconn.edu.

What can participation in the ORCA Project offer your school?

- **Exposure** to performance-based, constructed response items, and class-based data from measures of processes **similar to Common Core State Standards expectations** three years prior to release of formal assessments from the two consortiums.
- A vision of what **authentic assessment and feedback** might look like for schools seeking to integrate technology into standards-based curriculum practices
- The opportunity to consider how real-time performance data from inquiry-based online reading scenarios can **inform new elements of classroom instruction**

Key Features of ORCA Aligned with Common Core Standards

- **Problem-based scenarios** require application of higher level reading and writing processes to Internet reading contexts
- **Authentic, interdisciplinary tasks** integrate science, reading, and writing
- Content focused on human biology, a topic **connected to most middle school curricula**
- Scenario topics **relevant to today's adolescents** (e.g., heart healthy snacks; decorative contact lenses; safe volume levels of Ipods)
- **Reflects key processes in Common Core State Standards** for reading, writing, and literacy in science (see table on next page)

- The CCSS movement aligns with the higher order thinking and doing skills reflected in the "Quad D" area of the rigor/relevance framework developed by the International Center for Leadership in Education (2011). The ORCA project enables 7th- graders and their teachers to move toward "Quad D" learning experiences with application and assimilation activities from which assessment data can be used to inform classroom instructional decisions with regards to reading and the integration of technology.

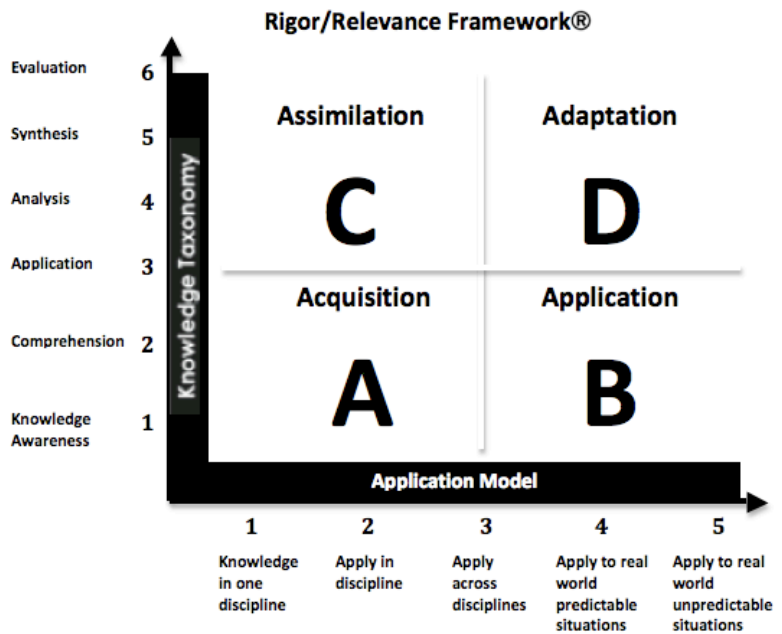


Image adapted from <http://www.leadered.com/rrr.html>

The ORCA Project and Common Core – June 2011

ORCA	Locate	Evaluate	Synthesize	Communicate
Common Core State Standards	Reading to Locate	Reading to Evaluate	Reading to Synthesize	Reading and Writing to Communicate
CCSS Reading Standards for Informational Text -- Grade 7				
Key Ideas and Details		1: Cite implicit & explicit textual evidence as support	2: Determine two or more central ideas and summarize	2: Determine two or more central ideas and summarize
Craft and Structure	4. Determine connotative meaning of words	4: Analyze impact of word choice on tone	4: Determine technical meaning of words	
Integration of Knowledge and Ideas	8. Assess if evidence is relevant and sound	9: Analyze how authors shape claims	8. Trace argument and assess whether reasoning is sound	
Range of Reading and Text Complexity	10: Comprehend across complex texts	10: Comprehend across complex texts	10: Comprehend across complex texts	
CCSS Reading Standards for Literacy in Science – Grade 7				
Key Ideas and Details	3: Follow multi-step procedures to carry out tasks	2: Determine central idea and summarize	2: Determine central idea and summarize	
Craft and Structure		6: Analyze author's purpose	4. Determine meaning of words in science	
Integration of Knowledge and Ideas		8: Distinguish fact, reasoned judgment and speculation	8: Distinguish fact, reasoned judgment and speculation	
Range of Reading and Text Complexity		10. Comprehend complex science texts	10. Comprehend complex science texts	
CCSS Writing Standards – Grade 7				
Text Types and Purposes	2. Write to convey relevant information	1: Write arguments with clear reasons and evidence	1: Write arguments with clear reasons and evidence	2: Write to examine topic & convey relevant ideas
Production and Distribution of Writing	6: Use Internet to publish writing and cite sources	6: Use Internet to publish writing and cite sources	6: Use Internet to publish writing and cite sources	4: Produce clear writing appropriate to audience 6: Use Internet to publish writing and cite sources
Research To Build and Present Knowledge	7: Conduct short research to answer question 8: Gather evidence using search terms effectively	9: Draw evidence to support analysis and research (assess argument and reasonableness of claims)	9: Draw evidence to support analysis and research (assess argument and reasonableness of claims)	8: Gather evidence from multiple digital texts 9: Draw evidence to support analysis and research
Range of Writing	10: Write for a disciplinary task in one sitting	10: Write for a disciplinary task in one sitting	10: Write for a disciplinary task in one sitting	10: Write for a disciplinary task in one sitting