Common Core State Standards for English Language Arts and Literacy in

Science

Welcome!
Thank you for joining the webinar.
The session will begin shortly.

Presenters: Hope Espinda & Leslie Hamasaki
State STEM Resource Teachers

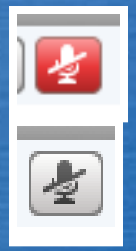
Presenters

K-12 STEM Resource Teacher
K-6 Elementary Teacher, Science Coach
Teacher Consultant, HI Writing Project

K-12 STEM Resource Teacher
High School Chemistry Teacher
Master's degree in Library & Information Science

Webinar Reminders

- **Close** all other applications on your computer.
- Please make sure to **mute** your microphones and keep them muted unless otherwise instructed.



- Please ask all **questions** through the **chat box**.
- Make sure your chat box is set for “Everyone.”

Questions will be addressed during Q & A.

- This session is being recorded.

❖ Optional: Take notes

The Hawaii STEM Learning Strategy and Network

Improving and advancing the character of

***S**cience,*

***T**echnology,*

***E**ngineering and*

***M**athematics*

education to prepare all students for the opportunities and challenges in our changing world.

What is STEM Education?

- STEM education integrates the study of science, technology, engineering and mathematics by using scientific inquiry and engineering design as unifying themes.

- It emphasizes innovation and the development of problem-solving, critical thinking and collaboration skills.

Goals of the Hawaii STEM
Learning Strategy & Network

- Transform and revitalize the teaching and learning of science and mathematics in grades K-12 by purposefully integrating technology and engineering with science and mathematics.
- Significantly increase the number of public school graduates who pursue or enter STEM-related careers or attain two- or four-year degrees in STEM fields.
- Increase STEM-foundational academic achievement and STEM learning opportunities for ***all*** students.
- Cultivate partnerships to expand and strengthen STEM education.

Why emphasize STEM Education?

- STEM is infused within every facet of our society and plays a major role in determining Hawaii's future viability.

- STEM education develops tomorrow's innovators who overcome the unforeseen challenges in health care, public safety, the economy, and the environment.

At its core, *learning is about transforming information into knowledge.*

To instruct someone … is to teach
[the student] to participate in the process that makes possible the establishment of knowledge.

We teach a subject not to produce little living libraries on that subject, but rather to get students to think mathematically [or scientifically] for themselves … to take part in the process of knowledge-getting.

Knowing is a process, not a product.

--Lee Shulman

En•gi•neer•ing [en-juh-neer-ing] – noun

The art or science of making practical application of the knowledge of pure sciences…"

STEM Education is transdisciplinary in nature, offering students the ability to use project-based learning to address real-world issues that affect their family, their community and their world.

--Teaching Institute for Excellence in STEM

Desired Outcomes

- Become familiar with the way the Common Core State Standards (CCSS) for literacy in science are organized
- Provide a rationale as to why teachers need to address the CCSS for literacy in science
- Describe some ways that teachers can address the CCSS for literacy in science

Pre-assessment

- Please complete the poll questions and press the submit button

Poll questions

1. I am familiar with the way the CCSS for literacy in science are organized.

2. I can provide a rationale as to why teachers need to address the CCSS for literacy in science during science instruction.

3. I can describe ways that teachers can address the CCSs for literacy in science during science instruction.

Literacy

What do you think literacy is?

Please type your answer in the chat box now.

Literacy Defined

Literacy is the ability to understand and use language and images to acquire knowledge, communicate and think critically in all content and contexts.

***Literacy for Learning*, Hawaii State Dept of Education, April 2009**

Profile of a Literate Learner

Literate learners will be able to apply the core concepts in all content areas and contexts:

- Read
- Write
- Speak
- Listen
- Solve Problems
- Think Critically
- Use Technology and Media
- Utilize Skills to participate in a Global Society
- Apply Skills to the Real World

***Literacy for Learning*, Hawaii State Dept of Education, April 2009**

Characteristics of Literacy Focused Instruction

Integration of learning through literacy

- Connects reading, writing, talking, listening, and thinking
- Connects to all content areas and everyday life

Student develops higher order thinking skills

- Formulating ideas
- Solving problems
- Making meaning
- Deeper and more discerning understanding of text

Differentiated instruction

Community of learners

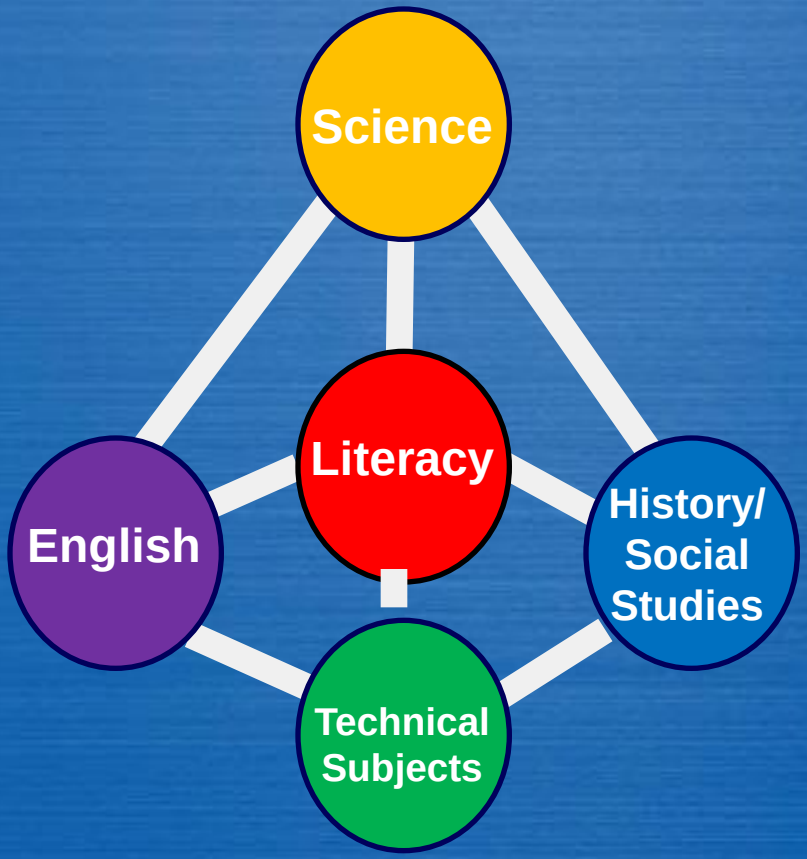
***Literacy for Learning*, Hawaii State Dept of Education, April 2009**

Common Core English Language Arts (ELA) Standards

for K-12

Key Design Considerations for Common Core Standards

- An integrated model of literacy
- Research and media skills blended into the standards as a whole
- Shared responsibility for students' literacy development



Organization of CCSS

for ELA and literacy in history/social studies, science, and technical subjects

Gr. K-5	Gr.6-12	
ELA integrated with History/Social Studies, Science, & Technical subjects	**ELA**	**History/Social Studies, Science, & Technical subjects**
STRANDS **•Reading** **•Writing** **•Speaking & Listening** **•Language**	**STRANDS** **•Reading** **•Writing** **•Speaking & Listening** **•Language**	**STRANDS** **•Reading** **•Writing**

Anchor Standards in Reading
10 Standards (K-12)

Key Ideas & Details

(3 Standards)

Craft & Structure

(3 Standards)

Literacy in History/Social Studies, Science, and Technical Subjects

Integration of Knowledge & Ideas

(3 Standards)

Range & Level of Text Complexity

(1 Standard)

Anchor Standards in Writing
10 Standards (K-12)

Text Types & Purposes

(3 Standards)

Production & Distribution of Writing

(3 Standards)

Literacy in History/Social Studies, Science, and Technical Subjects

Research to Build Knowledge

(3 Standards)

Range of Writing

(1 Standard)

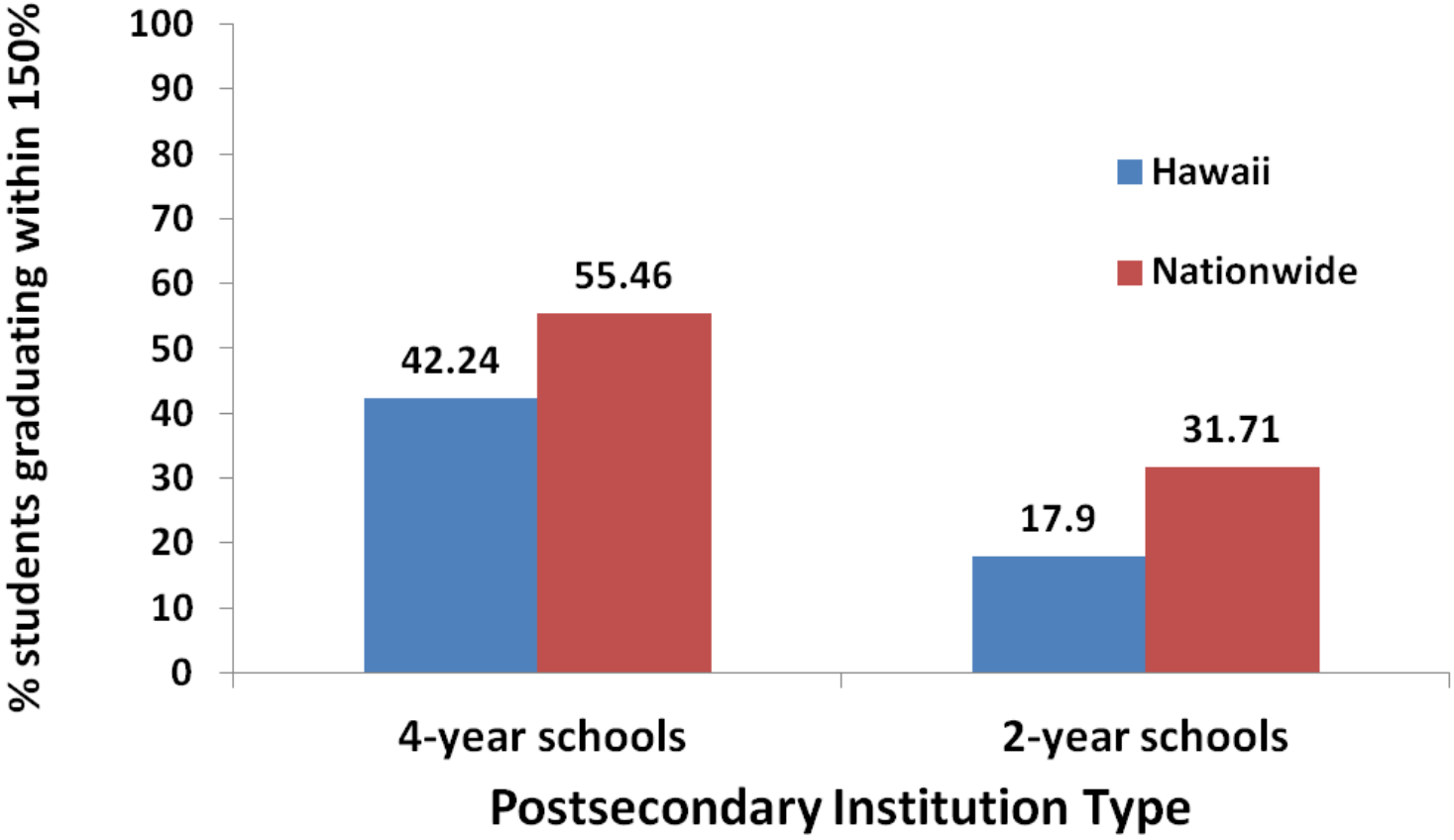
Why Literacy in Science?

College and Career Ready

- Nationwide, about 36% of first-year undergraduate students said they had taken a remedial course (any subject) in 2007-2008
- 42% for public 2-year institutions

National Center for Education Statistics. (2011). The condition of education. http://nces.ed.gov/programs/coe/indicator_rmc.asp

Graduation rates (%) for postsecondary institutions



National Center for Education Statistics. IPEDS State Data Center. Hawaii Graduation Rates Report. http://nces.ed.gov/ipeds/sdc/CDT_Report.aspx

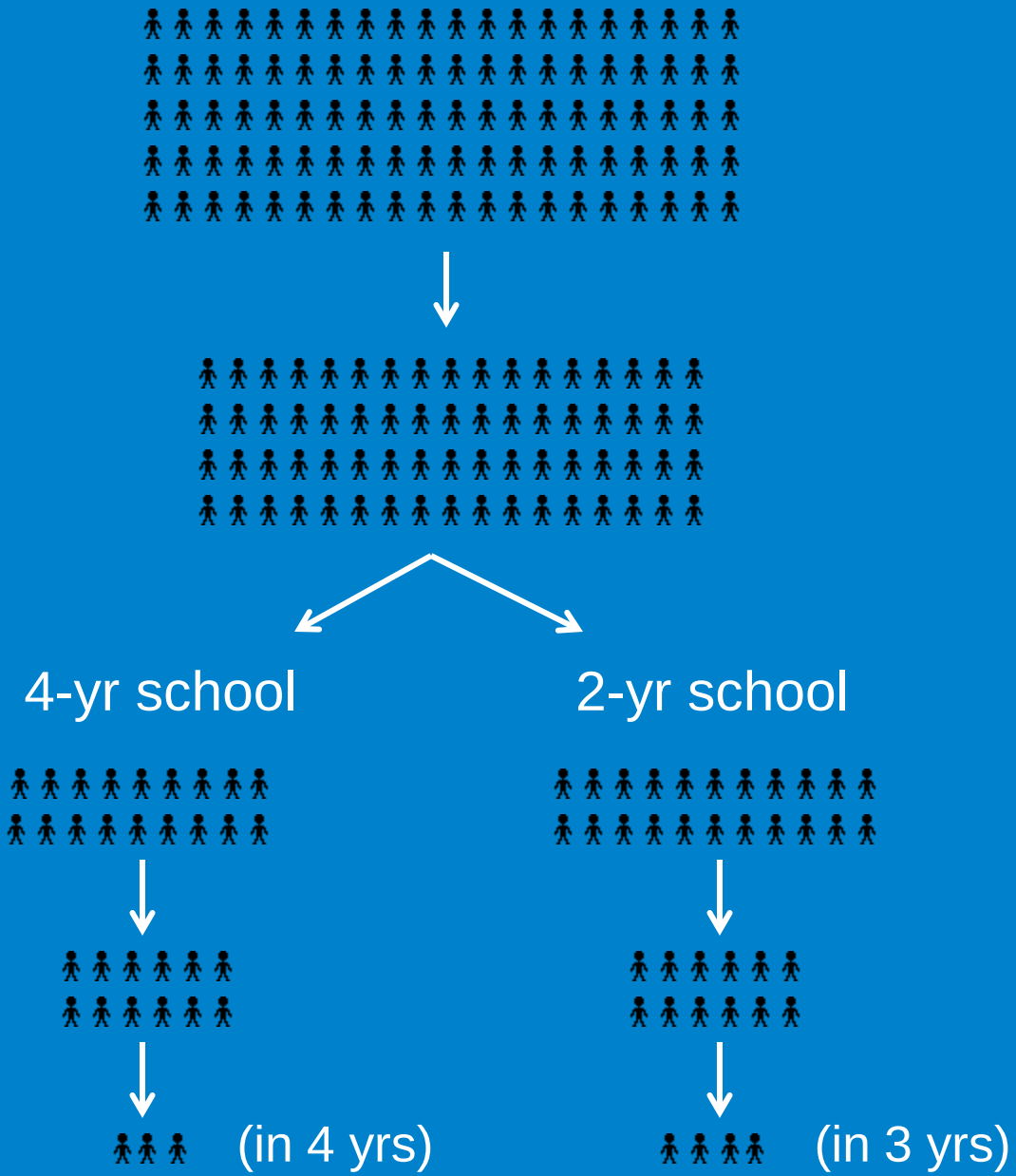
Enter 9th Grade: 100

Graduate high school: 68

Enter college: 40

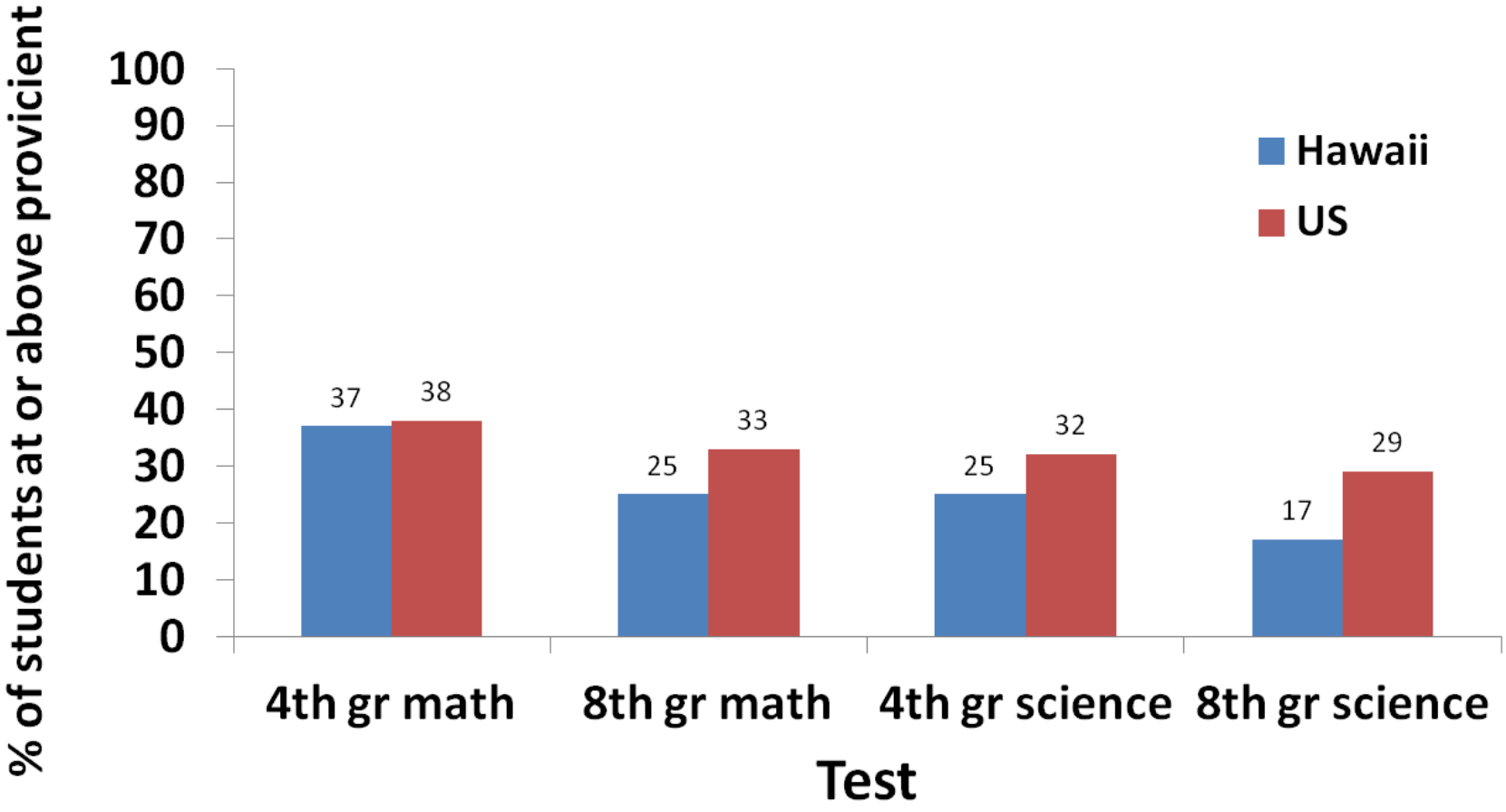
Return for 2nd year: 24

Graduate college: 7



Complete College America. (n.d.) Hawaii Alliance of States. http://www.completecollege.org/docs/Hawaii.pdf

% of students at or above proficient on the 2009 National Assessment of Educational Progress (NAEP)



Change the Equation. (n.d.) Hawaii STEM Vital Signs.
http://www.changetheequation.org/clientuploads/VitalSigns/VitalSigns_Hawaii.pdf

Why Literacy in Science?

- 10% of 8th graders met TIMSS advanced international benchmarks in science compared to 32% for Singapore[1]
- 26% of ACT-tested 2005 high school graduates achieved or exceeded ACT College Readiness Benchmark in Science[2]
  - 75+% chance of C or higher
  - 50+% chance of B or higher

[1]National Research Council (2011). *Successful K-12 STEM Education.*
[2]ACT (2006). *Developing the STEM Education Pipeline*.
http://www.act.org/research/policymakers/pdf/ACT_STEM_PolicyRpt.pdf

Why Literacy in Science?

- International students make up more than 1/3 of the students in grad school in engineering and science in the US[1]
- 16 of 20 jobs projected for highest growth in the next 10 years are STEM-related[1]
- STEM workers earn 26% more than non-STEM workers[2]

[1]National Research Council (2011). Successful K-12 STEM Education.
[2]U.S. Department of Commerce, (2011). STEM: Good Jobs Now and for the Future.

STEM Occupations: Examples

Computer and math occupations
Computer programmers
Network & computer systems administrators
Statisticians

Engineering and surveying occupations
Surveyors & cartographers
Drafters
Electrical & electronic engineers

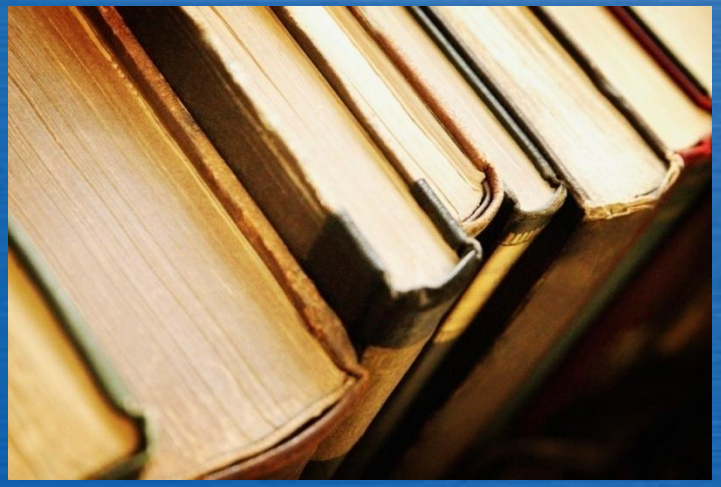
Physical and life sciences occupations
Agricultural & food science technicians
Conservation scientists & foresters
Atmospheric & space scientists

STEM managerial occupations
Computer & information systems managers
Engineering managers
Natural sciences managers

Why Literacy in Science?

College and Career Ready

- Complex informational text in a variety of content areas
- High volume of reading
- Little scaffolding



Why Literacy in Science?

College and Career Ready

- Gap between college and high school texts about 4 grade levels
- 8th grade texts = former 5th grade texts
- 12th grade texts = former 7th grade texts (compared to 40 years ago)

Susan Pimental's "Transitioning to the Common Core State Standards" 7/28/11 Presentation at OCISS

Why Literacy in Science?

College and Career Ready

- 7-15% of elementary & middle school instructional reading is informational text
- About 80% of college and career reading is informational text
- CCSS recommends 50% informational text in elementary & 75% informational text in high school

Council of Chief State School Officers. (2011). The Balance of Informational Literary Text in K-5. (video file).

Why Literacy in Science?

Informational Texts

- Growing emphasis on informational texts in the higher grades
- ELA classes must focus on literature as well as literary nonfiction
- A great deal of informational reading in grades 6–12 *must* take place in other classes

Fundamental Shifts in the CCSS

- Literacy across-the-curriculum
- Text complexity
- Informational: Literary Texts (50:50 for K-5; 75:25 for 6-12)
- Writing about texts (drawing evidence from texts)
- Composing arguments
- Conducting short, focused research projects
- Academic vocabulary

HCPS III Physical Science, Scientific Process	CCSS for ELA in Science Writing Standard Gr. 9-10
n/a	1. Write arguments focused on discipline-specific content
SC.PS.1.3 Defend and support conclusions, explanations, and arguments based on logic, scientific knowledge, and evidence from data **SC.PS.1.5** Communicate the components of a scientific investigation, using appropriate techniques	2. Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes
n/a	3. n/a
SC.PS.1.3 Defend and support conclusions, explanations, and arguments based on logic, scientific knowledge, and evidence from data **SC.PS.1.5** Communicate the components of a scientific investigation, using appropriate techniques	4. Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience
SC.PS.1.6 Engage in and explain the importance of peer review in science **SC.PS.1.7** Revise, as needed, conclusions and explanations based on new evidence	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
SC.PS.1.2 Design and safely implement an experiment, including the appropriate use of tools and techniques to organize, analyze, and validate data	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

CCSS for ELA in Science Writing Standard Gr. 9-10	Framework for K-12 Science Education
1. Write arguments focused on discipline-specific content	Dimension 1: Scientific & Engineering Practices 7. Engaging in argument from evidence
2. Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes	Dimension 1: Scientific & Engineering Practices 6. Constructing explanations (for science) and designing solutions (for engineering) Dimension 2: Crosscutting Concepts 2. Cause and effect: Mechanism and explanation
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	Dimension 1: Scientific & Engineering Practices 8. Obtaining, evaluating, and communicating information
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	Dimension 1: Scientific & Engineering Practices 8. Obtaining, evaluating, and communicating information
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	Dimension 1: Scientific & Engineering Practices 8. Obtaining, evaluating, and communicating information

Common Core State Standards

TIMELINE

	SCHOOL YEAR 2011 - 2012	SCHOOL YEAR 2012 - 2013	SCHOOL YEAR 2013 - 2014	SCHOOL YEAR 2014 - 2015
Non-Tested Grades and Content Specific Courses	Common Core State Standards (internalization and incorporation)	Common Core State Standards (internalization and incorporation)	Common Core State Standards (sustainability)	Common Core State Standards (sustainability)
Tested Grades 	Hawaii Content and Performance Standards III (instruction and Hawaii State Assessment)	Hawaii Content and Performance Standards III (instruction and Hawaii State Assessment)	Hawaii Content and Performance Standards III (instruction and Hawaii State Assessment) Common Core State Standards (internalization and incorporation) Common Core State Standards Hawaii State Assessment (Field Test)	Common Core State Standards (instruction and Hawaii State Assessment) Common Core State Standards (sustainability) Common Assessment based on Common Core State Standards (Operational Test)
All Grade Levels	Mathematical Practices, Text Complexity and Writing an Argument	Mathematical Practices, Text Complexity and Writing an Argument	Mathematical Practices, Text Complexity and Writing an Argument	Mathematical Practices, Text Complexity and Writing an Argument

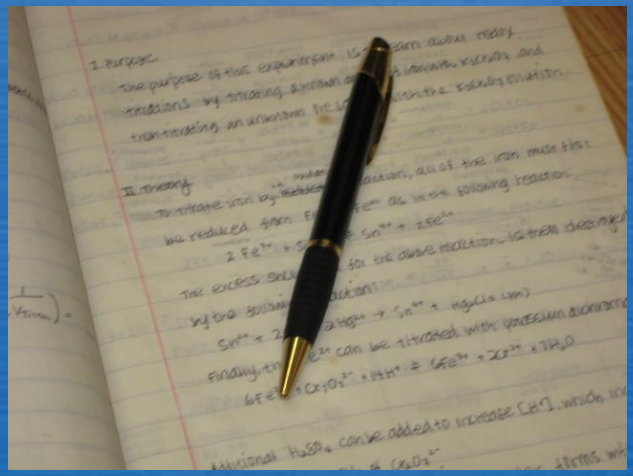
Science + Literacy

What do you already do in your science class that involves literacy?

Please type your answer in the chat box now.

Literacy components inherently present in science:

1. Science Talks/Discussions
2. Science Notebooks
3. Reading Expository Text
4. Formal Scientific Reports



ELA Skills Used in Science

- Writing procedures
- Following procedures
- Explaining concepts
- Reviewing information
- Summarizing data
- Effective use of language
- Constructing a reasoned argument
- Responding appropriately to critique

Scientific Inquiry

- Read relevant information before beginning experiments
- Write to record experiments in detail
- Orally present scientific findings to others

Persuasive Letters

- Pick a relevant topic
- Discuss ways that individuals can help the environment

  (recycling, not littering, conserving water, driving less, consuming less energy, composting…)

- Students choose one method to research and write about
- Students write a persuasive letter

- Share students' letters: spiral-bound book, post on a class/school website, via other technology options

Science Literature Study

- Students choose a famous inventor or scientist.

  (Isaac Newton, Galileo Galilei, or Alexander Graham Bell…)

- Students present their new knowledge to the class (PowerPoint, Prezi, Glog, Podcast, iMovie, …).

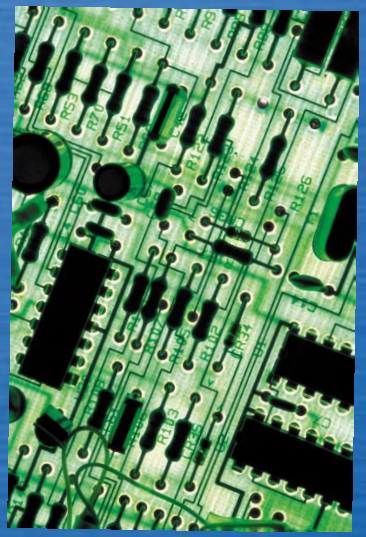
- While listening, students write down one fact about each scientist that they hear about.

Literacy + Science Examples

ELEMENTARY SCHOOL

ELECTRICAL CIRCUITS

- Explore electric circuits by using batteries, bulbs, wires, and motors. Keep a science notebook on their findings.
- Read informational texts on electric circuits.
- Orally report their findings to the class using their notebook entries to support their conclusions.
- Create a formal scientific report.

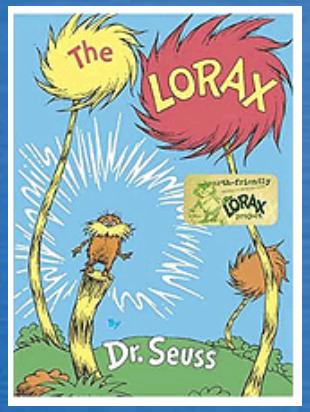


Energy and its Transformation SC.4.6.2: Explain what is needed for electricity to flow in a circuit to create light and sound

- Reading Informational: Range of Reading and Complexity of Text
- Writing: Research to Build and Present Knowledge
- Speaking and Listening: Presentation of Knowledge and Ideas

Literacy + Science Examples

ELEMENTARY SCHOOL



Social Studies: Character Building: Greed

Language Arts: Reading, Writing, Vocabulary…

Applied Math: Counting Change: Multiplication

Science: Botany: Trees: Interdependence

Science: Ecology: Pollution (water, air, human)

Recycling

Science: Zoology: Endangered Animals

http://www.homeschoolshare.com/lorax.php

Literacy + Science Examples

HIGH SCHOOL

Renewable Energy

Essential Questions:

1. What are the problems facing us with regards to energy?
2. How can we best address our energy needs, both now and in the future?

Final Products:

Glogster poster + oral presentation on an energy source

(Reading 1,2,4,5,6,7,9,10; Writing 2,4,6,7,8,10)

Laboratory report + oral presentation

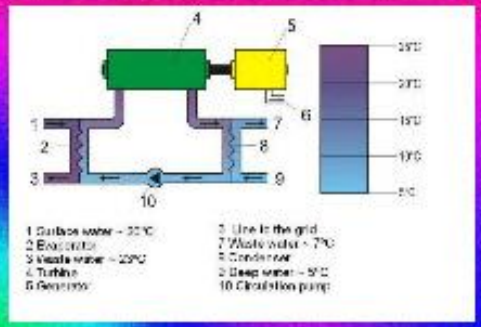
(Writing 2,4,10)

Letter to the editor on how best to meet energy needs in the future

(Writing 1,4,5,10)

Ocean Thermal Energy Conversion

Ocean thermal energy conversion harnesses energy by using water temperature differences to run a heat engine. In the closed system shown here, warmer surface water is used to vaporize a volatile gas. This gas spins the turbine, generating electricity. The gas is then condensed with cooler water from the deep ocean. This process is then repeated.



ENERGY PRODUCED (NET)
Nauru, 1981: 30 kW
Keahole Point, Hawaii
1992-1998: 103 kW, intermittent
present: used for air conditioning

ADVANTAGES

Cold, deep water can:
-provide air conditioning

-cool soil, allowing crops normally found in temperate climates to be grown in sub-tropics (chilled-soil agriculture)

-support aquaculture of cold-water species such as lobster and salmon

Open or hybrid cycle OTEC plants convert sea water to fresh water

In the future, may be able to mine sea water for minerals

DISADVANTAGES

Facilities are expensive to build

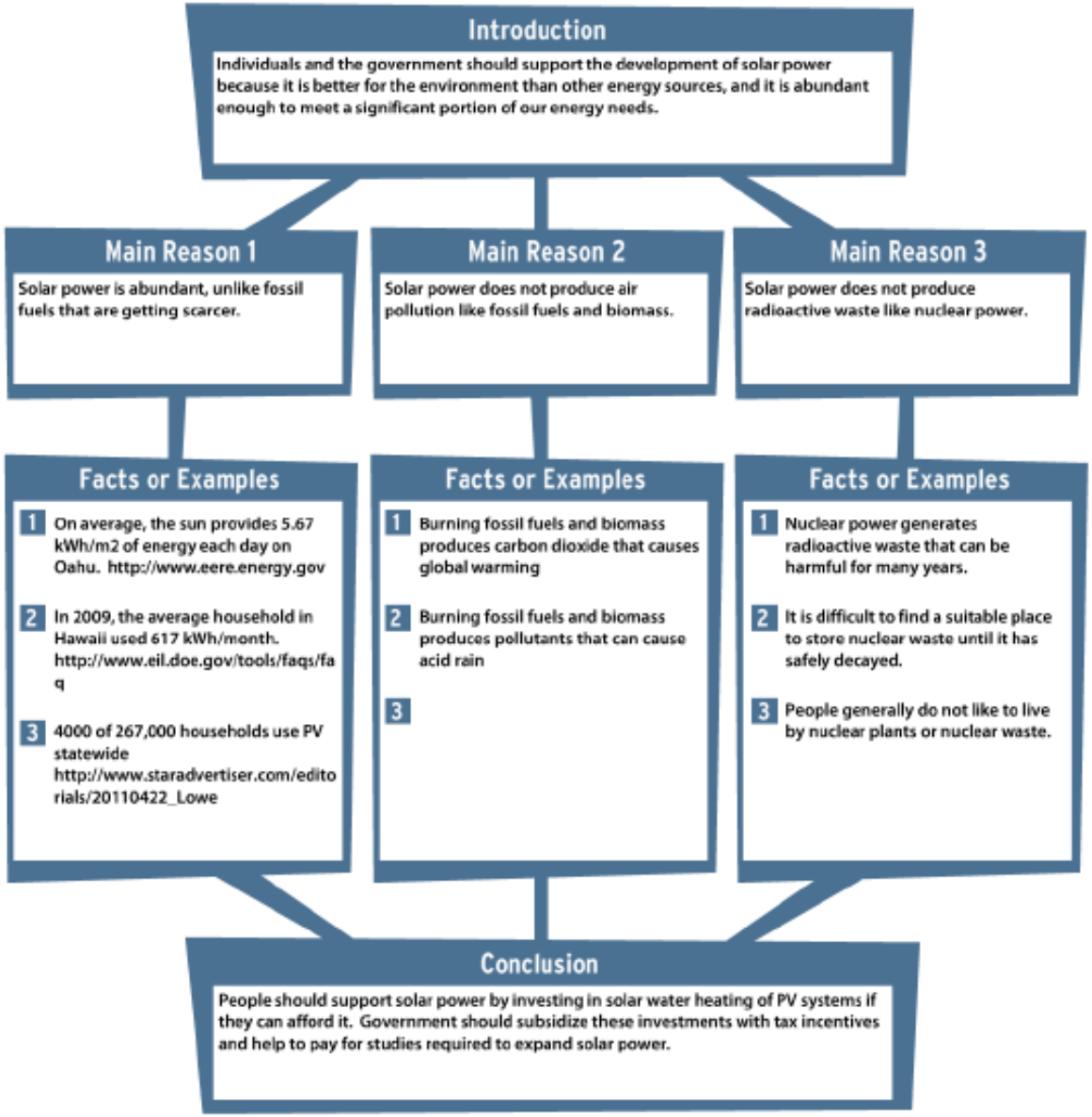
Technology is not profitable yet

There are few feasible locations (need large temperature difference between surface and deep water)

Possible disturbances to marine life may occur due to water temperature changes

http://en.wikipedia.org/wiki/Ocean_thermal_energy_conversion http://hawaii.gov/dbedt/info/energy/renewable/otec http://www.nsl.gov/otec

solar energy



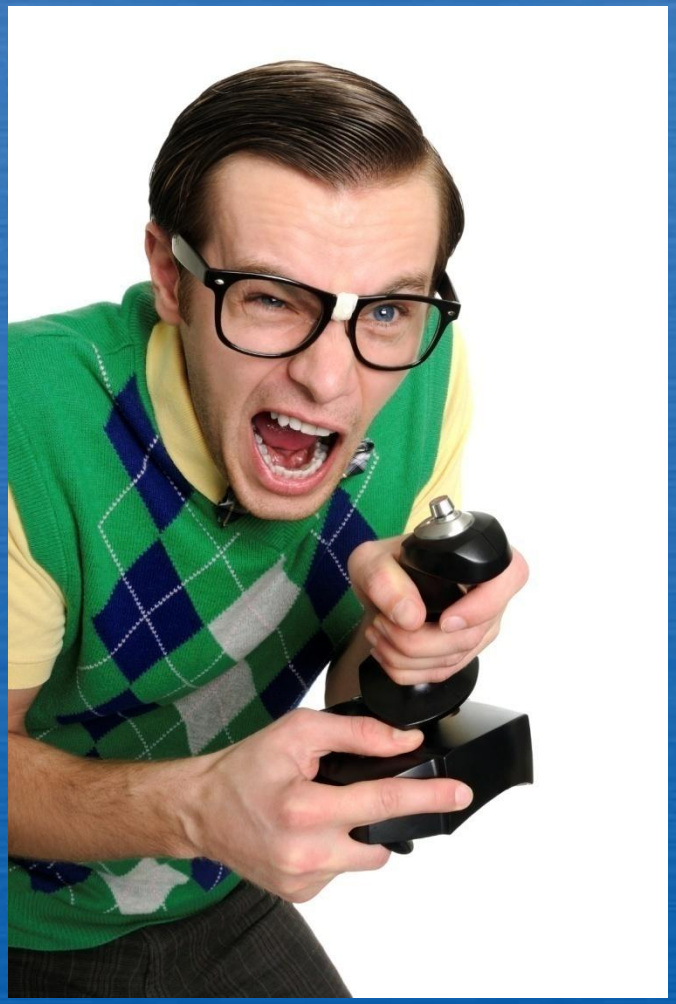
readwritethink International Reading Association NCTE Thinkfinity verizon foundation

Literacy + Science

What are some new ideas you can easily incorporate into your lessons to address the CCSS for literacy in science?

Please type at least one idea in the chat box now.

Game Time!



VISION:

what it means to be a literate person in the 21st century

Students who meet the ELA standards:

1. *Readily* undertake the close, attentive reading that is at the heart of understanding and enjoying complex works of literature.

VISION:

what it means to be a literate person in the 21st century

Students who meet the ELA standards:

2. *Habitually* perform the critical reading necessary to pick carefully through the staggering amount of information available today in print and digitally.

VISION:

what it means to be a literate person in the 21st century

Students who meet the ELA standards:

3. *Actively* seek the wide, deep, and thoughtful engagement with high-quality literary and informational texts that builds knowledge, enlarges experience, and broadens worldviews.

IN THE END…

- We need to all work together to ensure out students are literate learners who are ready to thrive in the 21st century!

Post-assessment

- Please complete the poll questions and press the submit button

Poll questions

1. I am familiar with the way the CCSS for literacy in science are organized.

2. I can provide a rationale as to why teachers need to address the CCSS for literacy in science during science instruction.

3. I can describe ways that teachers can address the CCSs for literacy in science during science instruction.

Other Related Webinars

- **Text Complexity**

  Elementary: May 13, 2012

  Secondary: April 17, 2012

- **The Written Argument**

  General: Feb. 14, 2012

  Written argument/opinion (elementary): March 20, 2012

- **Academic Vocabulary:** Oct. 25, 2011 (archive)

- **Literacy Standards Across The Curriculum:** Nov. 17, 2011 (archive)

Additional Resources

Livebinder:

http://livebinders.com/edit?id=166630

Profesional Development & Webinar Schedule:

http://standardstoolkit.k12.hi.us/index.html

Any questions?

Thank you for joining us!

- A recording of this webinar will be posted on the Standards Toolkit website.

- If there are any questions, please e-mail:
  - Hope Espinda & Leslie Hamasaki, STEM Resource Teachers
  - Petra Schatz, Language Arts Specialist, or
  - Derrick Tsuruda, Science Specialist