Reading for Understanding: 
A Principled Approach to the Integration of Assessment and Instruction for Reading in the Disciplines

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*Classroom teachers who are designing and enacting modules

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Project Context & Rationale

- Importance of reading to learn/acquire information from multiple information sources in academic, professional, and personal life
  - Requires specialized reading, critical thinking, and communicating practices (Alvermann & Moore, 1991; CCSSO, 2010; Goldman & Bisanz, 2002; Lee & Spratley, 2010; Moje, 2008; Moje & O’Brien, 2001; Shanahan & Shanahan, 2008; Snow & Biancarosa, 2003)

- National and international indicators showing that current educational practices are not producing citizens with these skills; ill-prepared for 21st century

- Common Core State Standards in ELA and Literacy in History/Social Studies, Science and Technical Subjects
  - Specific focus on disciplinary literacies and the engagement with multiple sources of information
Reading Standards for Literacy in Science and Technical Subjects 6-12

<table>
<thead>
<tr>
<th>Grades 6-8 Students:</th>
<th>Grades 9-10 Students:</th>
<th>Grades 11-12 Students:</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Key Ideas and Details:</strong></td>
<td></td>
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</tr>
<tr>
<td>1. Cite specific textual evidence to support analysis of science and technical texts.</td>
<td>4. Cite specific textual evidence to support analysis of science and technical texts, adhering to the conventions of academic scholarship.</td>
<td>5. Cite specific textual evidence to support analysis of science and technical texts, adhering to important criteria when reading nonfiction.</td>
</tr>
<tr>
<td>2. Determine the logical sequence of ideas.</td>
<td>3. Analyze the target by identifying its structure and key features.</td>
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<tr>
<td>4. Identify the information sources and use them as a basis for making decisions.</td>
<td>5. Evaluate the strength and reliability of the evidence used.</td>
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</tr>
<tr>
<td>6. Analyze and evaluate the evidence and arguments presented in the text.</td>
<td>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.</td>
<td>8. Analyze and evaluate the evidence and arguments presented in the text, evaluating the data when possible and corroborating or challenging conclusions with other sources of information.</td>
</tr>
<tr>
<td><strong>Craft and Structure:</strong></td>
<td></td>
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</tr>
<tr>
<td>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.</td>
<td>10. 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.</td>
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</tr>
<tr>
<td><strong>Range of Reading and Level of Text Complexity:</strong></td>
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<tr>
<td>11. By the end of grade 8, read and comprehend informational text at grade 10 text complexity level with independence and proficiency.</td>
<td>12. By the end of grade 10, read and comprehend informational text at grade 12 text complexity level with independence and proficiency.</td>
<td>13. By the end of grade 12, read and comprehend informational text at grade 14 text complexity level with independence and proficiency.</td>
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</tbody>
</table>
Steps Toward an Integrated System Linking Standards, C-I-A, & PD

- Common Core State Standards are a start but not enough
  - Standards need to be translated using “backwards design” and “evidence-centered design” processes
  - Need to be clear about the **Claims** one wishes to make about students, the **Evidence** that would back up those claims, and the **Tasks** that can provide the critical forms of evidence
  - Need a model for the processes and products of the **reading for understanding** process
Definition: **Reading for Understanding**

- Reading for understanding is the capacity to engage in *Evidence-Based Argumentation (EBA)* drawing on multiple text sources.
  - Unifying framework across disciplines: Making a claim or assertion that is supported by evidence that connects to the claim in a principled way.
  - Respects differences among disciplines: the nature of the claims, what counts as evidence, and what the principles are that warrant information to serve as evidence.

![Diagram of閱讀 for Understanding](image)

*Figure A1. Model of Reading for Understanding*
Project’s Theory of Action/Change

- Teachers mediate interventions intended to provide opportunities to learn for students.
- Most teachers have not themselves had opportunities to engage in evidence-based argumentation.
- READI Intervention development is proceeding at teacher as well as student levels.
  - READI Teacher Networks are Professional Learning Communities
    - Teachers engage with texts, tasks, assessments and student work to construct flexible knowledge of the how to support students acquisition of capacity to engage evidence-based argument.
  - Evidence-based Argument Instructional Modules
    - Mediate the intervention for students
    - Serve as educative curricula for teachers in context of Teacher Networks.
Domain Analysis

- Initial Task was to ask what knowledge and practices are involved in evidence-based argumentation in each of the three disciplines we focused on: science, history, literary analysis.
- Multi-disciplinary teams in each discipline generated responses to these based on existing theory and literature
- Looked across the disciplines – five constructs emerged
# Core Constructs: The Foundation

<table>
<thead>
<tr>
<th>Core Construct</th>
<th>Science</th>
<th>History</th>
<th>Literature</th>
</tr>
</thead>
<tbody>
<tr>
<td>Epistemology</td>
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<tr>
<td>Inquiry Practices/ Ways of Reasoning</td>
<td></td>
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<tr>
<td>Overarching Concepts, Themes, Frameworks,</td>
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<tr>
<td>Information Representation/ Types of Texts</td>
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<tr>
<td>Discourse/Language Structures</td>
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## Core Construct Description

**Epistemology**

(What counts as knowledge/ how do we know what we know)

Beliefs, values, and commitments that the reader draws upon to prioritize and warrant claims.

## Illustrations/Examples

<table>
<thead>
<tr>
<th>Science</th>
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</tr>
</thead>
<tbody>
<tr>
<td>*Science attempts to build understandings of the physical and designed worlds through models, as <em>approximations that have limitations.</em>&lt;br&gt; <em>Scientific findings: tentative and subject to revision.</em>&lt;br&gt; *Science knowledge is -- constructed incrementally -- socially constructed&lt;br&gt; <em>Scientific explanations meet certain criteria (e.g., based on sound empirical data, parsimonious, logically cohesive)</em></td>
<td>*History as&lt;br&gt; -- interpretation (competing narratives)&lt;br&gt; --approximation of the past&lt;br&gt; --perspective taking&lt;br&gt; --claims and evidence&lt;br&gt; --contested and contestable&lt;br&gt; *Historical empathy: interpreting past actions in context of patterns, beliefs, values existing at the time.&lt;br&gt; <em>Historical significance (some events/ issues are more significant than others)</em></td>
<td>Literature provides a terrain for interrogating the meanings of human experiences (e.g. archetypal themes over human history; psychological states; worldviews as propositions about the ideal and the moral, etc.)&lt;br&gt; Literary texts are open to dialogue between and among readers and texts&lt;br&gt; Literary interpretation is about both the meaning of content (i.e. plot, characterization) as well as form</td>
</tr>
</tbody>
</table>
### Core Constructs / Knowledge “Buckets”

<table>
<thead>
<tr>
<th>Inquiry Practices/ Ways of Reasoning</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sci/Hist: Ways in which scientists/historians evaluate claims and evidence in documents</td>
<td></td>
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<tr>
<td>Lit: Strategies used by expert readers to construct arguments about the meanings of literary texts</td>
<td></td>
</tr>
</tbody>
</table>

### Illustrations/Examples

<table>
<thead>
<tr>
<th>Science</th>
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<th>Literature</th>
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<tbody>
<tr>
<td>Scientific knowledge is built by:</td>
<td></td>
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</tr>
<tr>
<td>- Developing coherent, logical explanations, models or arguments from evidence</td>
<td>- Sourcing</td>
<td></td>
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<tr>
<td>- Advancing and challenging explanations</td>
<td>- Contextualization</td>
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<tr>
<td>- Converging/corroboration of evidence</td>
<td>- Corroboration</td>
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<tr>
<td>- Comparing/integrating across sources (and representations)</td>
<td>- Questioning Inclusiveness (what perspectives are included or left out)</td>
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</tr>
<tr>
<td>- Evaluating sources and evidence</td>
<td>- Questioning Coherence</td>
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<tr>
<td></td>
<td>Infer from details within texts</td>
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<tr>
<td></td>
<td>- Plot sequence, causal links;</td>
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<td></td>
<td>- Motivations &amp; psychological states –</td>
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<td></td>
<td>- generalizations about how meanings are achieved rhetorically</td>
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<td></td>
<td>Draw on prior knowledge to interpret social milieu of text, intentionality, moral &amp; philosophical precepts</td>
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<td></td>
<td>Use the text to reflect on the human condition or the reader’s life</td>
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</tbody>
</table>

### Core Constructs

| Overarching Concepts, Themes, Frameworks, |
| Sci: Unifying or General Concepts and Themes |
| Hist: Ways in which historians interpret the world |
| Lit: Concepts and knowledge on which readers draw as they construct interpretations of literary texts, especially what dimensions of text or readers’ beliefs should take center stage in acts of interpretation |

<p>| Illustrations/Examples |</p>
<table>
<thead>
<tr>
<th>Science</th>
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</thead>
<tbody>
<tr>
<td>Unifying concepts that apply across scientific sub-disciplines (College Board Standards for College Success (2009) p. 1):</td>
<td></td>
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</tr>
<tr>
<td>- Evolution</td>
<td>*Categories of historical Study (e.g., Political, Social, Economic, Artistic, etc.)</td>
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<tr>
<td>- Scale</td>
<td>*Basic systems (e.g., feudalism, monarchy)</td>
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<tr>
<td>- Equilibrium</td>
<td>*Relationships among phenomena (e.g., Chance, Chronology, Contingency, Coincidence)</td>
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<tr>
<td>- Matter and energy</td>
<td>*Change over time</td>
<td></td>
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<tr>
<td>- Interaction</td>
<td>*Themes: organize content to make it meaningful (e.g., diversity of populations, migration, industrialization)</td>
<td></td>
</tr>
<tr>
<td>- Form and function</td>
<td>Moral and philosophical content</td>
<td></td>
</tr>
<tr>
<td>- Models and explanations, evidence and representations.</td>
<td>Archetypal themes</td>
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<tr>
<td></td>
<td>Historical contexts of settings and time period when the work was produced</td>
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<td></td>
<td>Traditions of critical theory</td>
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<tr>
<td></td>
<td>Reader Response,</td>
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<tr>
<td></td>
<td>Feminist, New Criticism,</td>
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<td></td>
<td>Black Aesthetic, Post Structuralism, etc.</td>
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</tr>
<tr>
<td></td>
<td>Inter-textuality – valuing relations among literary texts;</td>
<td></td>
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<tr>
<td></td>
<td>among literary texts and texts of literature, criticism, etc.</td>
<td></td>
</tr>
<tr>
<td>Core Constructs / Knowledge &quot;Buckets&quot;</td>
<td>Description</td>
<td></td>
</tr>
<tr>
<td>--------------------------------------</td>
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<td></td>
</tr>
<tr>
<td>Information Representation - Types of Texts</td>
<td>Sci/Hist: Prototypical ways of structuring/ presenting scientific/historical information Lit: Prototypical ways of structuring plots and kinds of prototypical protagonists. Principle guiding the text based on action, character or philosophical or moral thought?</td>
<td></td>
</tr>
</tbody>
</table>

**Illustrations/Examples**

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<thead>
<tr>
<th>Science</th>
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</thead>
<tbody>
<tr>
<td>*Text Structures suit purpose: (e.g., Cause/Effect/Correlation; Problem/Solution/Findings; Sequence/Process)</td>
<td>*Structure/Organization of Information w/in Text (e.g., Narrative, Expository, Desc.)</td>
<td>Plot structures (e.g., Coming of age, Science fiction, Fable, Satirical Works, Myth, Magical Realism, Allegory, Tragedy, Romantic Comedy)</td>
</tr>
<tr>
<td>*Multiple Representations (e.g., diagrams, equations, charts, tables, video, simul.)</td>
<td>*Media – (Traditional Print, Radio, TV, Video, Internet)</td>
<td>Character Types (e.g., Detective, Trickster, Western Hero, Epic Hero, Tragic Hero, Anti Hero, Picaresque Hero)</td>
</tr>
<tr>
<td>*Types of Sources/Genres; written for different audiences and purposes; has implications content and structure (e.g., raw data, bench notes, refereed journal articles,)</td>
<td>*Genre (e.g., Memoir, historical fiction, political map, data tables, blogs, etc.)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>*Sources (e.g., Primary, Secondary sources)</td>
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</tr>
</tbody>
</table>

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| Discourse/Language Structures | Sci: Prototypical conventions of science texts Hist: Ways of communicating author perspective. Lit: Rhetoric of Literature: How author’s selection and sequence of action, dialogue and description create an imaginary world into which the reader is invited through the manipulation of language |

**Illustrations/Examples**

<table>
<thead>
<tr>
<th>Science</th>
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<tbody>
<tr>
<td>*Science texts contain - distinctive grammatical structures (e.g., nominalizations &amp; passives) - technical and specialized expressions.</td>
<td>*Conventions of Chronology *Thematic &amp; topical conventions (political, ideological, social, economic/feudalism, monarchy, etc.) Conventions of -Where story begins and ends -Presenting Claims and Evidence in oral &amp; written forms (e.g., one-sided, two-sided arguments, multi-sided; refutational arguments)</td>
<td>Imagery to create a visual representation (e.g., description, metaphor, simile) Figuration: lang use to invite a figulative inter beyond literal (symbolism, irony, satire) Problems of point of view: who is speaking, authorial vs. narrative audience; relation of narrator to author pt of view (omniscient, unreliable, mult.) Rhetorical strategies and patterns (parallelism, contrast, repetition, etc.)</td>
</tr>
<tr>
<td>*Science discourse signals degree of certainty, gnrlzblty, and precision of statements. Argumentation is a scientific discourse practice in which evidence is used to support knowledge claims, and scientific principles and</td>
<td></td>
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</tr>
</tbody>
</table>
Connecting the Domain Analysis to C-I-A

Learning Objective: Close Reading

<table>
<thead>
<tr>
<th>Science</th>
<th>History</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Engage in close reading of a range of science representations; Identify, analyze and interpret scientific evidence in texts/sources including graphs, diagrams, models, exposition.</td>
<td>Engage in close reading of historical resources to construct domain knowledge, including primary, secondary, and tertiary sources.</td>
<td>Engage in close reading of literary texts to construct interpretation(s) of human experience based on types of plots, characters, use of language and rhetorical devices.</td>
</tr>
</tbody>
</table>
Learning Objective: Epistemology

<table>
<thead>
<tr>
<th>Science</th>
<th>History</th>
<th>Literature</th>
</tr>
</thead>
<tbody>
<tr>
<td>Demonstrate understanding of the epistemology of science through inquiry dispositions and conceptual change awareness/orientation; generate inquiry questions, monitor their changing conceptions through multiple encounters with text, tolerate ambiguity, seek “best understandings given the evidence.”</td>
<td>Demonstrate understanding of epistemology of history as inquiry into the past, seeing history as competing interpretations that are contested, incomplete approximations of the past, open to new evidence and new interpretations.</td>
<td>Demonstrate understanding that texts are open dialogues between readers and texts; literary works embody authors’ interpretations of some aspect of the human condition; authors make specific choices about language, images, symbols; patterns in language provide clues to messages/interpretations of literary works.</td>
</tr>
</tbody>
</table>

Connecting the Domain Analysis to C-I-A

Domain Analysis Disciplinary Constructs -- Knowledge and Practices ➔ Student Model: Learning Objectives ➔ Formative and Summative Assessment ➔ Evidence Framework ➔ READI Instructional Approach
**Intervention via Modules**

**INTERVENTION:** Major component of Project READi addresses challenges related to
- Teachers’ preparation to teach disciplinary practices as well as content
- Lack of instructional resources to support teaching/learning
  - EBA - materials and assessments, especially formative assessments.

**Create educative, instructional models of EBA**
- Reflect empirical evidence on EBA processes in disciplines
- Reflect realities of teaching and learning in classrooms.
- Focus teachers on deep principles that underlie EBAs so that the modules are generative

**Module Core Design Principles**

**Tasks**
- Authentic discipline-specific inquiry
- Draw on multiple texts
- Developmentally appropriate – learning sequences build requisite knowledge

**Participation structures & classroom discourse routines**
- Maximize student talk and effort
- Draw on everyday language practices and experiences
- Model and provide access to close attention to text, academic language, disciplinary discourse, metacognitive awareness

**Instructional tools**

**Formative Assessment Support**
Core Design Principles cont’d.

- Instructional Tools provide support and scaffolding for
  - engagement and content knowledge and activation of related experiences,
  - grappling with text,
  - disciplinary discourse frames and academic language
  - feedback on elements of task execution

- Formative assessments
  - make thinking visible in multiple means – oral (formal and informal), written, graphic, text annotations
  - provide feedback loops to guide instruction and goal setting

Module Architecture: Four Basic Parts

- Learning objectives/goals
  - What do we want students to know and be able to do?

- Tasks
  - What are we asking students to do? Is it aligned with the learning objectives? Is it engaging for students?

- Materials
  - What are the information resources (traditional print, static and dynamic visuals, video, etc.)? How are they sequenced? How do they relate to one another and to the task?

- Instructional supports
  - What are the classroom norms, participation structures, types of activities that support students’ learning?
**Student Learning Goals for Science**

1. Engage in close reading of a range of science representations; identify, analyze and interpret scientific evidence in texts/sources including graphs, diagrams, models, exposition

2. Synthesize evidence and information across multiple sources including graphs, diagrams, models, exposition

3. Construct, justify, and critique explanations and explanatory models of science phenomena from scientific evidence drawn from multiple sources and using science principles, frameworks, and enduring understandings

4. Demonstrate understanding of the epistemology of science through inquiry dispositions and conceptual change awareness/orientation; generate inquiry questions, monitor their changing conceptions through multiple encounters with text, tolerate ambiguity, seek “best understandings giving the evidence.”

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**Overview of Evidence-Based Argumentation Module for Science**

- **Problematize:** Goals of inquiry
  - Introduce dilemma/question/issue & Consequential Task
  - Elicit and build on students' experience, prior knowledge
  - Close reading of text set to introduce space of the problem, understand the arguments, positions

- **Research and Refine**
  - Investigate driving question
  - Close reading of additional text sets
  - Identify claims, relevant data, and scientific principles that warrant use of the data as evidence
  - An iterative process – as learn more through close reading, refine the claims, data and principles

- **Develop evidence-based position on the question**
  - Synthesize and Integrate across sources
  - Prepare and present representations of position

- **Address Consequential Task**
Methicillin-Resistant Staph *Aureus* MRSA (AKA Flesh Eating Disease)

• Over the next few weeks, we are going to be studying about a serious public health issue, an infection called MRSA. This infection has been studied by scientists for many years. The bad news is the infection can be deadly. The good news is it is almost entirely preventable IF you understand the science.

• Your job, over the course of this unit, is to make sense of the science, determine the best steps to prevent the spread of the infection, and share what you have learned with your community. Your knowledge may be your community’s best defense. Let’s get to work!

Inquiry Questions

• **Significance**: What is the scientific significance and relevance of Methicillin-Resistant Staphylococcus *Aureus* (MRSA) to me, my family, my community? Why should I or others care about MRSA?

• **Causation**: How is MRSA transmitted? How does MRSA infection occur? What caused MRSA to emerge and increase? Where did MRSA come from?

• **Prevention**: What can limit the risk of MRSA? How do we prevent MRSA from spreading? How do we reduce our own risk?
MRSA Text Set/Sequence

- Connie’s Story: A Nurse’s Personal Story with MRSA (video) http://webmm.ahrq.gov/perspective.aspx?perspectiveId=58
- Kansas City Teen Gets MRSA From Attempted Lip Piercing, Almost Dies http://www.foxnews.com/story/0,2933,354696,00.html#xzz1m0Zjip9B
- MRSA History http://mrsa-research-centerbsd.uchicago.edu/timeline.html
- Contagion movie trailer
- Superbug, Super-fast Evolution (excerpt) University of California Museum of Paleontology
- Battling Bacterial Evolution: The Work of Carl Bergstrom
- Natural Selection and Antibiotic Resistance (excerpt) Battling bacterial evolution: The work of Carl Bergstrom
- Modification by Natural Selection (excerpt) MODERN BIOLOGY by Holt, page 287
- Growth and Reproduction http://www.biologyreference.com/Ar-Bi/Bacterial-Cell.html#ixzz1RG7ByBLw
- The Success of Evolutionary Engineering Adapted from www.sciencemag.org SCIENCE VOL 293 7 SEPTEMBER 2001
Text Example

Antibiotic/Antimicrobial Resistance

Antibiotics and similar drugs, together called antimicrobial agents, have been used for the last 70 years to treat patients who have infectious diseases. Since the 1940s, these drugs have greatly reduced illness and death from infectious diseases. Antibiotic use has been beneficial and, when prescribed and taken correctly, their value in patient care is enormous. However, these drugs have been used so widely and for so long that the infectious organisms the antibiotics are designed to kill have adapted to them, making the drugs less effective. People infected with antimicrobial-resistant organisms are more likely to have longer, more expensive hospital stays, and may be more likely to die as a result of the infection.

Source: http://www.cdc.gov/drugresistance/index.html

Scaffolds and Tools

- Interactive Notebooks
- Gateway and cultural modeling activities
- Text Annotation Routines
- Note taking tools
- Concept/Vocabulary Development routines
- Metacognitive Routines
- Varied participation structures
- Discourse routines
Snapshots of Enactment of MRSA in Sixth Grade

- Annotation
  *Preceded by Teacher modeling active rdg strategy
  *Ss annotate on their own with rdg. strategy list introduced earlier
  *Next step: Share w/ partner, then class

Skyrockets is the 2nd text that Ss work with. It shows exponential growth of cases of MRSA found in Washington state. Connection to math class – rates of change

Share with Class

Develop questions about MRSA. Questions guide inquiry – return to throughout the module
Building knowledge of transfer, spread, and resistance

Two more questions were added: “Is it hard to kill? Is it strong?” These connect back to video viewed earlier that called MRSA a “superbug”.

Day 11: Students create models

• Ss synthesize the information they read in the texts to create a model of how MRSA becomes resistant.
  – The T provided the first “stage” based on consensus from the class that MRSA first begins with a cut or bruise
  – Then asked Ss to “fill out the rest of the steps”. Sample of Ss models are below.
Discussion of Models leads to further investigation thru reading

T asks student to explain this last part of the model and Student 2 indicates that the antibiotics kill all the bacteria. T asks other students whether they agree with Student 2. Another student says “but we know it doesn’t kill off all the bacteria”. Discussion continued and after much prompting from T one student says that they know it is resistant but they don’t know how it’s becoming resistant. This spurs the next phase of investigation and sets purpose for reading texts.
Netlogo Simulation of Peppered Moths

- Three days after the initial student models, T has students work with an analogy to development of resistance in MRSA:
  - Netlogo simulation of impact of pollution on proportions of light, medium, and dark peppered moths in the population.
  - Without pollution
  - With pollution
  - Students Compare how the proportions change within the moth population

Connecting the Domain Analysis to C-I-A

- Domain Analysis: Disciplinary Constructs -- Knowledge and Practices
- Student Model: Learning Objectives
- Formative and Summative Assessment
- Evidence Framework
- READI Instructional Approach
Evidence-Based Argumentation: pretest and posttest assessment in Science

- Explanatory causal model of a phenomenon
  - Skin Cancer (or Bleaching of Coral Reefs)
- Text set (5) that provides information students need to construct explanation of phenomenon
  - Adapted versions of authentic texts
  - No contradictory or conflicting information
  - Each text contains information important to building a complete and coherent model
  - Reflects traditional print, diagrams, pictures, graphs or tables
- Inquiry question probed in multiple item formats

Skin Cancer Explanatory Model
Task

One purpose of reading in science is to understand the causes of scientific phenomena; in other words, we read to understand how and why things happen. Today you will be reading about what causes some people in experience abnormal cell growth like skin cancer. You will have to piece together important information across multiple sources to construct a good explanation of how and why this happens. No single source will provide all of the important pieces of the explanation. Instead, you are the one making connections across sources and coming up with an explanation.

Your task is to read the following set of sources to help you understand and explain what leads to differences in the risk of developing skin cancer.

While reading, it is important to show your thinking by making notes in the margins or on the texts.

You will be asked to answer questions and see specific information from the sources to support your ideas and conclusions.

You can read the sources in any order you select. "Background: Skin Damage" first, because it gives general information on the topic.

Text Set

Skin Cancer Incidence by Latitude

![Graph showing skin cancer incidence by latitude](image)

\[ \text{Skin Cancer Incidence by Latitude} \]

Text Set

![Text Set image](image)

Text Set

![Text Set image](image)
Essay Task

Name: 
Date: 
School: 
Period: 

Writing task

Using this set of documents, write an essay explaining what leads to differences in the risk of developing skin cancer. Make sure to connect the ideas within your explanation to the differences in the risk of developing skin cancer. Be sure to use specific information from the documents to support your ideas and conclusions.


Multiple Choice Items

Name: 
Date: 
School: 
Period: 

Multiple Choice Items

Based on the documents you read, please select the option that best fits in the blanks to answer the questions: "explain what leads to differences in the risk of developing skin cancer."

1. People living near 0 degrees latitude experience _____ which leads to more UV radiation.
   A. increased ionization 
   B. increased UV radiation exposure 
   C. increased UV radiation exposure from the sun 
   D. increased UV radiation exposure from the sun

2. A more intense radiation will most likely lead to _____ which causes skin cancer.
   A. increased UV radiation exposure from the sun 
   B. increased UV radiation exposure from the sun 
   C. increased ionization of damaged cells 
   D. increased ionization of damaged cells

3. Tanning salon treatments that increase skin odor results in _____ which results in increases in skin cell damage.
   A. increased UV radiation exposure from the sun 
   B. increased ionization of damaged cells 
   C. decreased UV radiation exposure from the sun 
   D. decreased UV radiation exposure from the sun

4. An increase in UV radiation exposure causes _____ which leads to more severe outcomes.
   A. increased UV radiation exposure from the sun 
   B. increased ionization of damaged cells 
   C. increased UV radiation exposure from the sun 
   D. increased UV radiation exposure from the sun

5. Using the document labeled "Skin Cancer and Latitudes," it can be concluded that:
   A. more skin cancer occurs the farther north you are. 
   B. less skin cancer occurs the farther north you are. 
   C. rates of skin cancer are the same regardless of distance north. 
   D. there is no relationship between skin cancer and latitude.
Explanation Evaluation

**Explanation Evaluation task**

Below are explanations written by students for what leads to differences in the risk of developing skin cancer. Read the explanations and answer the questions that follow:

**Explanation 1.**

To understand what leads to differences in the risk of developing skin cancer, you have to understand that skin is our largest organ. The skin has many layers to it, so it's not surprising that there are a lot of things that can go wrong with it. Skin cancer is the most common skin disease. There are several types of skin cancer, and they are named after where they're most common. For example, skin cancer on the face is called basal cell carcinoma. If you are in the sun a lot, you are at a higher risk of skin cancer. If you are in the sun a lot, you are at a higher risk of skin cancer.

**Explanation 2.**

Skin cancer risk can differ depending on how close you are to the equator. The closer you are to the equator, the more direct sunlight exposure you will get. Direct sunlight exposure can increase the risk of skin cancer. For example, people who live in the equator region have more skin cancer than people who live in the northern hemisphere. When a person is really old, it makes it less likely that damaged skin cells will be removed, and this increases the risk of skin cancer. The fewer bad mutations you have, the less likely it is that you'll have trouble removing damaged skin cells, and this is good.

Considering the same question, what did the student do well in the explanation?

Considering the same question, what advice would you give the student for improving this explanation?

Explanatory Model Evaluation

**Explanatory Model Evaluation task**

Below are graphical models comparing two models of the process. Which graphical model shows the best explanation for what leads to differences in the risk of developing skin cancer?

**Model 1:**

- Sunlight exposure
- Skin cancer

**Model 2:**

- Sunlight exposure
- Skin cancer

Which model do you think is the model you learned in class?

Why do you think this model you learned is better?
Example of Annotated Text

**Skin Cancer**

Background: Skin Damage

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**Figure 1.** A representation of a section of healthy skin.

There are many skin disorders, conditions, and diseases. Of these, skin cancer is among the most frequent. Skin cancer is the most common form of cancer in the United States. Skin cancer is the uncontrolled growth of abnormal skin cells. The type of skin cancer that develops depends on which type of skin cell grows uncontrollably. Some forms are more common in areas not frequently exposed to the sun. Other forms are more common in areas frequently exposed to the sun.

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**Figure 2.** The open path is the sight of this patient's symptoms caused by a basal cell carcinoma.

Skin cancer has three main types: basal cell carcinoma, squamous cell carcinoma, and malignant melanoma. Together, basal and squamous cell carcinomas make up approximately 75% of skin cancers. Malignant melanoma occurs in approximately 5% of skin cancer cases. However, malignant melanoma causes the most deaths from skin cancer.

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Checking your skin for suspicious changes can help with detecting skin cancer at its earliest stages. Early detection of skin cancer gives you the best chance for successful treatment.

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Project’s Theory of Action/Change: Status

- **READI Intervention implementation** is proceeding at teacher as well as student levels – **RCT in 9th grade Science**
  - **READI Teacher Networks** are Professional Learning Communities
    - Teachers engage with texts, tasks, assessments, and student work to construct flexible knowledge of the **how** to support students acquisition of capacity to engage evidence-based argument
  - **Evidence-based Argument Instructional Modules**
    - Mediate the intervention for students
    - Serve as educative curricula for teachers in context of Teacher Networks
- The development and testing of instructional and assessment materials continues in all three disciplines
Year 5 Intervention Design & Examples of Student Measures

Semester – long Intervention

Module - 1  Module - 2  Module - 3
Pre  Post  Pre  Post  Pre  Post
Formative  Formative  Formative

Baseline Measures (September 2014):
• RISE
• Epistemology
• Self Efficacy
• EBA-pre

Outcome Measures (December 2014):
• GISA
• Epistemology
• Self Efficacy
• EBA-post

Year 5: Intervention Design & Examples of Teacher Measures & “Fidelity” Data

Semester – long Intervention

Module - 1  Module - 2  Module - 3
Observation  Observation  Observation

Baseline Measures (September 2014):
• Interview
• Knowledge
• Attitudes/Beliefs
• Practices (self-rpt)

Outcome Measures (December 2014):
• Interview
• Knowledge
• Attitudes/Beliefs
• Practices (self-rpt)
Domain-Based Models as Central Elements in Integrating C-I-A

Assessment

Domain-Based Models of Reading for Understanding

Curriculum  Instruction

Questions & Comments