Next Generation Science Standards (NGSS) + Common Core-ELA (CCSS-ELA):

Argumentation from Evidence and *The Hunger Games* (Bioethics)

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NEXT GENERATION SCIENCE STANDARDS

OFFICE OF LEARNING
INSTRUCTION · STANDARDS · ASSESSMENT & ACCOUNTABILITY
STUDENT ASSESSMENT UNIT

COMMON CORE STATE STANDARDS OREGON

OBJECTIVES

- Understand the interconnectedness of the Common Core State Standards (English Language Arts) for Literacy in Science and Technical Subjects with the Next Generation Science Standards (Practices: Engage in argument from evidence)
- Apply the Literacy in Science and Technical Subjects in both an ELA and a science classroom setting
- Obtain some practical cross-curricular lesson ideas that can be implemented into your own classroom and district
- How to assist students to go past their own opinion on a controversial topic and use a variety of research sources to assist them with constructing an argument (pro/con)

AGENDA

- 2014 Oregon Science Standards (NGSS) Adoption Update
- CCSS-ELA (Reading, Writing, Speaking/Listening and Research)
- 2014 Oregon Science Standards (NGSS) -Practices
- Commonalities Among the Practices in Science, Mathematics, English Language Arts
- Element of Argument from Evidence (ELA vs. Socio-Scientific)
- Smarter Balanced ELA Performance Tasks
- Sample Science/ELA (Curriculum Embedded) Task
- Questions

ASSESSMENT GUIDANCE

Criteria	
1. Clear Purpose	Why am I assessing?
2. Clear Learning Target(s)	What am I assessing?
3. Quality Assessment	How can I assess it well?
4. Proper Test Administration	How will I ensure test conditions do not interfere with a student's ability to perform well on a test?
5. Effective Communication of Results	How will I share results for maximum impact?

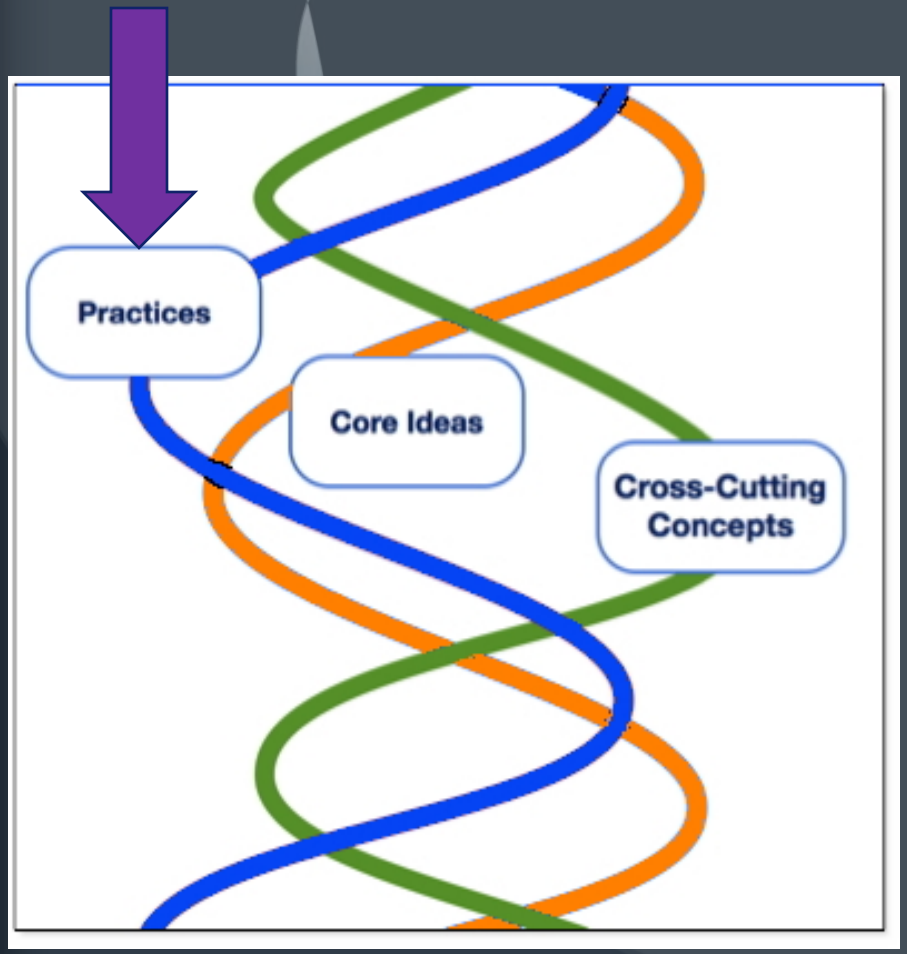
http://www.ode.state.or.us/go/LocalAssessmentGuidance

2014 Oregon Science Standards (Next Generation Science Standards)

- SBE adopted the 2014 Oregon Science Standards on March 6, 2014
- Adoption includes the grade level middle school science standards sequence (6, 7, and 8)
- Equip Rubric for Lessons and Units for Science is now available*
- 2009 Oregon Science Standards→ 2014 Oregon Science Standards Crosswalks for each grade level are available*
- Continue to use OAKS Science until a new science assessment that aligns to the new standards is developed and becomes operational in 2018-2019*

*http://www.ode.state.or.us/search/page/?id=4141

NGSS Architecture



- The NGSS are written as Performance Expectations
- NGSS require contextual application of the three dimensions by students.
- Focus is on how and why as well as what

Scientific and Engineering Practices

- Asking questions and defining problems
- Developing and using models
- Planning and carrying out investigations
- Analyzing and interpreting data

- Using mathematics and computational thinking
- Developing explanations and designing solutions
- Engaging in argument
- Obtaining, evaluating, and communicating information

Common Core State Standards

English Language Arts/Literacy Standards

- Anchor Standards and Grade Level Standards (Grade bands in high school: 9-10 and 11-12)
- Reading Foundational Skills in K-5
- Reading: Literature
- Reading: Informational Text
- Writing
- Speaking & Listening
- Language
- Literacy in History/Social Studies, Science, & Technical Subjects (Grades 6-12)

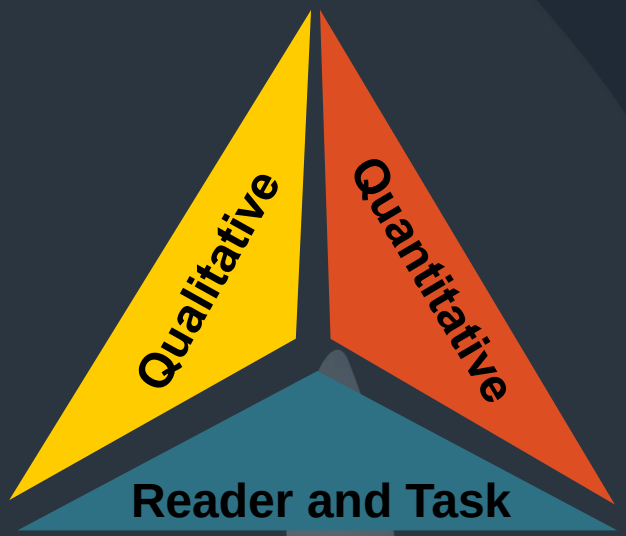
Key Shifts in the Common Core for ELA

1. Regular practice with complex texts and their academic language
2. Reading, writing, and speaking grounded in evidence from texts, both literary and informational.
3. Building knowledge through content-rich nonfiction.

Determining Text Complexity

Text complexity is defined by:

1. **Quantitative measures** – readability and other scores of text complexity often best measured by computer software.
2. **Qualitative measures** – levels of meaning, structure, language conventionality and clarity, and knowledge demands often best measured by an attentive human reader.
3. **Reader and Task considerations** – background knowledge of reader, motivation, interests, and complexity generated by tasks assigned often best made by educators employing their professional judgment.



Vocabulary Emphasis

Three "Tiers" of words: More to less frequently occurring; broader to narrower applicability

- Tier 1: Words of everyday speech, typically learned in early grades, not a challenge to native speakers
- Tier 2: General academic words; more likely in written text than speech; appear in all kinds of text; subtle or precise ways to say relatively simple things
- Tier 3: specific to domain or field of study; key to understanding a new concept; more common in informational text; often explicitly defined, repeatedly used, heavily scaffolded.

Literacy in Science and Technical Subjects

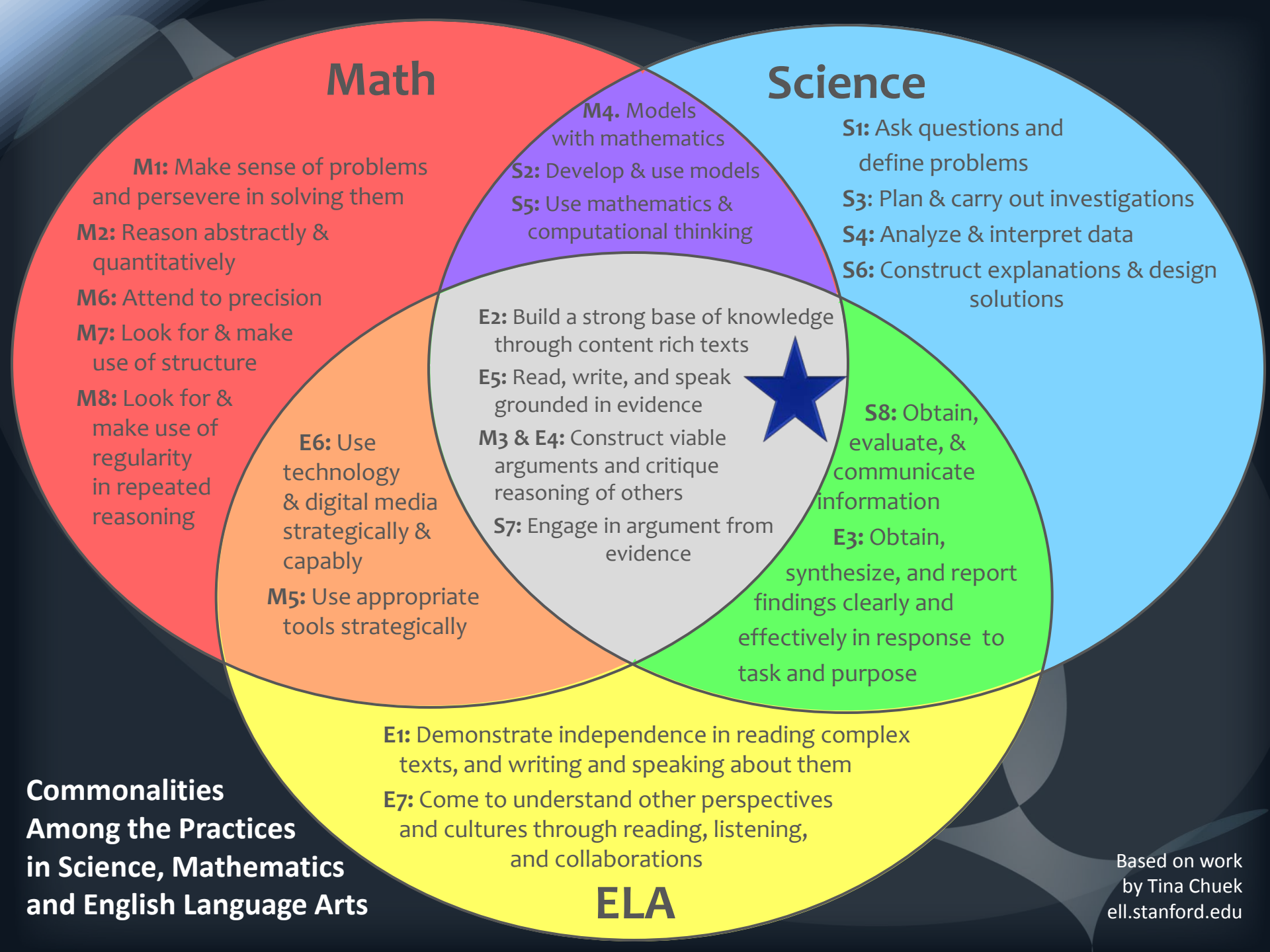
Reading Standards

- **Key Ideas and Details** (Citing textual evidence; determine central ideas/conclusions and summarize; follow multistep procedures and analyze results)
- **Craft and Structure** (Determine meaning of words/symbols; analyze structure of relationships; analyze the author's purpose)
- **Integration of Knowledge and Ideas** (Integrate/evaluate multiple sources of information; evaluate evidence and conclusions; synthesize information from a range of sources)
- **Range of Reading and Level of Text Complexity** (Read grade level text independently and proficiently)

Literacy in Science and Technical Subjects

Writing Standards

- **Text Types and Purposes** (Write arguments to support claims using evidence; write informative/explanatory texts)
- **Production and Distribution of Writing** (Produce clear and coherent writing; plan, revise, edit, rewrite)
- **Research to Build and Present Knowledge** (Short and sustained research projects; synthesize multiple sources; gather information and assess its quality; avoid plagiarism; appropriately cite sources; draw evidence)
- **Range of Writing** (Write routinely over various lengths or time frames for a variety of purposes and audiences)



Commonalities Among the Practices in Science, Mathematics and English Language Arts

Based on work by Tina Chuek
ell.stanford.edu

Argumentative Writing

Key Elements:

- Introduces a precise claim(s), distinguishes the claim(s) from alternate or ***opposing claims***
- Develops the claim(s) and counterclaims fairly, ***supplying data and evidence*** for each in a manner that anticipates the audience's knowledge level and concerns.
- Establishes and maintains a ***formal style and objective tone*** while attending to the conventions of writing.
- Provides a ***conclusion*** that follows from or supports the argument presented.

Developing socio-scientific arguments is complex; students must not only build sound arguments, but they must also draw on content knowledge and evidence from both science and ethics.

"Beyond My Opinion Versus Yours"-
The Science Teacher, January 2014

Socio-scientific argumentation and its connections to the *Next Generation Science Standards* and the Nature of Science.

Connections to the *NGSS*

- Scientific and Engineering Practice: Engaging in argument from evidence in 9–12 builds on K–8 experiences and progresses to using appropriate and sufficient evidence and scientific reasoning to defend and critique claims and explanations about the natural and designed world(s). Arguments may also come from current scientific or historical episodes in science.
  - Evaluate competing design solutions to a real-world problem based on scientific ideas and principles, empirical evidence, and logical arguments regarding relevant factors (e.g., economic, societal, environmental, ethical considerations).

Connections to the Nature of Science

- Science Is a Human Endeavor
  - Science is a result of human endeavors, imagination, and creativity.
- Science Addresses Questions About the Natural and Material World
  - Science and technology may raise ethical issues for which science, by itself, does not provide answers and solutions.
  - Science knowledge indicates what can happen in natural systems—not what should happen. The latter involves ethics, values, and human decisions about the use of knowledge.
  - Many decisions are not made using science alone but rely on social and cultural contexts to resolve issues.

"Beyond My Opinion Versus Yours"- The Science Teacher, January 2014

Why teach socio-scientific issues?

Teaching socio-scientific issues (SSIs) helps us not only meet the goals of equity and diversity described in *A Framework for K–12 Science Education* (NRC 2012) but also allows us to explicitly "bridge [our] diverse students' background knowledge and experiences to scientific knowledge and practices," as required by the *Next Generation Science Standards* (NGSS Lead States 2013, p. 6).

As demonstrated in this table, SSI lessons help us provide more equal opportunities for learning, allowing us to meet a number of often overlooked learning goals for *all* students.

Goals for all students	**Helping equalize opportunities to learn**
Address science-related choices students make now or in the near future.	Meaningfully relates science to "circumstances of [students'] own lives." (NRC 2012, p. 285)
Make interdisciplinary connections that situate science in the real world.	Cultivates students' participation as scientifically literate members of society.
Develop skills of investigation, argumentation, and critical thinking.	Encourages students to see themselves as "competent learners of science." (NRC 2012, p. 286)
Support thoughtful interpretations of others' ideas about science.	Provides a space to explore how students' cultures shape their ideas about nature.
Practice communication skills needed to learn science content in productive ways.	Recognizes diverse communication styles students use to make sense of science.
Encourage students to see the crucial roles that reading and writing play in science.	Promotes the iterative development of ideas characteristic of scientific work.

"Personalizing Science: Strategies for Engaging Diverse Students with Socio-Scientific Issues", The Science Teacher, January 2014

FIGURE 3

Elements of a strong socio-scientific justification.

Makings of a strong justification	Which means...
Decision	A position (claim) is clearly stated. The decision relates directly to the ethical question.
Facts	The facts and science content can be confirmed or refuted regardless of personal or cultural views. These can be used as evidence to support the claim.
Ethical considerations	Ethical considerations may include respect for persons, maximizing benefits and minimizing harm, and justice. These can serve as evidence to support the claim.
Stakeholder views	There are a variety of views and interests in the decision, and more than one individual or group will be affected by the outcome.
Alternative options and rebuttals	No one decision will satisfy all parties. A thorough justification considers strengths and weaknesses of various positions.
Reasoning and logic	A logical explanation that connects the evidence to the claim is provided.

"Beyond My Opinion Versus Yours"- The Science Teacher, January 2014

Performance Tasks: Smarter Balanced

- Require student-initiated planning, management of information and ideas, interaction with a variety of other materials
- Require production of extended responses, such as oral presentations, exhibitions, and other scorable products, including more extended writing responses which might be revised and edited
- Reflect a real-world task and/or scenario-based problem; tasks are multi-stepped and allow for reflection and revision
- Allow for multiple approaches to developing and organizing ideas
- Measure capacities such as depth of understanding, research skills, complex analysis, and identification/providing of relevant evidence
- Represent content that is relevant and meaningful to students

Performance Task Structure

Session 1: Classroom Activity

- Purpose is to "level the playing field" or "ground" students in the topic
- Introduce a stimulus or stimuli (article, film clip, recording, graphic, etc.)
- Allow time to view/read and reflect independently
- Divide into small groups for scripted small group activity
- Report out small group findings to full group

Performance Task Structure

Session 2: Consulting Resources and Scaffolding

- Read/review/reflect upon 3 to 5 resources related to the central topic; sources should represent a variety of perspectives and viewpoints
- Respond to several (suggested 2 or 3) scaffolding questions relating the resources which can be used in the culminating essay "full write."
- If time, begin planning/drafting of the "full write" argumentative or explanatory essay.

Performance Task Structure

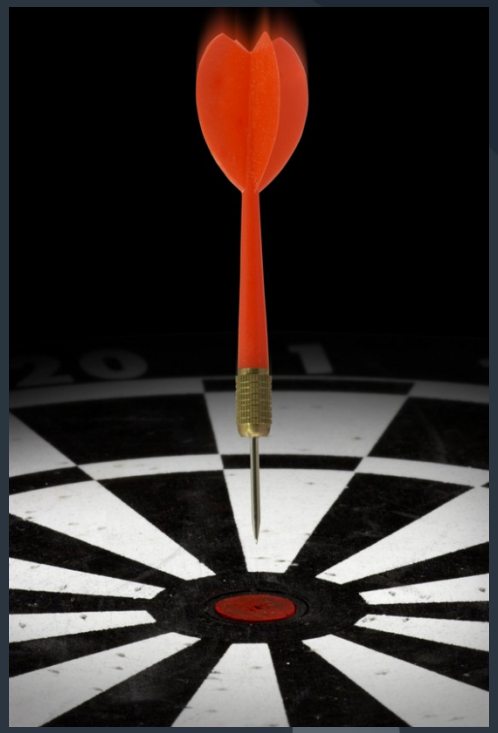
Session 3: Final Essay or "Full Write"

- Students should have continued access to the source materials through the writing process as well as to their responses to the scaffolding questions.
- Although students may be given a general topic or theme, they should develop their own thesis or topic statement.
- Essays should be multi-paragraph and draw directly from at least two or more of the source materials. Source attributions should be made within the student work.

Smarter Balanced Rubrics: Full Writes

Three Attributes

- **Purpose/Organization**
  (4-point scale)
- **Evidence/Elaboration**
  (4-point scale)
- **Conventions**
  (2-point scale)



*Individual attribute scores **contribute** to the overall score on the summative assessment.*

Smarter Balanced Rubrics: Purpose/Organization

Key Elements:

- Strong main idea or claim, and focus is maintained appropriate to audience and purpose
- Variety of transitions used to clarify relationships between and among ideas
- Introduction and conclusion are present
- Logical progression with strong connections; "syntactic variety"
- For argumentative mode, opposing arguments are acknowledged or addressed

Smarter Balanced Rubric: Evidence/Elaboration

Key Elements:

- Effective use of sources, facts and details as support for ideas or claims
- Effective elaboration of ideas using precise language (elaboration may include the use of personal experiences relevant to the main idea)
- References to sources are relevant and specific and effectively integrated into the essay
- Vocabulary is appropriate for the audience and purpose
- Style enhances content

Smarter Balanced Rubrics: Conventions

Key Elements:

- Correct sentence formation
- Correct capitalization
- Correct grammar/usage
- Correct spelling

Scoring is affected by:

- Variety or range of errors
- Severity of errors (Basic errors are more heavily weighted than higher-level errors)
- Density of errors (Proportion of errors to the amount of writing/length of the essay)

THE HUNGER GAMES

Sample ELA Performance Task

Argumentative:

The Hunger Games: Required Reading?

- Four Articles
  - Hunger Games: Ethics 101
  - Ethical Dilemma for the Reader/Viewer of The Hunger Games
  - The Moral and Ethical Issues of The Hunger Games
  - "The Hunger Games": A Glimpse of the Future?
- Three Scaffolding Questions

Sample ELA Performance Task

Informational/Explanatory:

The Hunger Games and Reality Television

- Four Articles
  - *The Hunger Games* and Reality Television
  - Why America Loves Reality TV
  - TV Contestants: Tired, Tipsy and Pushed to the Brink
  - Why Reality TV is the New Family TV
- Three Scaffolding Questions

Sample Classroom Activity

Explanatory/Informational Task for *The Hunger Games*

1. Divide into groups
2. View video clip
3. Complete chart
4. Report out
5. Full group discussion

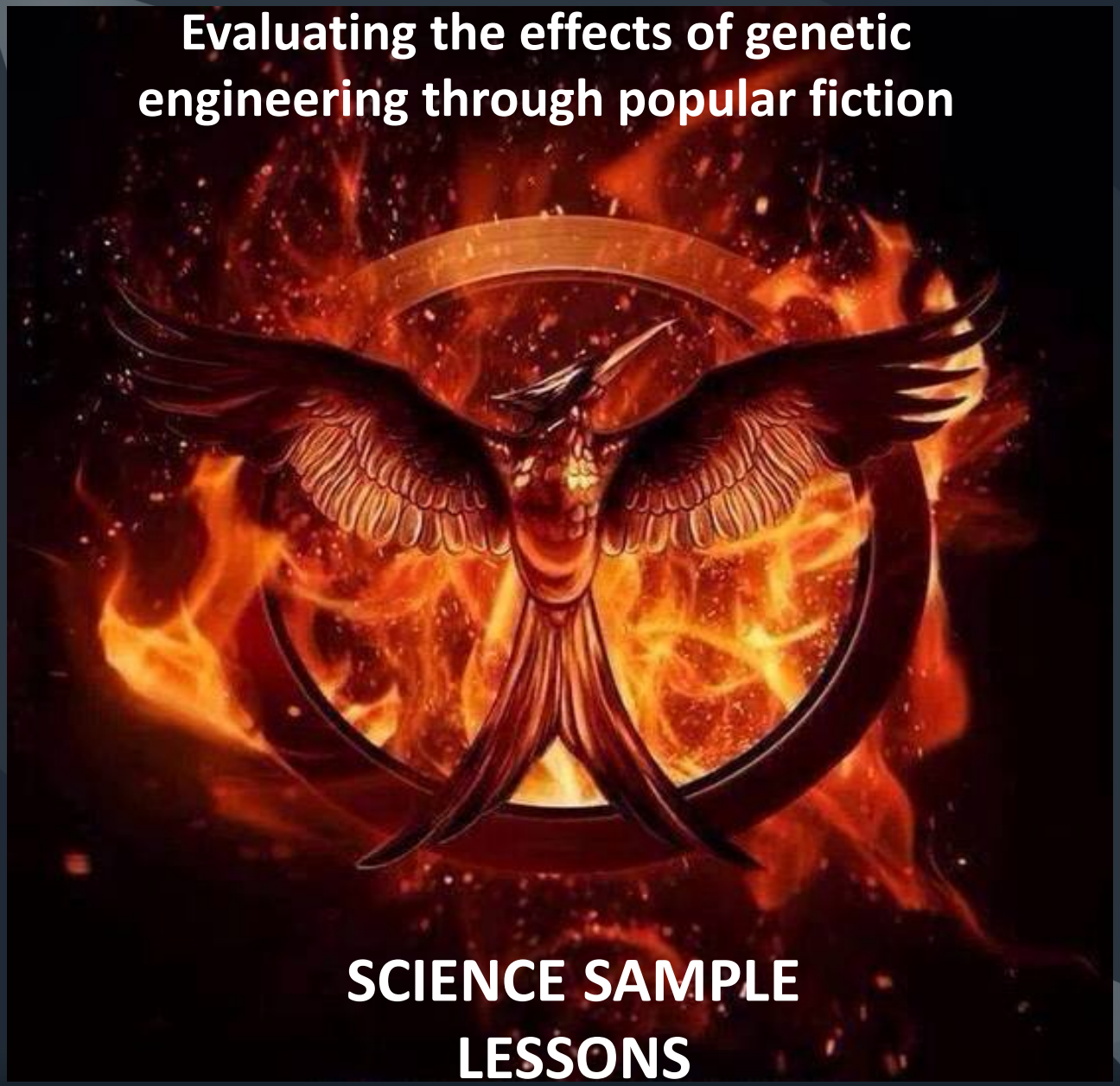
Class Activity Video Clip

Sample Classroom Activity Response

Survivor	• locale is usually outdoors, exotic locations • cameras catch "private" conversations • competitors are eliminated, one by one • to avoid elimination, alliances are formed • often the winner is the one who plays the game best—by lying, cheating, manipulating
Big Brother	• cameras capture the competition; available for viewing 24 hours • competitors are eliminated one by one • producers insert elements to "spice up" the competition • to avoid elimination, alliances are formed • care packages are sent by "patrons" from outside • ceremonial dimming of the lights as each contestant is eliminated

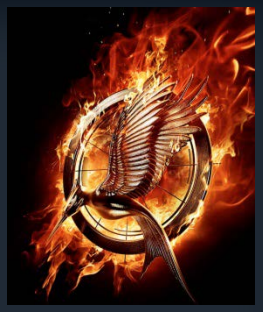
BIOETHICS IN THE HUNGER GAMES:

Evaluating the effects of genetic engineering through popular fiction



SCIENCE SAMPLE LESSONS

Lesson Plan(s)



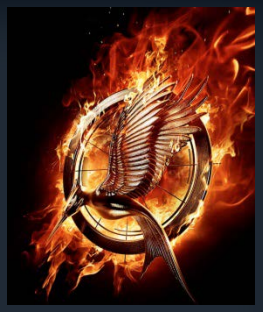
Day 1: Read Excerpt from *The Hunger Games* about mockingjays. Prior Knowledge Assignment (Questions)
Small Group Discussion
Large Group Discussion

Days 2-3: Students conduct internet research to address a subset of questions related to bioethics and genetic engineering.

Days 4-5: Students present their final arguments in a roundtable format addressing the following prompts:
Consider how responsible Panem was in genetically engineering the jabberjays and tracker jackers. Defend and argue your position on genetic engineering with regard to bioethics.

Formulate a plan the United States should have in place to make sure the genetic engineering done here is ethical.

Jigsaw Activity



*What is genetic engineering (GE)?

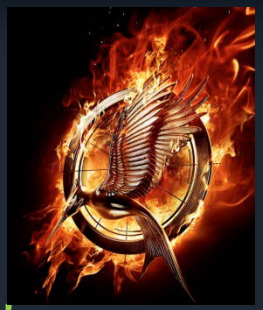
*How does the biology in *The Hunger Games* relate to our lives in America?

*Why did the leaders in Panem create only male jabberjays? How did this plan backfire? Do you see any parallels with actual genetically modified organisms?

*In what fields and for what purposes do you think GE is used today?

*Describe the pros/cons of genetic engineering

Roundtable Discussions



In the final phase of the project (estimated two days), students present their final arguments in a roundtable format addressing the following prompts:

- Consider how responsible Panem was in genetically engineering the jabberjays and tracker jackers. Defend and argue your position on genetic engineering with regard to bioethics.

- Formulate a plan the United States should have in place to make sure the genetic engineering done here is ethical.

Roundtable presentation instructions and rubric.

One way that scientists communicate—an essential part of scientific inquiry—is by holding roundtable sessions. Scientists present their findings, then other scientists ask questions and offer suggestions for future research. Our class roundtable discussion will cover the theme: "Bioethics in *The Hunger Games:* Evaluating the Effects of Genetic Engineering Through Popular Fiction." Guidelines:

1. Divide into groups of three.
2. Individuals take turns giving five-minute presentations of their topic, addressing scaffolded assessment prompts (Figure 1, p. 32), discussing sources, describing connections to data-driven research, and offering a clear conclusion or recommendation. You may use one index card with bulleted points, but you may not read the presentation from printed text.
3. Next, the presenter answers questions from other students at the table for about five minutes. The other students should also make suggestions and provide feedback. Note: This should be done in a critical but collegial way. The focus should be on helping people to see connections in a different way, not attacking what they think.
4. The instructor moves from group to group asking questions as well. In this way, each student is assessed individually on the ability to present, discuss, and answer questions about the topic.

RUBRIC

Name of student:_____

Discussion of issue (addressing prompts, discussion of sources, connections to data-driven research, and clear conclusion/recommendation):

0 5 10 15 20

Ability to answer related questions posed by peers:

0 5 10 15 20

Contribution to overall discussion/asking others questions, offering suggestions/feedback:

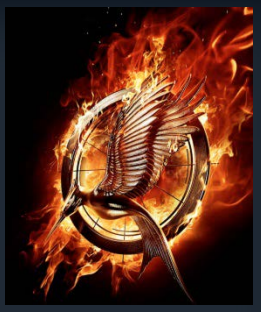
0 5 10 15 20

Overall professionalism (clarity, enunciation, eye contact, listening to others)

0 5 10 15 20

Comments:

Performance Task: Genetic Engineering: Bioethics of the Hunger Games

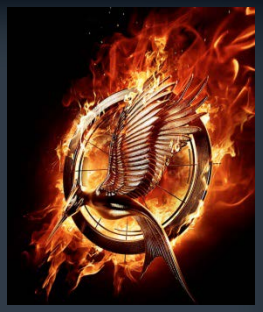


Male Jabberjay
(Genetically Engineered)

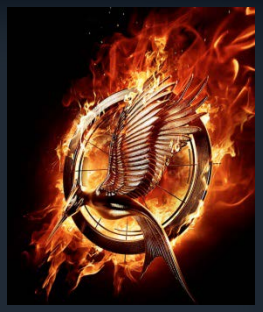
Female Mockingbird (Wild Type)

Mockingjay (Hybrid)

Performance Task Template (Part 1)



- Classroom Component:
- -Two Videos
- -Q/A Session
- Source #1: D.I.Y. Biology, on the Wings of the Mockingjay
- Source #2: Controversial Deadly Bird Flu Research Finally Published
- Source #3: Amateurs Are New Fear in Creating Mutant Virus
- Source #4: Genetic Engineering Today: The Promise and the Ethics
- 3 Questions Pertaining to the Sources



Performance Task (Part 2)

Based on the articles that you have researched and read, determine whether or not the United States should ban the future use of genetic engineering. Write an argumentative essay that takes a clear position, using material from the articles you have read as support. Be sure that your recommendation acknowledges both sides of the issue so that people know that you have considered this recommendation carefully.

Questions

Resources

Next Generation Science Standards (Achieve):
http://www.nextgenscience.org

Next Generation Science Standards (Achieve) Resources:
http://www.nextgenscience.org/resources

2014 Oregon Science Standards Webpage:
http://www.ode.state.or.us/search/page/?id=4141

Smarter Balanced Assessment Consortium:
http://www.smarterbalanced.org/

Smarter Balanced Practice Tests (Math and ELA Performance Tasks + Rubrics): http://sbac.portal.airast.org/practice-test/resources/

Smarter Balanced Achievement Level Setting Opportunity

- Educators, parents, business leaders, and other interested parties are invited to participate online.
- Participants will take selected English or Math tests and recommend achievement level scores.
- Register at http://www.smarterbalanced.org/onlinepanel by September 19th, 2014 to participate.
- Visit the Smarter Balanced website at www.smarterbalanced.org to learn more about the online panel.
- Please spread the word! We want as many Oregonians involved as possible!

Contacts

For 2009/2014 Oregon Science Standards(NGSS) related questions, please contact Jamie Rumage (jamie.rumage@state.or.us)

For OAKS Science and local performance assessment related questions, please contact Rachel Aazzerah (rachel.aazzerah@state.or.us)

For ELA assessment and work sample related questions, please contact Ken Hermens (ken.hermens@state.or.us)