

# Ethics of Genetic Testing and Bio-Engineering

★ TASK ★ LADDER

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Students create an editorial on the ethics of genetic testing. Which will allow them to interact more deeply with the ethical responsibilities due to the advancements in technology.

This LDC module was designed to be embedded within a genetics unit. Before this module, students will engage in lessons about heredity of traits, Punnett squares, genetic mutations, natural selection, analyzing data and evaluating patterns of inheritance.

These prior lessons will help students understand the big ideas.

- Characteristics of an organism are controlled by genes which may be inherited by offspring.
- DNA changes in population over time and causes variation
- Traits appear in two forms: dominant and recessive

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# Section 1: What Task?

#### Teaching Task

#### Task Template 2 - Argumentation

What role should ethics play in genetic testing? After reading informational texts addressing a selected topic write an editorial that addresses the question and support your position with evidence from the text(s). Be sure to acknowledge competing views. Give examples from past or current events or issues to illustrate and clarify your position.

#### Standards

# *Common Core State Standards for English Language Arts & Literacy in History/Social Studies, Science, and Technical Subjects*

### CCR.R.1

Read closely to determine what the text says explicitly and to make logical inferences from it; cite specific textual evidence when writing or speaking to support conclusions drawn from the text.

### CCR.R.2

Determine central ideas or themes of a text and analyze their development; summarize the key supporting details and ideas.

# CCR.R.4

Interpret words and phrases as they are used in a text, including determining technical, connotative, and figurative meanings, and analyze how specific word choices shape meaning or tone.

# CCR.R.7

Integrate and evaluate content presented in diverse media and formats, including visually and quantitatively, as well as in words.

# CCR.R.10

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

# CCR.W.1

Write arguments to support claims in an analysis of substantive topics or texts, using valid reasoning and relevant and sufficient evidence.

# CCR.W.4

Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.

# CCR.W.5

Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach.

# CCR.W.9

Draw evidence from literary or informational texts to support analysis, reflection, and research.

# CCR.W.10

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

#### Custom Standards

### RST.6-8.1

Cite specific textual evidence to support analysis of science and technical texts.

# RST.6-8.2

Determine the central ideas or conclusions of a text; provide an accurate summary of the text distinct from prior knowledge or opinions.

# RST.6-8.4

Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 6?8 texts and topics.

# RST.6-8.5

Analyze the structure an author uses to organize a text, including how the major sections contribute to the whole and to an understanding of the topic.

#### Next Generation Science Standards

Students who demonstrate understanding can:

### MS-LS4-5

Gather and synthesize information about the technologies that have changed the way humans influence the inheritance of desired traits in organisms.

#### Texts

% To Stop Crimes, share your genes. CODIS New York Times article. (student)

% My Medical Choice. Angelina Jolie opinion about her choice. (student)

**Seeking your genetic information pros and cons. Great resource for struggling students.** (student/teacher)

**6** Genetic Testing. University of Illinois college of MedicineOverview and good probing questions. (student/teacher)

**Solution** Cracking Your Genetic Code. Link to NOVA movie (additional activities to accommodate the movie are in uploaded resources). (teacher)

- Predisposed Genetic Testing articles .docx
- http://www.commonscience.com/states/accommonscie
- The DNA Dilemma.docx

Focus

- **DNA Profiling and CODIS Article.docx**
- B DNA and CODIS Solve Decade Old Crime Missing and Exploited Children.pdf
- Genetic Ethics Videos-3.docx
- designer\_baby\_articles\_modified V2.docx

### Student Work Rubric - Argumentation Task - Grades 6-8

	Emerging	Approaches Expectations	Meets Expectations	Advanced
	1	2	3	4
Controlling Idea	Makes an unclear or unfocused claim.	Makes a <b>general</b> claim <b>that</b> addresses the prompt, with an <b>uneven focus</b> .	Establishes and maintains a clear claim that addresses all aspects of the prompt.	Establishes and maintains a clear, specific, and credible claim that addresses all aspects of the prompt.
Selection & Citation of Evidence	Includes minimal details from sources. Sources are used without citation.	Includes details, examples, and/or quotations from sources that are relevant to the claim. Inconsistently cites sources.	Includes details, examples, and/or quotations from sources that are relevant to the claim and supporting ideas. Consistently cites sources with minor formatting errors.	Includes well-chosen details, examples, and/or quotations from sources that support the claim and supporting ideas. Consistently cites sources using appropriate format.
Development / Explanation of Sources	Explanation of ideas and source material is irrelevant, incomplete, or inaccurate.	Explanation of ideas and source material is <b>minimal</b> or <b>contains minor errors</b> .	Accurately explains ideas and source material and how they support the argument.	Thoroughly and accurately explains ideas and source material, using reasoning to support and develop the argument.
Organization	Lacks an evident structure. Makes unclear connections among claim, reasons, and evidence.	Groups ideas and uses some transitions to connect ideas, with some lapses in coherence or organization.	Groups and sequences ideas to develop the controlling idea. Uses transitions to clarify the relationships among claim(s), reasons, and evidence.	Groups and sequences ideas logically to develop the controlling idea and create cohesion. Uses varied transitions to clarify the relationships among claim(s), reasons, and evidence.
Conventions	Major errors in standard English conventions interfere with the clarity of the writing. Language or tone is inappropriate.	Errors in standard English conventions sometimes interfere with the clarity of the writing. Uses language and tone that are sometimes inappropriate for the audience and purpose.	Consistently applies standard English conventions; minor errors, while noticeable, do not interfere with the clarity of the writing. Uses language and tone appropriate to the audience and purpose.	Consistently applies standard English conventions, with few errors. Demonstrates varied syntax and precise word choice. Consistently uses language and tone appropriate to the audience and purpose.
Content Understanding (Generic)	Attempts to include disciplinary content in explanation or argument but understanding of content is weak; content is irrelevant, inappropriate, or inaccurate.	Briefly notes disciplinary content relevant to the prompt; shows basic or uneven understanding of content; minor errors in explanation.	Accurately presents disciplinary content relevant to the prompt with sufficient explanations that demonstrate understanding.	Integrates relevant and accurate disciplinary content with thorough explanations that demonstrate in-depth understanding.

#### **Background for Students**

You are a journalist for a Science Scholar Magazine, a monthly periodical that presents facts and opinions about current events and trends in the science community. The next edition will highlight ethical decision-making in science, and will be titled "Genetic Testing: Just because we Can, does it mean we Should?"

Your task for this month's magazine is to research current topics in genetics and write an editorial that addresses the following questions: What role should ethics play in (insert topic of genetics you are researching)? For example: What is the role of ethics in genetically engineering "Designer Babies?"

When you write your editorial, be sure to use evidence and examples from research to support your claims and reinforce your position. Address any opposing viewpoints. A fabulous research based editorial on controversial topic should allow our magazine to receive national recognition and increased sales.

Extension

Not provided

# Section 2: What Skills?

#### Preparing for the Task

**TASK ANALYSIS**: Ability to understand and explain the task's prompt and rubric and build connections to the task and content to existing knowledge, skills, experiences, interests, and concerns.

#### **Reading Process**

ACTIVE READING: Ability to identify the central point and main supporting elements of a text; identify and analyze competing arguments; and make clarifying connections and provide examples.
 ESSENTIAL VOCABULARY: Ability to identify and master terms essential to understanding a text.

ACADEMIC INTEGRITY: Ability to use and credit sources appropriately.

**NOTE-TAKING AND ANNOTATION**: Ability to select important facts and passages relevant to the task for use in one's own writing.

#### Transition to Writing

BRIDGING CONVERSATION: Ability to link reading to writing task.

#### Writing Process

**POSITION:** Ability to establish a position.

**PLANNING**: Ability to develop a line of thought and text structure appropriate to an argumentation task. **DEVELOPMENT**: Ability to construct an initial draft with an emerging line of thought and structure.L2 Analyze competing arguments. L3 Make clarifying connections and/or provide examples.

**REVISION**: Ability to refine text, including line of thought, language usage, and tone as appropriate to audience and purpose.

**EDITING**: Ability to proofread and format a piece to make it more effective.

**COMPLETION:** Ability to submit final piece that meets expectations.

# Section 3: What Instruction?

PACING	SKILL AND DEFINITION	PRODUCT AND PROMPT	SCORING GUIDE	INSTRUCTIONAL STRATEGIES
Preparin	ng for the Task			
1 hr	TASK ANALYSIS: Ability to understand and explain the task's prompt and rubric and build connections to the task and content to existing knowledge, skills, experiences, interests, and concerns.	ESSENTIAL QUESTION ENGAGEMENT Observe the bird-dog picture and analyze the statement "Just because we can, does it mean that we should?". Write your observations and analysis below:	Student meets expectations if he/she does the following: No Scoring	Introduce the article "Thinking ethically: a guide to moral decision making." http://www.scu.edu/ethics/practicing/decision/thinking.htmlEthics Approach JigsawAssign students to 5 groups, each group becomes a specialist on one of the 5 approaches to ethics. Each student in the group is responsible for taking notes that will allow him/her to present information to jigsaw peers. After a few minutes, teacher will assign each student to a new group that includes 1 person from each specialist group. Each person will have 2 minutes to present their ethical approach to their group. Allow time for questions. Students are responsible for taking short notes during each peer presentation. Teacher will have 5 approaches to ethics posted in the classroom (individual poster paper). Students will write their names on a post-it, and place it on the poster that best matches the ethical approach by which they operate. Pacing: 1 hour
	Additional Attachment Sethics Article line SApproachesto BirdDog.docx	nts: k and Jigsaw Directions thicsJigsaw.pdf		
20 mins	TASK ANALYSIS: Ability to understand and explain the task's prompt and rubric and build connections to the task and content to existing knowledge, skills, experiences, interests, and concerns.	DECONSTRUCTING THE RUBRIC & EVALUATE COMMAND TERMS Read and reflect what proficiencies are needed to achieve a "meets expectations" score (3), or higher, on each section of the rubric.	Student meets expectations if he/she does the following: Student highlights, or underlines on rubric.	Pass the argumentative rubric to students. As a class discuss each category under the "meets expectations" (3) column. Have students read and reflect on what proficiencies are needed to achieve a "meets expectations" score (3), or higher, on each section of the rubric. Bring attention to key vocabulary on the rubric using underlining, or highlighting strategies. Pacing: 20 minutes
	Additional Attachments: Command Terms			
1 hr	TASK ANALYSIS: Ability to understand and explain the task's prompt and rubric and build connections to the	WHAT IS AN EDITORIAL? Define what an editorial is, identify attributes of an editorial, read examples and analyze text as a whole group.	Students actively engage in activity. Exit Slip: How is an editorial different from other types of news articles?	<ul> <li>Editorials are meant to influence public opinion, promote critical thinking, and sometimes cause people to take action on an issue. In essence, an editorial is an opinionated news story.</li> <li>Review attributes of an editorial</li> <li>With the whole group, model locating the attributes in an example editorial. Give students editorial examples, which can be differentiated according to needs. Students identity</li> </ul>

	task and content to existing knowledge, skills, experiences, interests, and concerns. Additional Attachment % What is an editor	nts: ial?		<ul> <li>attributes of the editorial and share in small groups with the same editorial.</li> <li>Pick example editorials that will engage students. For example: year round school editorials.</li> </ul>			
Reading	Reading Process						
1 hr and 35 mins	ACTIVE READING: Ability to identify the central point and main supporting elements of a text; identify and analyze competing arguments; and make clarifying connections and provide examples.	SHORT CONSTRUCTED RESPONSE Complete a graphic organizer for each article. "What is the author's claim? Identify text elements that illustrate this." L2 "What competing arguments (counterclaims) across the texts have you encountered or can you think of?"L3 "What historical or current examples can you note that relate to the task prompt?"	Student meets expectations if he/she does the following: • Answers questions with credible responses and supporting elements from the texts/images.	<ul> <li>Students will choose one of the following topics: designer babies, CODIS, or predisposed genetic disorders.</li> <li>Students read and analyze documents - Have students complete the attached graphic organizer for each article Have students use the guiding questions to reflect on the readings Students reflect and find evidence within the article on the author's claim Students also reflect and find evidence of any counter claimsStudents complete the organizer by giving two supports of their claim based on evidence from the article.</li> <li>Pacing: 2 days</li> </ul>			
Additional Attachments: graphic organizer-CODIS.pdf graphic organizer-Predisposed genetic disord graphic organizer-designer babies.pdf		orders .pdf					
1 hr	ESSENTIAL VOCABULARY: Ability to identify and master terms essential to understanding a text.	KEY UNIT VOCABULARY Vocabulary list:"In your notebook, list and define words and phrases that challenge your understanding of the text/s."	<ul> <li>Student meets expectations if he/she does the following:</li> <li>Completes mini-task.</li> <li>Provides accurate definitions and/or explanations.</li> </ul>	<ul> <li>Throughout the unit students will engage with key vocabulary terms.</li> <li>Make pictorial representations or use graphic organizers to illustrate vocabulary terms (e.g. word mapping)</li> <li>Write definitions in their own words</li> </ul>			
	Additional Attachments:						
30 mins	ACADEMIC INTEGRITY: Ability to use and credit sources	SHORT CONSTRUCTED RESPONSE Definition and	Student meets expectations if he/she does the following:	<ul> <li>Discuss respect for others' work to assemble evidence and create texts.</li> <li>Discuss academic penalties for stealing others thoughts and words.</li> </ul>			

	appropriately.	strategies:"Explain why plagiarism is a problem and list ways to avoid it."	<ul> <li>Proper use and credit of sources.</li> <li>Explain several appropriate strategies to avoid plagiarism.</li> </ul>	<ul> <li>Instruct students on proper citation of sources used.</li> </ul>
	Additional Attachmer	nts:		
	% Plagiarism video	link		
40 mins	NOTE-TAKING AND ANNOTATION: Ability to select important facts and passages relevant to the task for use in one's own writing.	CLOSE READING STRATEGIES FOR ANALYZING TEXT Notes and Annotation:"For each text, take notes and/or annotate elements relevant to the task. Make sure you have the information to do a citation when needed to avoid plagiarism."	<ul> <li>Student meets expectations if he/she does the following:</li> <li>Identifies relevant elements – facts, quotes, explanations.</li> <li>Includes necessary citation information to support facts, questions, etc. (for example, page numbers for a long text, clear indication when quoting directly.</li> </ul>	<ul> <li>Teach or review strategies for note taking and/or annotation</li> <li>Check that early student work is in the assigned format (or in another format that gathers the needed information effectively).</li> </ul>
Transiti	on to Writing			
30 mins	BRIDGING CONVERSATION: Ability to link reading to writing task.	STUDENT DISCOURSE ABOUT TEXT "Review the task and identify key points and information from your texts/images that will help you address the task."	Student meets expectations if he/she does the following: No Scoring	<ul> <li>Review the task.</li> <li>Discussion-based strategies, such as seminar.</li> <li>Small group discussion using teaching task.</li> </ul>
Writing	Process			
30 mins	<b>POSITION</b> : Ability to establish a position.	SHORT CONSTRUCTED RESPONSE Position statement:"Write 1-3 sentence position statement which establishes the focus and purpose of your work."	Student meets expectations if he/she does the following: • Writes a concise summary statement or draft opening that: - Provides	<ul> <li>Offer several examples of position statements.</li> <li>Ask class to discuss what makes them strong or weak.</li> <li>Review the list that students created earlier to identify needed elements from skills cluster 1.</li> </ul>

			<ul> <li>direct answer to main prompt Establishes claim or position for the paper.</li> <li>Identifies key points that support development of argument.</li> </ul>	
1 hr	PLANNING: Ability to develop a line of thought and text structure appropriate to an argumentation task.	OUTLINE Outline/organizer:"Create an outline based on your notes and reading in which you state your position, sequence your points, and note your supporting evidence."L2 "Include competing argument(s)."L3 "Include at least 3 example(s) of historical or current connections to topic/issue."	<ul> <li>Student meets expectations if he/she does the following:</li> <li>Creates an outline or organizer.</li> <li>Supports opening position.</li> <li>Uses evidence from texts read and images analyzed earlier with appropriate citations.L2 Identifies competing argument(s).L3 Provides appropriate number of sound connections.</li> </ul>	<ul> <li>Provide and facilitate using an argumentative editorial paper organizer.</li> <li>Invite students to generate questions in pairs about how the format works, and then take and answer questions.</li> <li>Pacing: 30 minutes</li> </ul>
	Additional Attachmen	nts: litorialWritingOutline20150	1430-3-13g4q1c[1] V2	2.pdf
1 hr and 30 mins	<b>DEVELOPMENT:</b> Ability to construct an initial draft with an emerging line of thought and structure.L2 Analyze competing arguments. L3 Make clarifying connections and/or provide examples.	LONG CONSTRUCTED RESPONSE Initial Draft:"Write an initial draft complete with opening, development, and closing; insert and cite textual evidence."L2 "Identifies competing argument(s)."L3 "Provides appropriate number of sound connections."	<ul> <li>Student meets expectations if he/she does the following:</li> <li>Provides complete draft with all parts.</li> <li>Supports the stated position with evidence and citations in each section.</li> </ul>	<ul> <li>Encourage students to re-read prompt partway through writing, to check that they are on-track.</li> <li>Work with students on a logical, reasoned organization of the paper.</li> <li>Ask students to provide their reasons for the organization of their paper.</li> <li>Provide students with an opportunity to do peer review on each other's work Reference the Emotional and Social Wellness standards in the "Teacher Work Section" for establishing guidelines in the development of a safe, inclusive work environment.</li> </ul>
25 mins	<b>REVISION</b> : Ability to refine text, including line of	LONG CONSTRUCTED RESPONSE - AUTHOR EDIT	Student meets expectations if he/she does the	<ul> <li>Timely feedback and conferencing</li> <li>Feedback balances support for strengths and clarity about weaknesses.</li> </ul>

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		thought, language usage, and tone as appropriate to audience and purpose.	Multiple Drafts:"Use strategies which refine the work's logic, reasoning, and organization of ideas/points. Use textual evidence carefully, with accurate citations. Decide what to include and what not to include."	<ul> <li>following:</li> <li>Provides complete draft with all parts.</li> <li>Supports the opening in the later sections with evidence and citations.</li> <li>Improves earlier edition.</li> </ul>	<ul> <li>Peer review to provide each other with feedback on strengths and weaknesses of the paper Reference the Emotional and Social Wellness standards in the "Teacher Work Section" for establishing guidelines in the development of a safe, inclusive work environment.</li> </ul>	
4	!0 mins	EDITING: Ability to proofread and format a piece to make it more effective.	LONG CONSTRUCTED RESPONSE - PEER EDITING Correct Draft:"Revise draft to have sound spelling, capitalization, punctuation and grammar. Adjust formatting as needed to provide clear, appealing text."	<ul> <li>Student meets expectations if he/she does the following:</li> <li>Provides draft free from distracting errors.</li> <li>Uses format that supports purpose.</li> </ul>	<ul> <li>As a class discuss the purpose and how to effectively peer edit</li> <li>Briefly review selected skills that many students need to improve.</li> <li>Teach a short list of proofreading marks.</li> <li>Assign students to proofread each other's texts a second time using the rubric as a guide.</li> </ul>	
		Additional Attachments:				
		PeerEditingReviewSheet V2] .pdf				
3	85 mins	<b>COMPLETION:</b> Ability to submit final piece that meets expectations.	LONG CONSTRUCTED RESPONSE - FINAL Final Work:"Turn in your complete set of drafts, plus the final version of your work."	Student meets expectations if he/she does the following: • Submits final work for evaluation.	Not Provided	

#### Instructional Resources

#### **Teacher Resource**

- Genetic Ethics Videos-3.docx
- GeneticsUnitOutline.pdf

# Section 4: What Results?

#### Student Work Samples

#### Not Yet

- LDC Rubric Not Yet.docx
- Genetics LDC Not Yet Sample.docx

#### Approaches Expectations

- Genetics LDC Approaches Expectation.docx
- LDC Rubric Approaches Expectations.docx

#### Advanced

- Genetics LDC Module Sample Meets Expectation Plus.docx
- LDC Rubric Meets Expectataion Plus.docx

#### Meets Expectations

- LDC Rubric Meets Expectation Sample.docx
- Genetics LDC Meets Expectation Sample V2.docx

#### **Teacher Reflection**

Not provided

#### All Attachments

<sup>∞</sup> To Stop Crimes, share your genes. CODIS New York Times article. (student) : https://s.ldc.org/u/7exx9wwz51oc3mf9fkqdj6gok

𝗞 My Medical Choice. Angelina Jolie opinion about her choice. (student) : https://s.ldc.org/u/6mbn58ta3muxmpueidigdcckt

Seeking your genetic information pros and cons. Great resource for struggling students. (student/teacher) : https://s.ldc.org/u/e4hag3avn1hwyehq5vvl4uqb0

<sup>∞</sup> Genetic Testing. University of Illinois college of MedicineOverview and good probing questions. (student/teacher) : https://s.ldc.org/u/4ypmxttoh2zcjyjogd4a5e9q9

**Cracking Your Genetic Code. Link to NOVA movie (additional activities to accommodate the movie are in uploaded resources). (teacher) : https://s.ldc.org/u/3lzdk4rj6e8axl5refnbv58bo** 

Predisposed Genetic Testing articles .docx : https://s.ldc.org/u/6r1im745w2j86qewxmb0qhejd

Angelina Jolie.docx : https://s.ldc.org/u/rdyvxdhfh2nb1ydqz05sv3tw

The DNA Dilemma.docx : https://s.ldc.org/u/9yge64dvqcfsli2sz4bf670br

DNA Profiling and CODIS Article.docx : https://s.ldc.org/u/8xwughz0lp1iky63n2w3w0t0d

DNA and CODIS Solve Decade Old Crime - Missing and Exploited Children.pdf :

https://s.ldc.org/u/2cb10u1wn7m4247hnhqyqnpng

- Genetic Ethics Videos-3.docx : https://s.ldc.org/u/dqs3oj57ioqpxzj6tbhhvfxwz
- designer\_baby\_articles\_modified V2.docx : https://s.ldc.org/u/9m3d29rbve524nqeek5fdq27g

LDC Rubric Not Yet.docx : https://s.ldc.org/u/2p2md0d1xqjb0j7n0kayt7juq

Genetics LDC Not Yet Sample.docx : https://s.ldc.org/u/espcr1l6eh3seagd8q6uci3je

Genetics LDC Approaches Expectation.docx : https://s.ldc.org/u/2i2bn1jp1zcax0nr5q1uqw9lb

Genetics LDC Module Sample Meets Expectation Plus.docx :

https://s.ldc.org/u/eu7r5lz9lmygbomiusizf0z06

- LDC Rubric Meets Expectataion Plus.docx : https://s.ldc.org/u/6we6cbqptwcfflw3590zdp5hg
- LDC Rubric Meets Expectation Sample.docx : https://s.ldc.org/u/bwzmux5d5f1p3nz0v7nzan6ki
- Genetics LDC Meets Expectation Sample V2.docx :

https://s.ldc.org/u/c6xurmnoqio2of3r5qd3hz01d

- LDC Rubric Approaches Expectations.docx : https://s.ldc.org/u/a8yxiprore7bqkhqq0aa89wf1
- Genetic Ethics Videos-3.docx : https://s.ldc.org/u/jpcv1aw6grma01ch53yxdav9
- GeneticsUnitOutline.pdf : https://s.ldc.org/u/c0w4jr28qgtkvbntata8xoyje