Subject area/course: Science/Biology Grade level/band: 10 Task source: Center for Collaborative Education (Primary Authors: Amy Troiano, Rhonda Fortin, Alex MacPhail, Cari Sbardella)

Should Stem Cell Research Continue?

TEACHER'S GUIDE

A. Task overview:

Based on their individual research conducted to answer the essential question: "Should stem cell research continue," students will take a position regarding stem cell research. Students will have a choice in the product they create to educate the public on stem cell research, to communicate their position, and to provide the scientific evidence to support their argument.

B. Aligned standards:

1. Common Core State Standards

<u>CCSS.ELA-Literacy.W.9-10.1</u> Write arguments to support claims in an analysis of substantive topics or texts, using valid reasoning and relevant and sufficient evidence. <u>CCSS.ELA-Literacy.W.9-10.8</u> 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.

<u>CCSS.ELA-Literacy.RST.9-10.1</u> Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions. <u>CCSS.Math.Practice.MP3</u> Construct viable arguments and critique the reasoning of others.

2. Critical abilities

<u>Research</u>: Conduct sustained research projects to answer a question (including a selfgenerated question) or solve a problem, narrow or broaden the inquiry when appropriate, and demonstrate understanding of the subject under investigation. Gather relevant information from multiple authoritative print and digital sources, use advanced searches effectively, and assess the strengths and limitations of each source in terms of the specific task, purpose, and audience.

3. Next Generation Science Standards

NGSS SEP: Engaging in argument using evidence Compare and evaluate competing arguments or design solutions in light of currently accepted explanations, new evidence, limitations (e.g., trade-offs), constraints, and ethical issues.

• Respectfully provide and/or receive critiques on scientific arguments by



probing reasoning and evidence, challenging ideas and conclusions, responding thoughtfully to diverse perspectives, and determining additional information required to resolve contradictions.

LS1.A: Structure and Function

 Feedback mechanisms maintain a living system's internal conditions within certain limits and mediate behaviors, allowing it to remain alive and functional even as external conditions change within some range. Feedback mechanisms can encourage (through positive feedback) or discourage (negative feedback) what is going on inside the living system. (HS-LS1-3)

LS1.B: Growth and Development of Organisms

In multicellular organisms individual cells grow and then divide via a process called mitosis, thereby allowing the organism to grow. The organism begins as a single cell (fertilized egg) that divides successively to produce many cells, with each parent cell passing identical genetic material (two variants of each chromosome pair) to both daughter cells. Cellular division and differentiation produce and maintain a complex organism, composed of systems of tissues and organs that work together to meet the needs of the whole organism. (HS-LS1-4)

C. Time/schedule requirements:

The suggested timeline to complete the task is 3 weeks.

D. Materials/resources:

- Student biology textbooks: "Biology: Dynamics of Life" and "The Unity and Diversity of Life"
- 2. Science Reference Center on ebscohost.com http://stemcells.nih.gov/Pages/Default.aspx
- Code of Ethics for Biotechnology http://www.asbmb.org/Page.aspx?id=70
- TED Talk http://www.ted.com/talks/susan_solomon_the_promise_of_research_with_stem_cells ?language=en
- Medical News Today http://www.medicalnewstoday.com/categories/stem_cell
 Academia Search Engine
- Academic Search Engine www.refseek.com to search for "stem cell research future"

E. Prior knowledge:

Prerequisite skills and knowledge needed to demonstrate proficiency in this task:

- Cell structure and function
- Cell division
- Structure and function of DNA



- DNA>genes>proteins
- Protein function
- Organization of multicellular organisms
- Interdependence within systems

F. Teacher instructions:

Suggested time line for activities

	Monday	Tuesday	Wednesday	Thursday	Friday
Week 1	Project roll out in bio classes - Discuss with the students how stem cell research, use, and potential affects daily life. Include a discussion of ethics.	Students read materials and summarize research. Hand in to teachers for feedback. Students briefly discuss (~10 min) their research findings in small groups.	Teachers return research summaries, providing feedback Pass out for/against resources or have students conduct their own research.	Students read materials and summarize position statements. Students briefly discuss (~10 min) their research findings in small groups. Based on their discussions, students revise their positions and hand in to teachers for feedback.	Teachers check position summaries and provide feedback Students decide if they are for or against stem cell research for medicinal use. Students decide the type of product they will produce (letter, brochure, or PSA)
Week 2	Students begin researching own opinion - gathering at least 2 additional resources	Same as the day before	Students will begin writing their argument	Same as the day before	Peer review session. In small groups, students present and review their position product and revise and submit rough draft
Week 3	Rough drafts returned with feedback		Self-assessment and final draft due	Same as the day before	



G. Student support:

Possible accommodations (incl. for students with individual learning plans and English Learners):

- Teacher may develop graphic organizers for research
- Database instruction for valid and reliable sources
- Provided reading materials suitable to lexile level of student
- Teacher provided list of websites and videos on topic
- Chunking into smaller checkpoints along the way
- Opportunities for self-assessment, peer review and teacher feedback
- Provide a visual checklist and schedule

H. Scoring:

Student work can be scored using the SCALE Should Stem Cell Research Continue? rubric.

