Teacher Guide: What Do You Think About Stem Cell Research?

ACTIVITY OVERVIEW

Abstract:
This activity probes students' positions on stem cell research and calls for them to explain their reasoning. It can be used at the beginning of their exploration of stem cell research, at the end, or both.

Module:
Stem Cells in the Spotlight

Key Concepts:
Stem cells, embryo, *in vitro* fertilization, therapeutic cloning

Prior Knowledge Needed:
Definition of an embryo, how embryos are produced through *in vitro* fertilization, therapies that may be developed through stem cell research, how therapeutic cloning can be used to produce embryonic stem cells, the difference between adult and embryonic stem cells.

Materials:
Student handout

Appropriate For:
Ages: 12 - 18
USA grades: 7 - 12

Prep Time:
10 minutes

Class Time:
10 - 20 minutes

Activity Overview Web Address:
http://gslc.genetics.utah.edu/teachers/tindex/overview.cfm?id=SCRthink

Other activities in the ***Stem Cells in the Spotlight*** module can be found at:
http://gslc.genetics.utah.edu/teachers/tindex/

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I. PEDAGOGY

A. Learning Objectives

- Students will relate implications of stem cell research to their own ideas.
- Students will state and support an opinion on one or more stem cell issues.
- Students will demonstrate understanding of the personal and social relevance of science and technology.

B. Teaching Strategies

1. Timeline

- 3-5 days before activity:
  - Present the assignment to students.
- Day of activity:
  - Facilitate a 10-20 minute discussion about the statements considered in the survey.

2. Classroom Implementation

- Have students complete the "What do you think about stem cell research?" opinion form (S-1).
- Follow this with a class discussion of students' opinions. Have students support their opinions with reasons based upon factual knowledge of stem cells and stem cell research.

3. Extensions

- Students can write a more extensive opinion piece based upon statements presented in the opinion form (S-1).
- The survey could be expanded to a larger group.
- Follow up this activity with others that explore the science of stem cells and the issues surrounding stem cell research.

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II. MATERIALS

A. Detailed Materials List

- Opinion form: What do you think about stem cell research? (S-1)

III. STANDARDS

A. U.S. National Science Education Standards

Grades 5-8:

- Content Standard E: Science and Technology - Understandings About Science and Technology; technologies cost, carry risks, and provide benefits
- Content Standard F: Science in Personal and Social Perspectives - Science and Technology in Society; societal challenges often inspire questions for scientific research and societal priorities often influence research priorities; ethics

Grades 9-12:

- Content Standard E: Science and Technology - Understandings About Science and Technology; science often advances with the introduction of new technologies; new technologies often extend the current levels of scientific understanding and introduce new areas of research
- Content Standard F: Science in Personal and Social Perspectives - Science and Technology in Local, National and Global Challenges; we must decide how to use the knowledge available from science and technology; the basic concepts and principles of science and technology should be understood before debating the policies and ethics of science and technology-related challenges; individuals and society must decide on proposals involving new research and the introduction of new technologies into society

B. AAAS Benchmarks for Science Literacy

Grades 6-8:

- The Nature of Technology: Issues in Technology - rarely are technology issues simple and one-sided
- Human Society: Social Trade-Offs - making choices, personal versus social benefits

Grades 9-12:

- The Nature of Technology: Issues in Technology - alternatives, risks, costs and benefits
- The Human Organism - Human Development - social, moral, ethical and legal issues connected with the development and use of technology

- Human Society: Social Trade-Offs - benefits and costs of proposed choices
- The Designed World: Health Technology - social and ethical issues arising from biotechnology

C. Utah Core Curriculum

Intended Learning Outcomes for the Utah Secondary Core Curriculum in Science:

Students will:

4. Demonstrate awareness of the social aspects of science.
    g. Accept responsibility for actively helping to resolve social and ethical problems related to science and technology.
    h. Acknowledge that policy issues cannot be resolved by science alone because value issues must also be considered.
6. Communicate effectively using science language and reasoning.
    b. Prepare written and oral reports describing the reasoning which led to the conclusions.

Seventh Grade Integrated Science:

- Standard 4: Students will understand reproduction and heredity of organisms.
  Objective 3: Analyze issues related to genetics.
  - Cite advantages and disadvantages of genetic technologies.
  - Identify and explain issues related to genetic control of specific traits.

Biology (9-12):

- Standard 4: Students will evaluate the significance and impact of genetic alteration on living organisms.
  Objective 3: Research and analyze perspectives on issues related to genetic technologies.
  - Evaluate applications of genetic technologies.
  - Evaluate a position concerning a genetic technology.

Biology: Human Biology (9-12)

- Standard 3: Students will analyze how genetic information is passed from one cell to another.
  Objective 3: Describe the significance and impact of genetic alteration on living things.
  - Describe applications of genetic technologies.
  - Evaluate a position concerning a genetic technology.

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IV. CREDITS

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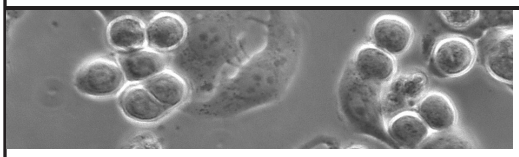
Opinion Form: What do you think about stem cell research?



New technologies have jump-started the pace of stem cell discovery in recent years. Stem cell therapies being developed today will eventually become commonplace in healthcare.

Should society accept these new technologies without critically evaluating their implications? For example, you might hear a lot about the benefits of stem cell research, but what are the risks? What are your views on stem cell research?

Directions:

1. Check the box that most closely matches how well you agree or disagree with each statement.
2. For each question, use the back of this page or another sheet of paper to list the reason(s) for your response.

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1. Many unused embryos produced through *in vitro* fertilization will be discarded. These embryos should be made available to researchers for stem cell research.					
2. If we have the technology to improve human life, we should use and build on that technology.					
3. The government should fund embryonic stem cell research with taxpayer monies.					
4. Stem cell research should be regulated by the government.					
5. If stem cell research and therapies are regulated, laws for adult stem cells should differ from laws for embryonic stem cells.					
6. If stem cell therapies are regulated, therapeutic cloning for producing embryonic stem cells for research should be permitted.					