



**NIH/NSTA Symposium: Exploring Bioethics – A New Model for Classroom Instruction
Thursday, March 19, 2009**

1:00 – 1:25 pm

Welcome, Introductions, and Goals for the Symposium

Flavio Mendez, Senior Director, NSTA Learning Center

Paul Tingler, NSTA

- About NSTA Symposia
- Agenda/Goals/Forms/Credit Info/Logistics/Introductions

Flavio Mendez, Senior Director, NSTA Learning Center

Ezekiel Emanuel, Director, Department of Bioethics, NIH Clinical Center

Millie Solomon, Director, Center for Applied Ethics, Education Development Center

Jeanne Ting Chowning, Director of Education, Northwest Association for Biomedical Research

Dave Vannier, Professional Development Coordinator, NIH Office of Science Education

1:25 – 1:45 pm

Bioethics and the Challenges to Teaching It

Millie Solomon

Learning Outcomes:

After participating in the presentation,

- Participants will define ethics and bioethics and provide examples of biomedical practices that raise ethics questions
- Participants will define and explain a set of concepts and skills used in ethical inquiry on challenging situations arising from advances health and medicine
- Participants will identify the challenges to teaching bioethics and begin to brainstorm ways for overcoming these challenges

1:45 – 2:05 pm

Activity 1 – Discerning Scientific, Ethical, Legal, and Personal Preference Issues

Jeanne Chowning

Learning Outcomes:

After participating in the presentation,

- Participants will distinguish ethical questions from scientific and legal questions and from matters of personal preference, habit or custom.
- Participants will explain the difference between evidence for an ethical argument and a scientific position

2:05 – 2:30 pm

Activity 2 – Ethical Analysis of Oscar Pistorius’ Olympic Bid

Jeanne Chowning

Learning Outcomes:

After participating in the presentation,

- Participants will implement a procedure for addressing bioethics questions that 1) includes identifying the primary ethics question, 2) gathering the relevant facts, 3) considering who/what will be affected by the outcome, and 4) analyzing the specific ethical considerations that the issue raises.
- Participants will provide a rationale for the fact that while there can usually be several answers or approaches to ethical questions, it is important to present a strong, well-reasoned argument for one’s position.
- Participants will gain the skills necessary to guide their students to presenting strong, well-reasoned bioethical arguments.
- Participants will discuss the skills necessary for facilitating a successful ethics discussion in the science classroom

2:30 – 3:00 pm

Steroids Case Study and Presentation - Key Ethical Considerations in Bioethics

Millie Solomon and Ezekiel Emanuel

Learning Outcomes”

After participating in the presentation,

- Participants will give a detailed description of ethical considerations of respect, harms and benefits, fairness, and authenticity
- Participants will observe and discuss these concepts in the context of a specific ethical dilemma
- Participants gain the skills and knowledge to implement this teaching approach in the classroom

3:00 – 3:10 pm

Participants’ Reflection on Challenges to Teaching Bioethics

Jeanne Chowning

Learning Outcome:

After participating in the presentation,

- Participants will review and discuss the challenges to teaching bioethics in the classroom

3:10 - 3:25 pm

Break

3:25 – 3:40 pm

Overview of *Exploring Bioethics*, a new NIH Curriculum Supplement

Dave Vannier

Learning Outcome:

After participating in the presentation,

- Participants will review and discuss a new bioethics resource for the classroom

3:40 – 4:15 pm

Exploring Ethics within the HS Biology Curriculum – Implications of Genetic Testing

Millie Solomon

Learning Outcomes:

After participating in the presentation,

- Participants will contrast how the predictive value of a genetic test influences the ethical questions raises
- Participants will develop the skills to discuss the above issue in the classroom

4:15 – 4:40 pm

More on Implementing the Model and Facilitating Ethical Discussions

Jeanne Chowning and Ezekiel Emanuel

Learning Outcomes:

After participating in the presentation,

- Participants will gain further confidence in analyzing the ethical considerations of a medical situation
- Participants will increase their portfolio of approaches to teaching bioethics and honoring differing points of view in the classroom
- Participants will gain further confidence in their ability to facilitate robust ethics discussions

4:40 – 4:55 pm

Participant's Second Reflection on Challenges to Teaching Bioethics

Dave Vannier

Learning Outcome:

After participating in the presentation,

- Participants will review and discuss the challenges to teaching bioethics in the classroom

4:55 – 5:10 pm

The Importance of Bioethical Reasoning Skills

Ezekiel Emanuel

Learning Outcomes:

After participating in the presentation,

- Participants will be able to clearly articulate a description of bioethics and how bioethical reasoning skills are important to our lives.
- Participants will be able to articulate and employ the concepts and skills bioethicists use to analyze challenging situations and make decisions about the best course of action
- Participants will be able to provide a rationale for the fact that while there can usually be several answers or approaches to ethical questions, it is important to present a strong, well-reasoned argument for one's position.
- Participants will be able to give a detailed description of the ethical considerations of respect, harms and benefits, fairness, and authenticity.

5:10 – 5:30 pm

Final Words

- Administer post-assessment form
- Evaluation form/Survey/Credit info
- NSTA Web seminars
- Drawing of door prizes

Correlation with the National Science Education Standards: Content Standards, Grades 9 – 12

Science as Inquiry - Standard A

As a result of activities in grades 9–12, all students should develop

- Understandings about scientific inquiry
 - Scientific explanations must adhere to criteria such as: a proposed explanation must be logically consistent; it must abide by the rules of evidence; it must be open to questions and possible modification; and it must be based on historical and current scientific knowledge.

Life Science - Standard C

As a result of their activities in grades 9–12, all students should develop understanding of

- Cell functions are regulated. Regulation occurs both through changes in the activity of the functions performed by proteins and through the selective expression of individual genes. This regulation allows cells to respond to their environment and to control and coordinate cell growth and division.
- Most of the cells in a human contain two copies of each of 22 different chromosomes. In addition, there is a pair of chromosomes that determines sex: a female contains two X chromosomes and a male contains one X and one Y chromosome. Transmission of genetic information to offspring occurs through egg and sperm cells that contain only one representative from each chromosome pair. An egg and a sperm unite to form a new individual. The fact that the human body is formed from cells that contain two copies of each chromosome—and therefore two copies of each gene—explains many features of human heredity, such as how variations that are hidden in one generation can be expressed in the next.
- Changes in DNA (mutations) occur spontaneously at low rates. Some of these changes make no difference to the organism, whereas others can change cells and organisms. Only mutations in germ cells can create the variation that changes an organism's offspring.
- Behavioral biology has implications for humans, as it provides links to psychology, sociology, and anthropology.

Science and Technology - Standard E

As a result of activities in grades 9–12, all students should develop

- Understandings about science and technology
 - Scientists in different disciplines ask different questions, use different methods of investigation, and accept different types of evidence to support their explanations. Many scientific investigations require the contributions of individuals from different disciplines, including engineering. New disciplines of science, such as geophysics and biochemistry often emerge at the interface of two older disciplines.
 - Science often advances with the introduction of new technologies. Solving technological problems often results in new scientific knowledge. New technologies often extend the current levels of scientific understanding and introduce new areas of research.

- Science and technology are pursued for different purposes. Scientific inquiry is driven by the desire to understand the natural world, and technological design is driven by the need to meet human needs and solve human problems. Technology, by its nature, has a more direct effect on society than science because its purpose is to solve human problems, help humans adapt, and fulfill human aspirations. Technological solutions may create new problems. Science, by its nature, answers questions that may or may not directly influence humans. Sometimes scientific advances challenge people's beliefs and practical explanations concerning various aspects of the world.

Science in Personal and Social Perspectives - Standard F

As a result of activities in grades 9–12, all students should develop understanding of

- Personal and community health
 - Hazards and the potential for accidents exist. Regardless of the environment, the possibility of injury, illness, disability, or death may be present. Humans have a variety of mechanisms—sensory, motor, emotional, social, and technological—that can reduce and modify hazards.
- Natural and human-induced hazards
 - Natural and human-induced hazards present the need for humans to assess potential danger and risk. Many changes in the environment designed by humans bring benefits to society, as well as cause risks. Students should understand the costs and trade-offs of various hazards—ranging from those with minor risk to a few people to major catastrophes with major risk to many people. The scale of events and the accuracy with which scientists and engineers can (and cannot) predict events are important considerations.
- Science and technology in local, national, and global challenges
 - Science and technology are essential social enterprises, but alone they can only indicate what can happen, not what should happen. The latter involves human decisions about the use of knowledge.
 - Understanding basic concepts and principles of science and technology should precede active debate about the economics, policies, politics, and ethics of various science- and technology-related challenges. However, understanding science alone will not resolve local, national, or global challenges.
 - Progress in science and technology can be affected by social issues and challenges. Funding priorities for specific health problems serve as examples of ways that social issues influence science and technology.

History and Nature of Science - Standard G

As a result of activities in grades 9–12, all students should develop understanding of

- Science as a human endeavor
 - Scientists are influenced by societal, cultural, and personal beliefs and ways of viewing the world. Science is not separate from society but rather science is a part of society.

- Nature of scientific knowledge
 - Scientific explanations must meet certain criteria. First and foremost, they must be consistent with experimental and observational evidence about nature, and must make accurate predictions, when appropriate, about systems being studied. They should also be logical, respect the rules of evidence, be open to criticism, report methods and procedures, and make knowledge public. Explanations on how the natural world changes based on myths, personal beliefs, religious values, mystical inspiration, superstition, or authority may be personally useful and socially relevant, but they are not scientific.
- Historical perspectives
 - Occasionally, there are advances in science and technology that have important and long-lasting effects on science and society. Examples of such advances include the following: biological evolution, germ theory, molecular biology, and medical and health technology