An Ethics Primer

Lesson ideas and ethics background

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Primer Development Team

Jeanne Ting Chowning, MS
Education Manager, Northwest Association for Biomedical Research
Program Director, Collaborations to Advance Understanding of Science and Ethics

in conjunction with

Paula Fraser, MLS
Bellevue School District, PRISM Program

Collaborations to Advance Understanding of Science and Ethics

Susanna Cunningham, PhD
Principal Investigator and Professor
Dept. of Biobehavioral Nursing and Health Systems, University of Washington

Susan Adler
Co-Principal Investigator and Executive Director
Northwest Association for Biomedical Research

Mark Windschitl, PhD
Co-Principal Investigator and Assistant Professor
School of Education, University of Washington

Consultants

Laura Bishop, PhD
Ethics Consultant and Program Coordinator
High School Bioethics Curriculum Project, Georgetown University

Lola Szobota, MA, MEd
Professional Development Consultant and Ethics Trainer
District Science Supervisor, Northern Valley High School District, Demarest, NJ

LueRachelle Brim-Atkins, MA
Diversity Consultant, Brim Donahoe and Associates

Curriculum Advisory Committee

Wylie Burke, MD, PhD
Professor and Chair, Department of Medical History and Ethics
University of Washington

Mel Dennis, PhD
Professor and Chair, Department of Comparative Medicine
University of Washington

Suzanne Holland, PhD
Associate Professor, Department of Religion, University of Puget Sound

Beverly Torok-Storb, PhD
Senior Scientist, Fred Hutchinson Cancer Research Center

Paul Robertson, PhD
CEO and Scientific Director, Pacific Northwest Research Institute

Pat Wasley, PhD
Dean, College of Education, University of Washington

Professional Development Advisory Committee

Winona Hauge, MSW
Community Outreach Manager, External Relations and Communications
Fred Hutchinson Cancer Research Center

Karen Hoffman
Executive Director, North Carolina Association for Biomedical Research

Carole Kubota, PhD
Assistant Professor, Department of Education, University of Washington

Wendy Law, PhD
Scientific Liaison, Office of the Director, Fred Hutchison Cancer Research Center

Maureen Munn, PhD
Director, High School Human Genome Program, Department of Genome Sciences
University of Washington

Louisa Stark, PhD
Director, Genetic Science Learning Center, University of Utah

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Field Test Teachers

Debbie Alan
Tri-Cities Prep, Tri-Cities, WA

Stella Bass
Washington Middle School, Seattle, WA

James Cooke
Mercer Island High School, Mercer Island, WA

Elise Cooksley
Two Rivers School, North Bend, WA

John Elyard
Trout Lake School District, Trout Lake, WA

Mary Glodowski
Juanita High School, Kirkland, WA

Shannon Hemrich
La Center High School, La Center, WA

Rosetta Lee
Seattle Girls School, Seattle, WA

Dianne Massey
Kentridge High School, Kent, WA

Jodie Mathwig
Kentridge High School, Kent, WA

William Monahan
Eastlake High School, Sammamish, WA

Special Thanks to

Kelly Fryer-Edwards, PhD
Professor, Department of Medical History and Ethics, University of Washington

Carolyn Church Landel, PhD
Project Director, N. Cascades and Olympic Science Project
Western Washington University

Drego Little
Research Assistant, University of Washington

Lori Miller
Graduate Staff Assistant, University of Washington
Genomics Outreach for Minorities Project

La Neu
Graphic Design

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Most of the secondary science teachers who shy away from incorporating ethics into their curricula are quite clear about the reasons they do so. First, they are uncomfortable with teaching ethics, a subject that science teachers often have very little experience with. Ethics as a discipline is full of unfamiliar terms and its own jargon. Secondly, teachers fear classroom discussions 'getting out of control', degenerating into a battle of opinions, or having parents and administrators confuse teaching about values and morals with teaching *particular* values and morals. Lastly, something as seemingly subjective as ethics can be perceived as somewhat out of place in a science classroom, where the focus is ostensibly on objectivity: "Why are we studying values in science class?" Ethics seems like just one more element in an already crowded curriculum. This primer focuses on tools and strategies for overcoming these barriers, as well as some perspective on the importance of addressing the ethical dimensions of science with students.

The primer is designed to *help science teachers in guiding their students to analyze issues in light of the scholarly discipline of ethics.* This Ethics Primer provides classroom-friendly lesson ideas for integrating ethical issues into a science curriculum. It also provides basic background on ethics as a discipline, with straightforward descriptions of major ethical theories. Several decision-making frameworks are included to help students apply reasoned analysis to ethical issues. The primer is designed to be flexible enough to use with many different types of topics and science content.

The primer is *not* intended to be used as a unit from cover to cover. Rather, teachers should review the strategies and resources that seem most suitable for their classes. Although this document is geared towards secondary science teachers, we hope that it will prove of broad value to educators across grade levels and subjects.

Preface	The Preface examines ethics as a unique discipline and outlines the core concepts to convey to students. It introduces one approach for distinguishing between the related terms 'values', 'morals', and 'ethics'. Key features distinguishing ethics from other modes of thought are presented, and the relationship between ethics and science is explored. The Preface also provides rationale for teaching ethics in science, and addresses state and national science education standards. Three key elements are necessary for effective teaching of ethical issues in science - lesson strategies, decision-making models, and student understanding of ethical perspectives and theories. A brief overview of these elements is provided in this section. Each element is further described in its own section of the Primer.
Ethics as a Discipline	This section provides summaries of ethical perspectives and theories that can be utilized in the decision-making process. The Process of Ethical Inquiry flow diagram provides a model for asking ethical questions, gathering relevant background, reasoning through an ethical dilemma, making and acting on a decision, and evaluating the outcome.
Lesson Strategies	This section provides ideas for general approaches to take with students when integrating ethics into the science classroom. An Ethics Classroom Strategies summary chart provides an overview of the approaches featured. In addition, rubrics for assessment/ evaluation are presented.
Decision-Making Frameworks	Decision-Making Frameworks provide students with a way to structure their thinking. Elements of a sample decision-making model are discussed in this section. Alternative frameworks are also provided at the end of the text for that section.
Appendix	The Appendix provides resources and background for teachers seeking additional information.

Preface

Preface

What Makes Ethics Unique As a Discipline?

Ethics is a field of study that examines the moral basis of human behavior and attempts to determine the best course of action in the face of conflicting choices. Ethics is central to our human experience and provides an organizing dimension to human interaction. *Because it invokes questions that consider morals, values, and principles, and because it seeks to consider and respect alternate viewpoints, it is a key component to living within a society in a civilized way.*

What Are the Most Important Ideas and Concepts to Teach Students About Ethics?

There are several 'essential understandings', or core concepts, that are important to communicate to students about ethics. We hope to foster among students an understanding of the *importance of well-reasoned judgments*, combined with a *respect and empathy for other approaches*.

1. Intellectual Rigor: The Importance of Well-Reasoned Judgments

Students need to learn to differentiate opinions based on emotions from those supported by evidence and logical argument. A key misconception among students is that ethics is a matter of opinion (the issue of moral relativism), and that therefore ethical issues are not worth discussing or cannot be resolved. The discipline of ethics stresses an analytical approach to evaluating issues. Successful arguments are both well-reasoned and clearly articulated. A *solid understanding of science content* provides the foundation from which students can develop their positions. What matters most is not which position students take, but how thoroughly they have analyzed the ethical dilemma and how well-justified and supported their arguments are.

2. Citizenship in a Democratic, Pluralistic Society: Respect for Alternate Approaches and Viewpoints

Ethics allows students to gain greater understanding and respect for other positions and approaches, even if they do not agree with them. It enhances their ability to understand the issues and values informing different points of view, and thus makes them better citizens within our democratic and pluralistic society.

Students should also be aware that in certain contexts, well-reasoned judgments can sometimes be used to support morally unacceptable practices. The ethical perspectives of some stakeholders may be morally reprehensible to others. It is important to stress that at the community and societal levels that not all values are deemed equally significant.

How Does Ethics Differ from Morals and Values?

Values are qualities that signify what is important and worthwhile. Values serve as the basis for moral codes and ethical reflection.

('Life is to be valued, in other words life is sacred')

Individuals have their own values based on many aspects including; family, religion, peers, culture, race, social background, gender, etc. Values guide individuals, professions, communities, and institutions.

Morals are codes of conduct governing behavior. They are an expression of values reflected in actions and practices.

('One should not kill')

Morals can be held at an individual or communal level and are culturally bound.

Ethics provides a systematic, rational way to work through dilemmas and to determine the best course of action in the face of conflicting choices.

('If killing is wrong, can one justify the death penalty or kill in self defense?')

Ethics attempts to find and describe what people believe is right and wrong, and to establish whether certain actions are actually right or wrong based on all the information available.

Paul and Elder (Paul 2003) point out that there are three main kinds of reasoning in response to three different types of inquiry: First, factual questions require objective evidence in the form of a correct answer. Secondly, opinion questions call for a subjective preference in the form of a value-laden answer. Third and finally, multi-system questions require an answer based on rigorous reasoning and sound principles, in other words, "reasoned judgment".

While the first two types of questions (factual or opinion) are not significantly controversial in a democratic society, the third type of question is often very contentious in that it can become confused with the others. Often, students will make statements of ethical absolutism - "There is ONE right answer!", or else they will espouse ethical relativism - "Well, it's all just relative—you see it your way and I see it my way!" When educators help students see beyond these two extremes, they open up possibilities for understanding the range of perspectives that exist, and acknowledge that ethics stresses the logic and quality of the argument that is being made.

Having students engage in disciplined inquiry and discourse that requires reasoned judgment helps them move beyond mere "fact or opinion" analysis and is essential in a democratic society.

(Merriam-Webster online definitions provided in italics)

Ethics

The discipline dealing with what is good and bad and with moral duty and obligation, a set of moral principles or values, a theory or system of moral, the principles of conduct governing an individual or a group, a guiding philosophy.

We often confront puzzling situations. An ethical dilemma is a special type of puzzling situation that involves one or more competing moral solutions. Ethical analysis helps us in such situations when moral confusion is involved.

Dorothy Wertz (Wertz 1996) defines the discipline of ethics as "a system of inquiry that examines the bases of human goals and the foundations of "right" and "wrong" human actions that further these goals." Furthermore, unlike morality and morals, which are culturally bound, ethics seeks to arrive at reasoning and principles that are more universally applicable in considering diverse perspectives and interests. The discipline of ethics strives for commonality that can be valued and practiced by many within the context of a pluralistic, democratic society. In other words, it attempts to meet the standard of valuing both individual rights and the common good.

Ethics provides us with a common language that stands for widely shared values, such us those focused on human dignity. It seeks universal standards for reasoned judgments. The discipline of ethics provides a structured way to analyze dilemmas in order to come to well-reasoned positions.

Religion

The service and worship of God or the supernatural, commitment or devotion to religious faith or observance, a personal set or institutionalized system of religious attitudes, beliefs, and practices, a cause, principle, or system of beliefs held to with ardor and faith.

Hundreds of different religions exist, each with their own set of beliefs. People seek guidance from many religious traditions. Appealing to religious beliefs is an important way of seeking guidance, but justifications based on religion differ from ethical arguments. However, both perspectives based on religious traditions and ones based on ethical principles benefit from a reasoned approach.

In the U.S., our Constitution, our history of the separation of church and state, and our highly pluralistic society, obligate us to rely on principles that are widely accepted in making decisions that impact many individuals. These principles are not unique to any particular religion, yet at the same time they are not necessarily exclusive of religion.

In public school classrooms, it is important to be sensitive to various family value systems regardless of religious persuasion. Teachers should enhance and support the work of parents as they guide the ethical reasoning and actions of their children in the home and in the community. Emphasis on treating people, including oneself, with civility, courage, fair-mindedness, care, respect, empathy, integrity, and kindness (beneficence) and in a way not to cause harm (nonmaleficence), helps lay the groundwork for students to value both diversity and the common good within a pluralistic society. These dispositions and principles cut across religious and nonreligious boundaries.

Sociology

The science of society, social institutions, and social relationships; specifically, the systematic study of the development, structure, interaction, and collective behavior of organized groups of human beings/ the science of mind and behavior, the mental or behavioral characteristics of an individual or group.

Social preferences or conventions are also distinct from ethics, again based on their cultural variability. Because conventions are strongly and systematically ingrained, they are sometimes confused with ethics.

Law

A binding custom or practice of a community, a rule of conduct or action prescribed or formally recognized as binding or enforced by a controlling authority, the whole body of such customs, practices, or rules.

Although one would hope for a strong connection between ethics and the law, what is legal is not necessarily ethical, and vice versa. Many societies have enforced unjust laws based on discriminatory views, for example. Similarly, authority can be used as a justification for a particular decision, without reference to an underlying ethical basis.

What is the Relationship Between Science and Ethics?

In the classroom, students must understand the appropriate science content before they can fully evaluate related ethical questions. An understanding of the scientific background behind an issue will help provide factual information in support of reasoned ethical judgments.

Both science and ethics ask questions that seek to understand the world. The importance of reasoned analyses, systematic thinking, and rational arguments is central to both scientific and ethical disciplines. Both rely on a logical decision-making process as well as a clear rationale and justification for conclusions. For teachers who strive to foster thinking skills in their students, ethics provides a powerful tool for cultivating such habits of mind.

For both science and ethics, cultural subtexts are important to examine. Some of the cultural subtexts inherent in western science include the value placed on knowledge, the importance of integrity to the scientific process, and the inherent complexities associated with funding issues and the pursuit of success. In western ethical practice, a high value is placed on autonomy and individual rights and freedoms.

Most scientific issues have some ethical dimensions. Ethics can help provide the framework by which science should be conducted and technology developed. However, there is an inherent tension between the belief that science is a value-neutral process and the concept of scientists as having social responsibilities. John Pomery (Pomery 1996) has pointed out that individuals who excel in highly technical fields such as science ('algorithmic thinkers') may reject applied ethics because of the perceived ambiguities inherent in the ethical dilemmas, and because of the pluralism that is necessary for contemplating other points of view. Such individuals may have expectations that important questions necessarily have clear "unambiguous answers, accessible to rational and logical persons through application of well-defined models." However, he stresses that highly technical understanding and reasoning must be balanced with sensitivity and awareness of issues inherent in a global, multicultural world.

Similarly, Fuchs (Fuchs and Macrina 2000) notes that some scientists may be "suspicious that 'soft disciplines' such as moral philosophy lack the same type of academic rigor displayed by their own fields", and that others may mistakenly view ethical positions as little more than matters of opinion. He notes that ethics falls somewhere between completely subjective preferences and objective data, but that such a position does not diminish the power of the discipline. Appreciation of the range of values and viewpoints of stakeholders involved in an ethical dilemma, and of the interconnectedness, complexity, and ambiguity inherent in real-world problems, may help students to transcend a stereotypical and oversimplified conceptualization of the world.

Why Incorporate Ethics into Science Classrooms?

"…if we decide that we do not have time to stop and think about right and wrong, then we do not have time to figure out right from wrong, which means that we do not have time to live according to our model of right and wrong, which means, simply put, we don't have time for lives of integrity…" - Stephen Carter

The rapid pace of scientific innovation has not been matched by a parallel growth in the analysis of the ethical implications of new technologies. Science has been long conceived to be value-neutral, and many textbooks still proffer this view of science. However, because science is a human enterprise that is conducted in a social context, science and its technological applications clearly have ethical implications.

Teachers are faced with the formidable task of preparing students to recognize the issues inherent in a society increasingly shaped by science and technology. Discoveries in molecular biotechnology often put biomedical research on the front page. The sequencing of the entire human genome and the application of stem cell research, for example, herald a new age of discovery, but also raise difficult ethical issues that merit public awareness. Today's young people will be the first to benefit from the revolutionary developments in molecular biology, but they will also be the first to face the challenging social and ethical questions such technologies raise. The difficult decisions that will face humanity in the upcoming centuries will not be solved by technological solutions alone. They will require both scientific understanding as well as consideration of the impact of alternate solutions on those involved, and reasoned justification based on ethical principles.

Students often come to class discussions with preformed opinions on many ethical issues. The challenging task for teachers is to help students learn to identify the facts of a case, recognize the underlying ethical dilemmas, and to understand the different perspectives involved.

Most students lack familiarity with ethics as a discipline, and consequently are unable to articulate their stance or participate in a reasoned discussion about ethical issues in science. As developing citizens, students require analytical skills to use ethical reasoning when considering scientific controversies. The role of the teacher includes encouraging students in their personal decision-making process while helping them learn to listen respectfully to the positions of others, to overcome prejudices, and to communicate their dissenting opinions reasonably and effectively. In such an educational setting, students are empowered to apply the same kinds of ethical reflection and critical-thinking to difficult situations they encounter elsewhere in their lives.

Because bioethical issues offer no single right answers or simple solutions, they can help students to think critically by fostering an understanding of the importance of logic and reason when approaching complex problems. A study of ethics helps students move more rigorously and emphatically towards better reasoned judgements/decisions based on standards and principles.

Lastly, ethics also provides a real-world, motivating context for understanding science and its relevance. In such a setting, scientific content is not isolated from its social context or from other disciplines, but can be viewed by students as part of a larger whole. Helping students grapple with ethical controversies and decision making in the classroom serves as an authentic rehearsal for their future life; it provides a real and relevant way for them to begin to acquire the skills and ethical dispositions necessary for future citizenship.

How Does Ethics Relate to National Science Education Standards?

National and state standards recommend that students develop a set of cogent views of the world as illuminated by the concepts and principles of science. Moreover, the standards stress the importance of students becoming aware of the influence of society on science and technology, and the integration of science with daily life and other disciplines. In achieving these goals, students are not only poised for academic achievement, but are also equipped with skills to become responsible and informed members of an increasingly complex and inter-connected world.

The National Science Education Standards point clearly to the need for teachers to not only provide students with a solid grounding in science content, but also with an understanding of ethical implications of science and the human context in which science occurs. The Standards state that understanding basic concepts and principles of science and technology must precede active debate of their economical, political and ethical issues. Moreover, the Standards ask that students be able to understand and evaluate costs and benefits associated with technological advances. For example, Life Science Content Standard F, Science in Personal and Social Perspectives, indicates that as a result of activities in grades 9-12, all students should develop understanding of science and technology in local, national, and global challenges. In addition, Life Science Content Standard C describes the need for students to understand the molecular basis of heredity, and also describes the importance for students to take informed positions on ethical aspects of developing biotechnologies.

The Benchmarks for Science Literacy from the American Association for the Advancement of Science's Project 2061 address similar themes as they define content standards for Habits of the Mind and the Nature of Science. Benchmark 1.C makes clear that science is a social enterprise and has its own system of ethics. It stresses the abundance of current issues that call attention to the importance of ethics in science, and offer support for the case-study approach as a tool for teaching ethics. Benchmark 8.F in particular stresses the importance of addressing the ethical dimensions of emerging biotechnologies.

National science education standards emphasize the importance of teaching bioethics and the social implications of biological discoveries. An ethical framework and skills for decision-making will allow students to apply their understanding of science content to the formation of their own positions, and will promote effective citizenship.

Key Elements

Three components are key to promoting effective teaching and discussion related to ethics and science: content as delivered through lesson strategies, a decision-making framework, and a familiarity with ethical perspectives. These elements are represented diagrammatically in Figure 1 below.

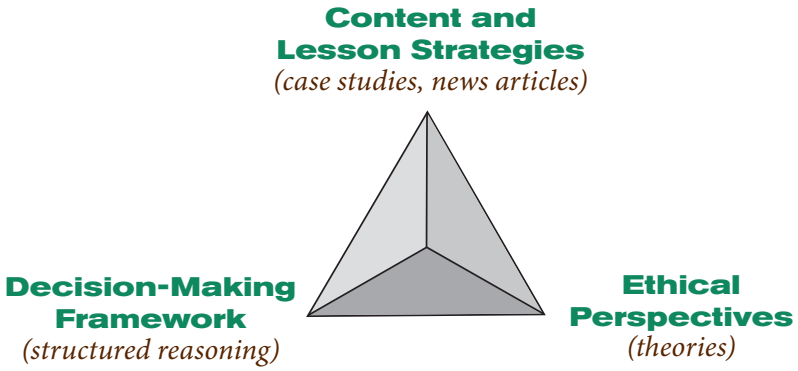


Figure 1.
Key Elements for Successful Teaching of Science and Ethics

Content and Lesson Strategies

Three components are key to promoting effective teaching and discussion related to ethics and science: content as delivered through lesson strategies, a decision-making framework, and a familiarity with ethical perspectives. These elements are represented diagrammatically in Figure 1 below.

We *strongly* recommend that the study of ethics begin through the exploration of a case study or similar content. Analyzing the various dimensions of a scenario leads naturally to a discussion of the need for the other elements. Students are apt to become overwhelmed if they encounter the ethical perspectives for the first time before they have been presented with an ethical dilemma.

The science content and strategies provide the 'hook' for student engagement. Case studies make excellent starting points for ethical discussions, and can be found in textbooks, on specialized web sites, or can be taken directly from the news. Several publishers provide 'pro and con' position papers on ethical issues related to science. Teachers have also had success beginning a discussion with a movie or a vignette from a movie.

The Ethics Primer provides a range of strategies that can be used interchangeably with many different science content topics. Please consult the 'Ethics Classroom Strategies Chart' for an overview of different lesson ideas.

When evaluating an ethical dilemma involving science, it is necessary for students to have a solid understanding of the science behind the issue. Ethical dimensions of science should ideally be taught in conjunction with science content, rather than as an 'add-on' when time permits. Not only does the study of ethics provide a social context for science, but it also creates a 'need to know' that motivates students to learn the science.

Ethical Perspectives/ Theories

Even a rudimentary introduction to ethical perspectives and theories does much to deepen student discussion and involvement in dilemmas. Some exposure to the discipline of ethics provides students with the language to give shape to their thoughts. Different ethical perspectives/theories provide the basis from which students can consider what kinds of questions can be asked in an ethical dilemma. The Primer section entitled 'Ethics Background', provides background on these perspectives.

Many teachers find it easiest to begin with what are widely referred to as the 'Four Principles' of bioethics: respect for persons/self-determination (autonomy), beneficence (do good), nonmaleficence (do no harm), and justice (treat others equitably, distribute benefits/burdens fairly). Beneficence and nonmaleficence are closely related and are sometimes grouped by ethicists under the broader heading of 'utility', (Veatch, 2003) and could also be combined for classroom use. Principle-based ethics provides a familiar form of reasoning for students, and it is fairly concrete for teachers as well.

After becoming comfortable with Principle-based ethics, teachers often progress to teaching about other ethical perspectives. In the Ethics Background Summary for students, five general perspectives are presented (Outcomes, Rules, Principles, Care, and Virtue). While there are additional perspectives that are not included, these five represent some of the major 'schools of thought' in ethics.

Decision-Making Framework

Traditional 'Science-Technology-Society' (STS) approaches have achieved limited success, mostly because they lack a coherent pedagogical theory, attention to ethical issues, or focus on the moral development of students (Zeidler 2004). These problems can be addressed by introducing students to models for critical reasoning, as well as by supporting their understanding of ethical perspectives.

Too often, teachers provide the starting content only, and then ask students to 'discuss' the issue or justify their position. Pairing the content with a decision-making framework helps students to organize their thoughts and to craft their positions in a logical way. It may be instructive to have students reflect on the process they use when making decisions related to ethics in their own lives, and articulate their own model.

While several decision-making models exist, the one developed by the Hastings Center (Campbell et al. 1990) is particularly useful. Please see the section on Decision-Making Frameworks for additional information.

The three components described work synergistically in supporting informed ethical discussion in the science classroom. Teachers report that using these methods energizes their science students, often engaging individuals for whom science seems abstract or uninteresting. Parents have remarked that their students are more aware of the different perspectives and positions that can be taken on an issue. We hope that these strategies will allow teachers to more confidently address ethical issues in science with their students, thereby fostering student understanding science as a social enterprise. The skills acquired by students are useful not only in the science classroom, but translate into lifelong skills for responsible citizenship.

Ethics Background

Ethics Background

This section of the primer provides an overview of some of the features of ethics as a discipline.

The materials in this section are designed to introduce students to the scholarly study of ethics and some of the language and concepts that are used in the field. These resources should help students to investigate the relationship between their position on issues and the various ethical perspectives.

The **Process of Ethical Inquiry** flow chart provides a visual representation of some of the elements of ethical analysis. The flow chart that follows demonstrates the components of ethical inquiry in graphical form. The elements of awareness, ethical background, reasoning, decision-making, motivation/action, and evaluation, are explained/explored in more detail in the summary that follows the chart.

Several points link to material discussed in the Strategies section. For example, the element of awareness can be explored through the strategies of Narrative Ethics, and the Decision-Making Model can be used when reasoning and deciding on the best course of action.

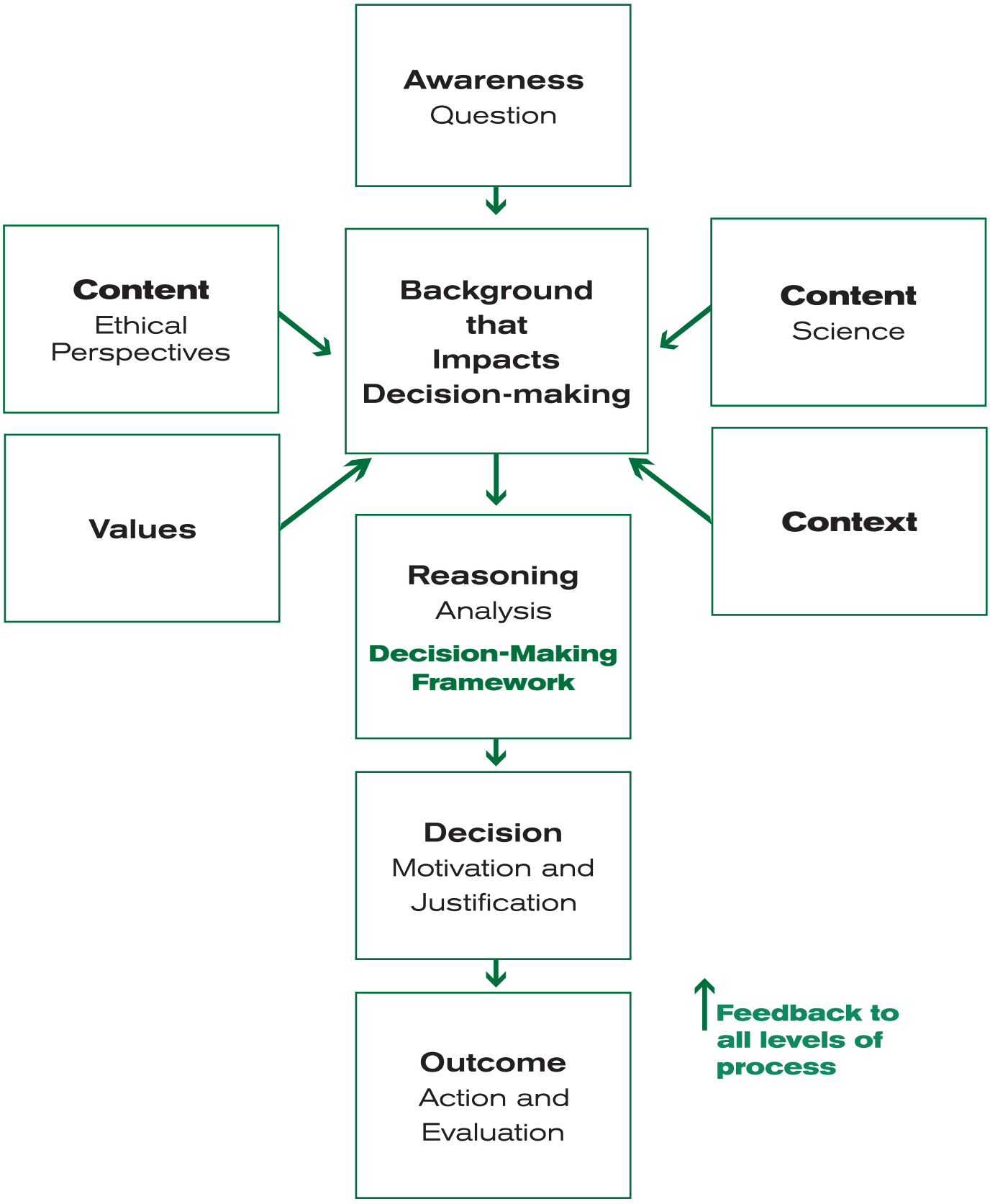
The ethical perspectives provide background on the ethical dimensions of an issue, but other background information (values, context, and especially science content) must also be considered.

The **Background Reading: Ethical Perspectives and Theories** provides an overview of ethics, morals, and values, as well as a comparison of different perspectives, is provided.

Several **One Page Summary Sheets** suitable for use with students are provided. Each of these provides information on commonly used ethical perspectives. These perspectives all represent efforts to understand, organize and structure moral life. Each one provides a framework that helps human beings determine which human actions are morally right or morally wrong.

The **Comparison of Main Ethical Perspectives** table shows how the ethical approaches relate to one another.

The Process of Ethical Inquiry



The Process of Ethical Inquiry

The Process of Ethical Inquiry Flow Chart provides a visual representation of the steps involved in analyzing and responding to an ethical issue related to science. The following components are part of the sequence diagrammed:

1. Awareness: Questioning

SENSITIVITY: Being able to recognize the issues and frame the question. Moral analysis begins when there is confusion about competing alternatives for action, when values of stakeholders conflict, and when none of the alternatives are entirely satisfactory for resolving the dilemma.

2. Background: Ethical Perspectives and Values

Many elements influence the background that goes into decision-making. These include:

Science Content – presented in classroom and/or researched by students.

Ethical Content - presented in classroom (discussion of perspectives and theories) and/or researched by students.

The Ethics Background Summary for students presented in this section provides background information on ethical content.

Context - the cultural, legal, social, historical context

Values - the values brought by the students themselves, based on family values, religious values, cultural values, etc. Because values differ for each student, each student will bring their own perspectives and ideas into the process.

3. Reasoning: Using Frameworks and Critical Thinking Tools

JUDGMENT: The student makes a judgment about what course of action is morally right (or fair, or just, or good), thus prescribing a potential course of action regarding what ought to be done.

The student analyzes the situation and takes a logical and critical approach to reasoning through the problem.

Decision-Making Frameworks are useful in helping to structure student thinking about a problem.

4. Decision: Motivation and Justification

MOTIVATION: Personal Responsibility/Commitment
The student makes the decision to do what is morally right.

5. Action and Evaluation

CHARACTER: Perseverance / Implementation

The student implements the moral course of action decided upon and evaluates the outcome. The cycle may be repeated.

Based in part on materials modified from Dr. Kelly Fryer-Edwards, University of Washington Department of Medical History Ethics, and from the Four Component Model of Morality (Rest 1984).

NAME_____ Date_____ Period_____

Background Reading: Ethical Perspectives and Theories

How Does Ethics Differ from Morals and Values?

The terms 'values', 'morals', and ethics are often used interchangeably. However, there are some distinctions between these terms that are helpful to make.

- **Values** signify what is important and worthwhile. They serve as the basis for moral codes and ethical reflection. Each individual has their own values based on many aspects including; family, religion, peers, culture, race, social background, gender, etc. Values guide individuals, professions, communities, and institutions. One expression of values might be that 'Life is sacred.'
- **Morals** are codes of conduct governing behavior. They are an expression of values reflected in actions and practices. Morals can be held at an individual or communal level. For example, 'One should not kill' provides a guideline for action based upon values.
- **Ethics** provide a systematic, rational way to work through dilemmas and to determine the best course of action in the face of conflicting choices. Ethics attempt to find and describe what people believe is right and wrong, and to establish whether certain actions are actually right or wrong based on the all the information available. For example, ethics might address a question such as 'If killing is wrong, can one justify the death penalty or kill in self-defense?'

What Are Some Different Ethical Perspectives?

Ethicists defend their positions using different ethical perspectives and theories. Five of the major perspectives are described here.

- **Moral Rules**
  An action is right if it follows certain fundamental moral rules. In Rules-based perspectives, the important feature is that action itself should be considered, not what happens as a result of that action. This theory emphasizes moral duties and obligations as well as moral rights. Examples of commonly used rules are not treat people as only a 'means to an end' and to 'treat others as you would like to be treated yourself'. Someone arguing from a rules-based perspective might say that his or her moral rule or duty is to 'always avoid killing'.
- **Virtues**
  An action is right if it conforms to a model set of attributes inherent in a particular community. Virtues-based ethics looks at the overall character that is considered desirable by a community. It then asks, 'what would the virtuous person do?' Ancient Greeks identified certain virtues that are

still widely recognized today as important such as compassion, honesty, courage, and forgiveness. Virtue ethics looks at the whole person and their behaviors over their lifetime in many situations. For example, killing may not be considered in harmony with a virtuous character that emphasizes forgiveness.

- **Outcomes**
  An action is right if good consequences outweigh bad consequences. Outcome-based approaches look at the results of actions in determining whether they are ethical or not. Often this theory will look for solutions that will create the greatest 'good' for the greatest number. For example, killing some people may be justified under this perspective if many more will be saved as a result.

- **Principles**
  An action is right if it follows the principles:

  Respect: Respect individuals and their autonomy (right to make independent choices).

  Beneficence: Be of benefit

  Non-maleficence: Minimize Harm

  Justice: Treat others equitably, distribute benefits/burdens fairly.

  The principles provide a combination of rules and outcomes-based perspectives. For example, respect for individuals and justice are focused more on rules, and beneficence and non-maleficence require looking at the outcome of an action. The principles are widely used in biomedical ethics. Suppose a person who was dying wished to be killed. The principle of autonomy might be interpreted to say that in order to respect that individual's wish, they should be killed. However, suppose the patient had asked a doctor to do the killing. A doctor who had vowed not to harm others might invoke the principle of non-maleficence and decide they could not kill the patient.

- **Care**
  An action is right if it acknowledges the importance and value of interpersonal relationships. Care ethics also looks at the underlying power structures of a situation. For example, an ethicist using the perspective of care might look at how an oppressive or exploitative social structure may underlie an act of killing.

  Each of these perspectives allows different questions to be asked of an ethical dilemma. For example, in looking at different solutions one might ask, "which one provides the greatest good for the greatest number?" "which solutions are the most fair to the parties involved", or "which are consistent with moral rights and duties?" Familiarity with these perspectives can provide you with a language to describe and defend your position, and help you see how your arguments align with established philosophical perspectives.

Moral Rules and Duties (Deontological Ethics)

Summary

In this perspective the focus is on the nature of an ACT itself, and not what happens as a result of that action.

The emphasis is on being motivated by moral duties and acting in accordance with them. Respect for persons is also stressed in this view.

The German philosopher Immanuel Kant (1724-1804) was a major proponent and developer of this approach to ethics. Kant formulated a 'categorical imperative' (a command that is absolutely binding, without exceptions), and stated it in several ways:

1. *"One must act only in such a way that one could will one's act to become a universal law or rule (maxim)".*
   One should act only in ways that would be acceptable if everyone else acted that same way.
2. *"Act in such a way that always the action treats humanity never simply as a means, but at the same time as an end".*
   One should not treat persons as a means to an end only, where the outcome is the only concern.

Kant distinguishes between perfect and imperfect duties. Perfect duties must always be done – do not commit suicide, do not kill innocents, do not lie, etc. Imperfect duties must only sometimes be done – develop our talents and ourselves, contribute to the welfare of others.

Contributions

- Offers consistent principles or rules
- Persons must be treated as ends in themselves and never only as a means to an end
- Recognizes individual rights

Challenges

- Does not offer a way to deal with conflicting obligations
- Perfect duties permit no exceptions, which can sometimes be morally difficult to reconcile
- Does not offer much guidance about forming and applying moral rules in a real life setting

Adapted with permission from Laura Bishop, Ph.D., Kennedy Institute of Ethics, Georgetown University

Virtues

Summary

This perspective focuses on the CHARACTER of the individual and his or her attitudes or traits.

Examples of virtues are honesty, courage, integrity, trustworthiness, wisdom, temperance, and justice.

Actions that are morally virtuous conform to a model set of attributes valued or inherent in a particular community.

It is the virtue that makes an act right or wrong. The individual must work to cultivate virtuous traits to ensure that he or she will act morally rightly.

Virtue ethics emphasizes that our actions both build and reflect our character and core commitments. It is an ancient theory from classical Greek ethics.

Contributions

- Broadens the perspective beyond that of the ACT to include the CHARACTER of the individual
- Encourages the identification and cultivation of human excellence, a prerequisite for good living. Specific virtues are identified as prerequisite for the practice of good medicine, good nursing, good science, etc.
- Compatible with ethical principles

Challenges

- Lack of consensus regarding the essential virtues
- Skeptics question whether good character or virtue can be taught
- Virtue is of a very personal nature
- An agent can be of good character and do wrong - or be of bad character and do right - virtue theory does not explain this fact very effectively

Adapted with permission from Laura Bishop, Ph.D., Kennedy Institute of Ethics, Georgetown University

Outcomes (Consequentialist, Utilitarian)

Summary

The focus of this perspective is on the CONSEQUENCES of the action.

The morally appropriate act is one that maximizes the amount of whatever outcome is deemed good and identified as intrinsically valuable, useful, or good.

Consequentialists seek to bring about the greatest good for the greatest number of people.

English philosophers Jeremy Bentham and John Stuart Mill were crucial in the development of utilitarianism as a form of consequentialist ethics. In its most simplistic and traditional form, utilitarianism identifies "pleasure" as the good that must be maximized and "pain" as the evil that must be minimized. Utilitarians want to maximize happiness so they determine which actions will have the best outcome in terms of happiness or pleasure, and act so as to bring it about. Moral action is that which results in good or desirable consequences. The rightness of the act is measured by the good or bad consequences it brings about – more good is better. Contemporary utilitarian philosophers identify other values as "good" such as friendship, health, knowledge, etc.

Terms associated with consequentialism: Utility, consequences, ends, outcomes, cost/benefit analysis, "the ends justify the means"

Contributions

- Considers the interest of all persons equally
- Directs attention to the consequences of actions
- Offers a familiar form of reasoning – thinking about consequences to guide actions
- Can be used to establish public policy

Challenges

- Bad acts with good consequences might be permissible
- Ignores or does not do justice to the particular and morally significant relationships that make up our lives – the highly personal nature of "duty"
- Interests of majority can override the rights of minorities
- Makes people responsible for too much; requires too broad a view Must take into account ALL people and ALL consequences
- Hard to determine what counts as a benefit or a harm, hard to compare benefits/harms

Adapted with permission from Laura Bishop, Ph.D., Kennedy Institute of Ethics, Georgetown University

Principles — Respect, Justice, Nonmaleficence, Beneficence

Summary

The focus of this perspective is on the four PRINCIPLES supported by or compromised by the question or issue at hand.

Philosophers Tom Beauchamp and Jim Childress identify four principles that form a commonly held set of pillars for moral life.

Respect for Persons/Autonomy	Acknowledge a person's right to make choices, to hold views, and to take actions based on personal values and beliefs
Justice	Treat others equitably, distribute benefits/burdens fairly.
Nonmaleficence (do no harm)	Obligation not to inflict harm intentionally; In medical ethics, the physician's guiding maxim is "First, do no harm."
Beneficence (do good)	Provide benefits to persons and contribute to their welfare. Refers to an action done for the benefit of others.

Contributions

- Draws on principles or pillars that are a part of American life – familiar to most people, although not by their philosophical term
- Compatible with both outcome-based and duty-based theories (respect for persons and justice are duty-based, while nonmaleficence and beneficence are outcome-based).
- Provides useful and fairly specific action guidelines
- Offers an approach that is appropriate for general bioethics and clinical ethics
- Requires weighing and balancing – flexible, responsive to particular situations

Challenges

- Lacks a unifying moral theory that ties the principles together to provide guidelines
- Principles can conflict and the theory provides no decision procedure to resolve these conflicts
- Difficult to weigh and balance various principles
- Autonomy in some cultures refers to individual autonomy, while in others refers to group/family/community autonomy

Adapted with permission from Laura Bishop, Ph.D., Kennedy Institute of Ethics, Georgetown University

Care

Summary

The focus of this perspective is on RELATIONSHIPS, POWER, and on understanding the STRUCTURES underlying situations. Ethicists using this perspective might examine these aspects of an issue:

1. Vulnerable Populations

- Who makes up the most vulnerable populations?
- Ethical analysis should focus on these populations, because how they are treated in a society reflects the morals of that society.

2. Importance of Experience

- What are the personal and collective experiences of the individuals considered?
- Knowledge that comes from experience is valuable

3. Underlying Structure

- What is the underlying structure of the situation? (Looking at the structure gets us away from labeling 'good' or 'bad' people.)
- How does the structure drive certain aspects of the situation? Is the structure itself oppressive?
- What is being ignored? Is my attention being distracted? Should I be suspicious?
- Who benefits? At whose expense? What is being left out?

4. Relationships

- What are the qualities of the relationships?
- 'Right-relationships' honor the dignity of human beings and are based on mutual benefit instead of domination.

Contributions

- Provides a balance to principle-based approaches
- Provides context

Challenges

- Power structures are not always evident
- Lacks rules or principles that are easy to apply

Modified with permission from Dr. Kelly Fryer-Edwards, University of Washington Department of Medical History and Ethics, 2003. Based on notes from Suzanne Holland, Ph.D., University of Puget Sound.

Comparison of Main Ethical Perspectives

Ethical THEORY	MORAL RULES and DUTIES	VIRTUES	OUTCOMES	PRINCIPLES	CARE
Other Names	Duty-Based (Deontological) or Rights-Based Ethics	Virtue-based Ethics	Consequentialist Ethics (Utilitarian)	Principle-Based Ethics	Care-based Ethics
Focus	Act	Agent	Consequence	Context	Power/ Relationships
Description	Actions (independent of consequences) are right or wrong. We are all obliged to fulfill our duties and to act to fulfill these duties	Attitudes, dispositions, or character traits enable us to be and to act in ways that develop our human potential (for example, honesty, trustworthiness, integrity, faithfulness, etc.)	Consequence of actions or policies must uphold the well-being of all persons directly or indirectly affected. Choose actions producing greatest overall benefits	Four principles form a set of pillars for moral life; respect for persons/ autonomy, justice, beneficence (do good), and nonmaleficence (do no harm)	Focuses on relationships and underlying power structures within a situation
What would a person from such an approach say?	"Whenever I am _____, I shall _____. Whenever anyone is _____, he or she will _____." "The ends do not justify the means."	"What is ethical is what develops moral virtues in ourselves and our community." "It takes a virtuous person to act in a virtuous manner; if you always act in a virtuous manner, you are a virtuous person."	"Of any two actions, the most ethical one will produce the greatest balance of benefits." "The ends do justify the means."	"Uphold the pillars whenever possible according to the situation." "Take the agent, act, and consequence all into consideration and proceed in the path that follows the principles."	"What is not being said?" "What are the underlying power relationships and how do they influence actions?" "How can we value relationships?"
Some Contributions	-Offers consistent rules to follow -Recognizes role-related duties in society	Encourages cultivation of human excellence	-Directs attention to consequences -Considers interests of all persons equally	-Requires balancing -Draws on principles familiar to American life	-Provides counterpoint to principle-based approaches -Looks at context
Some Challenges	Sometimes obligations conflict	Lack of consensus regarding essential virtues	-Bad acts are permissible -Interests of the majority can override minority -Can't predict all outcomes	Principles can conflict	-Power structures not always evident -Lacks easily applied rules/ principles

Adapted with permission from Laura Bishop, Ph.D., Kennedy Institute of Ethics, Georgetown University, and Wendy Law, Ph.D., Fred Hutchinson Cancer Research Center.

Lesson Strategies

Lesson Strategies

This section of the primer contains suggestions for strategies that can be used to introduce elements of ethical inquiry into the science classroom.

The **Ethics Classroom Strategies Chart** summarizes the features of each approach, including the classroom time required.

Each strategy is described in more detail following the chart. Teacher directions are provided, along with student handouts where appropriate.

The **Ethics in Science Sample Rubrics and Assessments Chart** provides some sample assessments and scoring guides, including discussion rubrics, policy letters, and letters to the editor.

Ethics Classroom Strategies Chart

Ethics Classroom Strategy	Summary	Sample Use	Short (Less than 1 hour)	Medium (Approx. 1 hour)	Longer (2-5 class periods)	Page
General Discussion Background	Ideas for setting norms and conducting classroom discussions are provided.	Introductory /Discussion	*	*		32
Choices and Values	Students will decide what they value and how values affect their choices in everyday living.	Introductory		*		34
Values Prioritization	Students are asked to prioritize their own values and reflect on the importance of values in individual and group decision-making	Introductory	*	*		38
Science and Ethics – Subjective or Objective?	Students consider where science and ethics fall along the range of purely subjective to purely objective.	Introductory	*			46
Awareness: Ethical Questions	Students distinguish between ethical questions and other types, and learn how to ask ethical questions.	Introductory	*	*		47
Range of Perspectives: Four Corners	Students position themselves in the room according to their position on an issue.	Introductory	*	*		55
Range of Perspectives: Examples Along a Line	Students place examples along a range from acceptable to not acceptable.	Introductory	*	*		56
Lifeboat Exercise	Students learn/reflect on ethical perspectives using a hypothetical example.	Introductory	*	*		57
Classical Ethical Dilemmas	Students use simple, classical dilemmas to learn or reinforce their understanding of ethical theories and perspectives	Introductory	*	*		59
Focus on the Principles	Students are introduced to the biomedical ethical principles and use them to consider implications of an ethical question.	Introductory		*		61

Ethics Classroom Strategy	Summary	Sample Use	Short (Less than 1 hour)	Medium (Approx. 1 hour)	Longer (2-5 class periods)	Page
Ethical Perspectives Review	Students practice their understanding of ethical perspectives by matching them with different hypothetical scenarios.	Introductory	*			64
Ethical Perspectives and Familiar Examples	The 'moral of the story' in fairy tales, the issue of cheating, or creative dramatization are used to learn ethical perspectives.	Introductory	*	*		66
Ethical Theories and Perspectives Skits	Students create short skits that highlight different ethical perspectives	Introductory		*		67
Foursquare/ Carousel	A general classroom strategy adopted to focus on different ethical perspectives.	Introductory	*	*		73
Critical Reasoning Analysis Using the Elements of Thought	Students use the 'elements of thought' to analyze information.	Introductory	*	*		74
Identifying Stakeholders and Values	Students identify stakeholders in an ethical issue and examine their values.	Introductory	*	*		77
Creating a Decision-Making Model	Students use their own decision-making process to design a framework.	Introductory		*	*	77
Introduction to Decision-Making Framework	Students learn how to apply a decision-making model to an ethical dilemma.	Introductory		*	*	78
Pro/con Paper Using Ethics	This is a version of a classic essay, but focuses on ethical perspectives.	Essay			*	79
Position Analysis	Students analyze an ethical position or perspective taken by an author of a news article or opinion essay.	Essay		*	*	79

Ethics Classroom Strategy	Summary	Sample Use	Short (Less than 1 hour)	Medium (Approx. 1 hour)	Longer (2-5 class periods)	Page
Rules vs. Outcomes	Students analyze an issue through the lenses of two major ethical perspectives.	Movie/ Discussion	*	*		80
Documentary Film Analysis	Students use a documentary to analyze arguments based on facts/opinions, to analyze pros/cons, and to map arguments to ethical perspectives.	Movie/ Discussion		*		82
Narrative Ethics	Students analyze how perception of an issue is influenced by the way it is presented.	Movie/ Discussion	*	*		86
Same Perspective, Different Arguments	This group strategy shows students that one ethical perspective can be used to argue both sides of an ethical dilemma.	Discussion		*	*	89
Structured Academic Controversy	A text-based small-group deliberation model where students learn about both sides of an issue before examining their own perspectives.	Discussion/ Deliberation		*	*	90
Case Study	Students examine a case assuming stakeholder roles in order to analyze an ethical issue.	Discussion/ Deliberation		*	*	93
Congressional Hearing Model	Students assume stakeholder roles and make a brief presentation to a 'Congress'.	Discussion/ Deliberation			*	94
Debate	A traditional class debate can be a useful tool for examining an issue.	Discussion/ Deliberation		*	*	98
Socratic Seminar	Students engage in a group discussion, examining ideas, issues, and principles related to a particular content.	Discussion		*	*	104

Ethics in Science Sample Rubrics and Assessments

Ethics Rubrics	Summary	Sample Use	Page
Socratic Seminar Rubric	A rubric for evaluating a Socratic Seminar discussion.	To evaluate participation of students. May also be used for peer or self evaluation.	111
Discussion	A rubric for evaluating classroom discussion of ethics in science.	When conducting classroom discussion, for self or peer evaluation.	112
Sample Policy Letter Rubric	A general rubric for a policy letter.	A letter to the President or government official advocating for a particular policy.	114
Letter to the Editor Checklist and Scoring Guide	A general format for developing and scoring a letter to the editor.	A letter to a newspaper from a particular position.	117
Decision-Making Framework Checklist	A scoring sheet to use in conjunction with the Decision-Making Framework.	To assess student understanding of the Framework.	128

General Discussion Background

Summary

Setting norms helps foster productive conversations. Suggestions for conducting classroom discussions are also provided.

Teacher Instructions

Introduce norms as 'standards or models by which behavior is judged within a community as acceptable/unacceptable'.

Ask students why norms are important for class discussions of ethics. Tell them that they will set norms for their own class.

Allow students some quiet reflection time

Gather ideas from the group in a brainstorming session: One method is to ask students to generate a list of norms in small groups, and then ask each group to share one norm until all have been listed.

Clarify and consolidate norms as necessary

Post norms where they can be seen by all and revisit them often

Possible Student Discussion Norms

- A bioethics discussion is not a competition or a debate with a winner and a loser.
- Everyone will respect the different viewpoints expressed.
- If conflicts arise during discussion, they must be resolved in a manner that retains everyone's dignity.
- Everyone has an equal voice.
- Interruptions are not allowed and no one person is allowed to dominate the discussion.
- All are responsible for following and enforcing the rules.
- Critique ideas, not people.

Suggestions for Conducting Classroom Discussions

- Listen carefully to what students are saying when they argue a particular issue. Be patient and allow students to express their views fully.
- Take notice of the words that students use in arguing their positions. Often the choice of words will reveal a bias or an unquestioned assumption.
- Ask clarifying questions. Many students will express important ideas that are rough or unclear. Asking students to define their terms or to reword their statements may help students hone their ideas.
- Make distinctions that will further the analysis. For example, if students are discussing duties, ask them what kinds of duties they want to include or emphasize (legal, professional, ethical)?
- Look for logical inconsistencies or fallacies in the students' arguments.
- Ask yourself whether a student's comment is supportive of an ethical theory (e.g. utilitarianism or rule-based theories). Challenge them to consider the shortcomings of that theory and how an alternate theory might address the issue.
- Challenge students to take an opposing view or to be critical of their own view. Ask them to consider the weaknesses of their arguments. What, if anything, makes them uneasy about their own views?
- Ask students to justify their views or the statements they make. If the response is 'I just feel that way' or 'I just know it's right', ask them to explain why. Many times students will refer to principles or values to justify their views, and these provide more justificatory power than do feelings or intuitions. If no principle or value emerges, challenge students to consider whether their emotive responses or intuitions are wrong.
- Provide balance. Play the devil's advocate. Don't let the argument be decided by the strength or a student's personality or by the loudness of the argument.
- Check for redundant views. Keep the analysis simple.
- Be on the lookout for frustration. If you sense a student is becoming frustrated, ask him or her to express this frustration. Many times this will lead to interesting and important ideas.
- Stick to the case. While departing from the case may sometimes be useful, letting the discussion wander can be dangerous. You may create a discussion that is difficult to direct. Stick to the facts of the case. Many of the facts will limit the number of the issues that need to be considered.

Contributed by the Department of Genome Sciences Education Outreach and the Department of Medical History and Ethics, University of Washington

Choices and Values

Summary

Students will decide what they value and how values affect their choices in everyday living.

Student Handouts: Value Characteristics, What's Important to Me?, What is a Value?

Teacher Instructions

Have students fill out the checklist 'What's Important To Me?'

(Note: before copying, review list for any that may not be appropriate for your community and delete or change.)

Ask students to go back through the list and pick the four to five values that are the most important to them and write the numbers in the blanks at the bottom. Then have them refer to the 'Values Characteristics' handout, find the numbers they have chosen on the left side of the page and write the corresponding words on the lines at the bottom of the page.

Refer students to 'What is a Value?' Discuss the definition of values. Do the students think the four or five they have selected are the qualities that motivate them to act as they do? Have students share their values with a friend. Did they have any the same? (It is natural for people to associate with people who share the same values).

Student Handout

NAME_____ Date_____ Period_____

Choices and Values: What's Important to Me?

Take a few minutes to think about the meaning of the items listed below. Indicate with a check mark the items that are important to you.

1. ___ A physical appearance to be proud of
2. ___ To graduate with honors
3. ___ Being an honest person.
4. ___ To have political power.
5. ___ Being known as a "real" person
6. ___ A meaningful relationship
7. ___ Self-confidence and personal growth
8. ___ Enjoyment of nature and beauty
9. ___ A life with meaning, purpose, fulfillment
10. __ Continuing to learn and gain knowledge.
11. __ A chance to help the sick and disadvantaged
12. __ To be atractive to others
13. __ Some honest and close friends
14. __ A long and healthy life
15. __ A meaningful relationship with God
16. __ A good marriage
17. __ Satisfaction/success in the career of your choice
18. __ An equal opportunity for all people
19. __ Freedom to live life as you want
20. __ A financially comfortable life
21. __ Accomplishment of something worthwhile
22. __ A secure and positive family life
23. __ An enjoyable, leisurely life
24. __ Unlimited travel, fine foods, entertainment, recreational, and cultural opportunities
25. __ Getting things changed for the better
26. __ A beautiful home in the setting of your choice
27. __ A chance to develop creativity/potential in any area
28. __ Owning a possession of great value
29. __ To speak up for my personal beliefs.
30. __ To have better feelings about myself
31. __ To be needed and to be important to others
32. __ To become a good parent
33. __ To have a better relationship with my parents
34. __ To be sexy
35. __ To persevere in what I am doing
36. __ Time for prayer
37. __ To give of myself freely in helping others
38. __ A safe and secure environment
39. __ To be loved by a special few
40. __ To be trusted by others

List below the number of the four or five items that are most important to you:

A._____ B._____ C._____ D._____ E._____

When you have listed the 4 to 5 items that are most important to you, refer to the "Value Characteristics" sheet and write the appropriate characteristics related to these numbers.

NAME_____ Date_____ Period_____

Choices and Values: Value Characteristics

NUMBER	CHARACTERISTIC
5	Sincerity
3, 40	Honesty, Integrity
7, 30	Emotional well-being, Stability
8	Artistic appreciation
2, 10	Education, Intelligence, Wisdom
11, 37, 18	(Altruism) Compassion, Fairness, Justice
1, 12, 34	Appearance, Beauty, Approval
6, 13, 31, 39	Love, Friendship, Personal closeness
14, 38	Health, Personal safety, Security
15, 36	Religion, Spirituality
16, 22, 32, 33	Family, Love, Emotional security
9, 17, 21, 27	Fulfillment, Intellectual and Vocational achievement
19	Personal freedom, Independence
20, 26, 28	Financial security, Money, Status
23, 24	Pleasure, Travel, Material satisfaction
4, 25	Power, Achievement
29	Courage
35	Perseverance

Write the characteristic that corresponds to the numbers you selected on the checklist.

1. _____
2. _____
3. _____
4. _____
5. _____

NAME_____ Date_____ Period_____

What is a value?

Values are those inner standards from which you receive the motivation to act as you do and by which you judge behavior (both yours and others).

Values signify what is important and worthwhile. They serve as the basis for moral codes and ethical reflection. Each individual has their own values based on many aspects including; family, religion, peers, culture, race, social background, gender, etc. Values guide individuals, professions, communities, and institutions.

1. A value must be chosen freely. If you don't cheat because someone tells you not to, or because you know you will get into trouble with some authority figure, say, you are not freely acting on your values of honesty and integrity.

2. A value is always chosen from among alternatives. If you don't cheat because you are taking a test in an empty room without any resources, you cannot say you chose not to cheat. There must always be an alternative in choosing your value.

3. A value results from a choice made after thoughtful consideration of choices. If you don't cheat because it never occurred to you to do otherwise, there is no value at play. If you cheat thoughtlessly or carelessly, it does not reflect a value. Only when you carefully consider alternatives and consequences and then make a choice is value reflected in that decision.

4. When you value something, it has a positive quality for you. If your decision not to cheat is something you feel good about, then it is based on a value. You like yourself for your honesty and integrity. You prize them and cherish these qualities in yourself.

5. You are willing to publicly stand by your values. Not only are you proud of your choice not to cheat, you will speak about your position and even try to convince others not to cheat. You declare in your actions and your words that you value honesty and integrity.

6. When you have a value, it shows up in every aspect of your life. You don't just talk about having honesty and integrity – you live it. You will spend time and energy on developing your honesty and integrity. You will associate with people who also value honesty and integrity. You will make sacrifices (money or otherwise) to live by your values.

7. Values show up again and again in your actions. Not cheating on one thing does not mean you hold a value. Only when you make the same kind of choices over and over again in similar circumstances is value at play. Because of your honesty and integrity, you don't cheat on anything. From small quizzes to big tests, from board games to big contests, your value is in effect in every circumstance.

Adapted from materials found on: http://www.mtsu.edu/~u101irm/valuedef.html

Originally from Louis E. Raths, Merrill Harmin, and Sidney B. Simon, Values and Teaching, Columbus, Ohio: Charles E. Merrill Publishing Co., 1978.

Values Prioritization

Summary

Students are asked to prioritize their own values and reflect on the importance of values in individual and group decision-making. Students are asked to link outcomes important to them with values they may hold.

Teacher Instructions

Students are asked to prioritize their own values and reflect on the importance of values in individual and group decision-making. Students are asked to link outcomes important to them with values they may hold. This activity follows the 'Choices and Values' one.

Student Handouts – Values Prioritization, What is a Value?, Values Definition Table, materials from Choices and Values activity

Ask students to offer their definitions of the word 'value'. What do people mean when they say things like 'family values', 'school values', 'religious values' etc?

Review the 'What is a Value?' sheet that lists the criteria for values to clarify what makes a value a true value.

Provide the 'Values Definition Table' and explain that 1) students might use it as a resource when they're having difficulty verbalizing what the value at play might be, and 2) as lengthy as this list might be, it is still an incomplete one, and it is important that they continue to think about the criteria for values in coming up with values relevant to a given situation.

Review the 'Choices and Values: Value Characteristics Sheet'.

Ask students to prioritize their top values on the Value Characteristics Sheet. Have students rank their values in order of importance.

Discuss what students felt they learned from the activity of prioritizing values – Was it difficult? What was challenging about it? Did they learn anything new about themselves and their own priorities?

Variation

Values Auction

It is often advisable to keep the individual values of students private. However, in some contexts, teachers and students may be comfortable talking about student values as a group. One variation of prioritization is an 'auction'. Have students prioritize their values as above, and then conduct the auction for values. If they had '100 points' to spend, and if 20 points meant that they could definitely 'keep' that value, how would they assign their points?

For example, if honesty, family, and perseverance are non-negotiables, a student might set aside 60 points to guarantee that they will win these and keep these. With the remaining 40, they might hope to bid and get resilience, spirituality, intelligence, and fairness. They will have to do some thinking on their feet if the bidding reaches a point where they will need to "let it go" or keep bidding because it's that important.

The prioritization exercise shows that values will influence what we do, what the most important things in life are to us as individuals. Also, the activity illuminates that we might have some shared values, but it is unlikely to have two people who hold the EXACT same value sets. This factor comes into play when we make decisions as a group or make decisions that impact a group.

Alternatively, wait until after the lesson to introduce the criteria and definitions, in order to give clarity to discussion points, to come to a common understanding, and to explain that the exercise hits a small subset of the true range of values possible in our lives.

This activity is a good one to precede discussion of stakeholders and values in ethical dilemmas.

Note: Values clarification was a popular exercise in the 1960's and 1970's. However, the use of such exercises became contentious in the later part of the century. Today, the scholars in values clarification emphasize the need to share with students that not all values are relative – within particularly social contexts, certain values have primacy. Additionally, values clarification methods in and of themselves are not sufficient for developing appropriate values and moral behavior in young people, but need to be combined with values learned from family, religious and spiritual leaders, and from the larger community and society in which the individual operates.

For more information, see

Kirschenbaum, Howard, A Comprehensive Model for Values Education and Moral Education, Phi Delta Kappan; v73 n10 p77176 Jun 1992, http://www.hi-ho.ne.jp/taku77/refer/kirsch.htm

Baer, Richard A., Jr., Teaching Values in the Schools, American Education; v18, n9, p11-17, Nov 1982, http://www.hi-ho.ne.jp/taku77/refer/baer.htm

Contributed by Rosetta Lee, Seattle Girls School, Seattle, WA

Student Handout

NAME_____ Date_____ Period_____

Values Prioritization

Values Auction and Discussion

You have 100 Resource Points to spend. Using your Resource Cards, bid on the values that are worth most to you. 20 Resource Points purchases a value automatically, whereas only the top bidders will get to claim the values for point values below 20. List values you want to bid for, and circle values you won through bidding.

Values I want to bid for:

_____ _____

_____ _____

_____ _____

_____ _____

Discussion Points:

1. Why did we do a "bidding" for these values, do you think? How does the bidding represent what we do with values in real life?

2. What might be the "resource cards" represent in real life? How and what do we spend to gain and develop our values?

3. Where do our values come from? Who or what influences the values we have, get, keep, or discard?

4. Is your set of most important values the same as someone else? How might these similarities and differences play out in decisions we make as a group?

5. (Optional) How does class or economic resources affect our ability to gain some of these values? What do you think about this issue?

Contributed by Rosetta Lee, Seattle Girls School, Seattle, WA

Modified from a Handbook of Personal Growth Activities for Classroom Use, by R. and I. Hawley, and Open Minds to Equality: A Sourcebook of Learning Activities to Affirm Diversity and Promote Equality, by N. Schniedewind and E. Davidson.

NAME_____ Date_____ Period_____

Bidding Resource Points

Resources 5 points	Resources 5 points	Resources 5 points	Resources 5 points	Resources 5 points
Resources 5 points	Resources 5 points	Resources 5 points	Resources 5 points	Resources 5 points
Resources 5 points	Resources 5 points	Resources 5 points	Resources 5 points	Resources 5 points
Resources 1 point	Resources 1 point	Resources 1 point	Resources 1 point	Resources 1 point
Resources 1 point	Resources 1 point	Resources 1 point	Resources 1 point	Resources 1 point
Resources 1 point	Resources 1 point	Resources 1 point	Resources 1 point	Resources 1 point
Resources 1 point	Resources 1 point	Resources 1 point	Resources 1 point	Resources 1 point
Resources 1 point	Resources 1 point	Resources 1 point	Resources 1 point	Resources 1 point

Resources 5 points	Resources 5 points	Resources 5 points	Resources 5 points	Resources 5 points
Resources 5 points	Resources 5 points	Resources 5 points	Resources 5 points	Resources 5 points
Resources 5 points	Resources 5 points	Resources 5 points	Resources 5 points	Resources 5 points
Resources 1 point	Resources 1 point	Resources 1 point	Resources 1 point	Resources 1 point
Resources 1 point	Resources 1 point	Resources 1 point	Resources 1 point	Resources 1 point
Resources 1 point	Resources 1 point	Resources 1 point	Resources 1 point	Resources 1 point
Resources 1 point	Resources 1 point	Resources 1 point	Resources 1 point	Resources 1 point
Resources 1 point	Resources 1 point	Resources 1 point	Resources 1 point	Resources 1 point

NAME_____ Date_____ Period_____

Values Definition Table

Value	Definition
Acceptance	Having people receive you well
Accomplishment	Doing or finishing something well
Accountability	Feeling obligated to or being willing to accept responsibility
Adaptability	Ability to change behavior to fit new situations
Adventurousness	Tendency to do new and daring things
Allegiance	Loyalty or feeling obligated to be loyal
Altruism	Caring for others without regard to yourself
Ambition	Eagerness or strong desire to achieve something
Appreciation	Ability to see the quality and the importance of people and things
Aspiration	Strong and persistent desire for high achievement
Assiduousness	Quality of never quitting, being persistent, and working hard
Authenticity	Quality of being trustworthy or genuine
Autonomy	Quality of being independent
Benevolence	Tendency to do kind and giving things
Camaraderie	Goodwill and lighthearted connection to friends
Caring	Feeling and showing concern for others
Changeability	Ability to adapt to different circumstances
Charity	Generosity toward others
Chastity	Having not done anything wrong
Cheerfulness	Quality of being lighthearted; lessening gloom
Citizenship	Exercising the duties, rights, and privileges of being a citizen
Clear Thinking	Acting intelligently without mental confusion
Collaboration	Working cooperatively with others
Commitment	Feeling bound in mind or heart to someone or doing something
Community	Sharing, participation, and fellowship with others
Compassion	Being deeply aware of and wanting to lessen the suffering of others
Competence	Being qualified to do something
Competitiveness	Doing something better than others
Composure	Maintaining a peaceful or calm state of mind
Concern	Taking an interest in someone or something
Conscientiousness	Doing things very carefully and thoroughly
Consideration	Thinking carefully and always through things
Consistency	Doing things reliably and in the same way
Constancy	Remaining faithful to a person or an action in the face of change
Cooperation	Working willingly with others to accomplish something
Courage	Ability to face danger, fear, and obstacles with confidence

Values Definition Table 2 of 4

Value	Definition
Courtesy	Consideration for others
Credilbility	Having people believe you
Decency	Conforming to the standards of proper or modest behavior
Dedication	Devoting energy and time without concern for yourself
Democracy	Believing that everyone deserves the same rights and respect
Dependability	Being reliable
Determination	Having strong will, purpose, or character
Diversity	Respecting and wanting difference and variety
Easiness	Being relaxed and informal in attitude or standards
Education	Gathering and growing knowledge or skill through learning
Efficiency	Ability to make things happen with a reasonable amount of effort
Empathy	Ability to identify with other people's situations and feelings
Encouragement	Ability to get others to take action
Equality	Believing that everyone deserves the same treatment
Equity	Wanting things to be just, impartial, and fair
Excellence	Having qualities to an unusual degree
Fairness	Doing things consistently with rules, logic, and ethics
Faith	Confident and complete belief in someone or something
Faithfulness	Sticking firmly and devotedly to someone or something
Fidelity	Faithfulness, loyalty, or devotion
Flexibility	Ability to respond to change
Forgiveness	Willingness to stop blaming or being angry with someone
Fortitude	Ability to face danger, pain, or obstacle with calm resolve
Friendship	Having a relationship based on mutual respect and good will
Generosity	Willingness and desire to give
Gentleness	Being mild, calm, and docile
Genuine	Being true and not fake
Giving	Offering knowledge or things without expecting anything in return
Goodness	Being kind, thoughtful, or honest
Goodwill	Friendly attitude that says you wish good things to happen to others
Gratitude	Feeling thankful for or appreciating things, people, or their actions
Hardworking	Working hard, well, and tirelessly
Helpfulness	Giving useful help or advice in a friendly way
Honesty	Acting straightforwardly and fairly
Honor	Being upright in character and having personal integrity
Hope	Feeling that something you want can be yours or will happen

Values Definition Table 3 of 4

Value	Definition
Humility	Feeling that you are not better than others
Industriousness	Working hard and regularly
Ingenuity	Having inventive skill or imagination
Initiative	Ability to energetically start and follow through with a plan or task
Integrity	Strictly following what you believe is right and good
Joy	Intense happiness
Justice	Strictly following what you believe is fair and just
Kindness	Wanting to be good, kind, and giving to others
Law-Abiding	Following all the rules and laws of society
Liberty	Choosing freely to act, believe, or express yourself in your own way
Love	Feeling strong desire or attraction toward a person or idea
Loyalty	Feeling devotion, attachment, and affection toward a person or idea
Mercy	Forgiving someone even though you have the power to punish them
Moderation	Having neither too little or too much of anything
Morals	Your own belief about what is right or wrong that guides your actions
Obedience	Following the rules of what is required in a given situation
Optimism	Expecting the best possible outcome with bright hope
Patience	Waiting and withstanding without complaining or getting angry
Peace	Being free of conflict and violence
Perseverance	Sticking firmly and consistently to a course of action or belief
Promise-Keeping	Keeping your word that you will certainly do something
Prudence	Doing something right because it is the right thing to do
Punctuality	Adherance to the exact time of a commitment or event
Purity	Having done no wrong
Reason	Ability to think through and make good decisions
Recognition	Having people see and give you credit for all you have done
Reliability	Doing things consistently so that others can depend and trust you
Repentance	Feeling sorry and wanting to right past wrongs
Resilience	Ability to bounce back quickly from change or bad circumstances
Resourcefulness	Ability to act effectively and creatively, especially in tough situations
Respect	Showing polite attitude toward people or things that are important
Responsibility	Being accountable and answerable for something
Righteousness	Being without guilt or sin
Sacrifice	Willingness to give up a thing for something else more important
Self-Control	Being able to control your emotions, desires, or actions
Self-Discipline	Ability to make yourself do something even if you don't want to

Values Definition Table 4 of 4

Value	Definition
Sensitivity	Being aware of the needs and emotions of others
Serenity	Being calm in mind and even in temper
Sharing	Wanting others to take part, enjoy, or use together or in turns
Sincerity	Genuineness and honesty; not fake
Sobriety	Being calm, cool, and serious; freedom from extreme passions
Stamina	Having the physical or mental strength to do something for a while
Stewardship	Carefully conducting, supervising, or managing something
Supportive	Giving support and help
Thoughtfulness	Tendency to anticipate people's needs or wishes
Tolerance	Recognizing and respecting the beliefs and practices of others
Tranquility	Being calm and peaceful
Trustworthiness	Having people believe you and have confidence in you
Understanding	Having a positive, truthful relationship with others
Wisdom	Ability to make good decisions based on experience and learning
Additional Values	

List adapted from http://www.ethics.org/resources/values_defined.html. This is NOT a complete list of values, as a true list would be almost endless. When in doubt, see if the quality in question is a value by checking with the seven criteria for values ('What is a Value?' Handout)

Science And Ethics – Subjective Or Objective?

Summary

Students consider where science and ethics fall along the range of purely subjective to purely objective.

Teacher Instructions

Have students work in pairs with a blank sheet of paper.

Ask them to draw a line, and write 'Purely subjective – all opinions' and 'Purely objective – all facts' at either ends.

Next, ask them to locate the point where they believe Science falls on the line and draw it in.

Similarly, ask them to draw a point where Ethics falls on a line.

Ask for class discussion on where students have put each.

Emphasize that contrary to popular opinion, science is not purely objective (because it is a human endeavor) nor is ethics purely subjective (because reasoned judgment based on philosophical principles is valued – some arguments are better than others)

Ask students to return to their lines and draw the point where different sciences fall: Physics, Chemistry, Biology, and Social Sciences like Psychology fall. Ask them to mark where Math falls.

Next, ask them to put down where Personal Preferences fall (for example, preferences for ice cream flavors).

Emphasize that different disciplines are open to different degrees of interpretation. For example, in a math problem there is more of a sense of a 'correct' answer than in the interpretation of social phenomena. It should also be clear that ethics is a rigorous discipline, and thus does not consist of 'all opinions' like personal preferences. In ethics, reasoned, logical arguments are valued.

This exercise provides a good opportunity to discuss the relation between science and ethics discussed in the Primer Preface section.

Adapted with permission from Bruce Fuchs, PhD

Awareness: Ethical Questions

Summary

Students learn the characteristics of ethical questions through structured examples. Three 'practice sheets' allow students to first clarify how an ethical question differs from other questions, then to identify ethical questions among other types of questions in a particular context, and lastly how to ask ethical questions that apply to a specific situation.

What constitutes an Ethical Question?

Ethical questions involve or imply the words 'ought' or 'should'. They involve consideration of conflicting moral choices and dilemmas, with several alternative solutions, none of which is without some challenging or problematic aspect. They arise because of our social responsibilities to others in our community and because our behavior is capable of influencing the welfare of others. Conflicts between different principles and values held by different individuals or groups generate such questions.

Student Handouts: Ethical Question Practice Sheets.

1. Overview - Questions: Background Characteristics
2. Ethical Questions #1: Distinguishing Ethical Questions from Other Kinds of Questions
3. Ethical Questions #2: Distinguishing Ethical Questions Within a Scenario
4. Ethical Questions #3: Asking Ethical Questions

Teacher Instructions

Introduce different types of questions (Scientific, Religious/Cultural, Legal, or Ethical) by having students brainstorm what the defining characteristics of each are. Remind them that questions may be of more than one type, and that other types of questions also exist. Lead them through discussion to the characteristics described on the Overview sheet. The Overview may be a helpful resource to them when they are completing the Practice Sheets.

Note that the sheets are intended to encourage discussion, and there are not always necessarily 'right' answers, but there are answers that are better-reasoned than others.

Question	Characteristics
Scientific	• Asks testable questions about the natural world. • Can be explored through scientific inquiry and observation. • Relies on empirical and measurable evidence. Example: How does a kidney function in the body?
Religious/Cultural	• Asks us what would be in line with a particular religious belief or practice, or the common practices of a particular culture. Example: What does my religion or culture say about whether it is acceptable to donate a kidney?
Legal	• Asks us what the law says about a particular issue. • Ethics may inform the law, but sometimes laws are unethical and sometimes the ethically right thing to do may be illegal. Example: Is it legal to sell kidneys in the United States?
Ethical	• Ask us what the 'right' thing to do is – what we 'should' or 'ought' to do – in the face of a moral dilemma. • Often arises out of a conflict in values between different individuals or groups. • Requires moral reflection (making evaluations and judgments about responsibilities, rights, duties, values, and principles). Example: Should individuals who donate kidneys be allowed to choose who their organs should go to?

Student Handout

NAME_____ Date_____ Period_____

Practice Sheet #1: Distinguishing an Ethical Question from Other Kinds of Questions

Question	Ethical, Religious/ Cultural, Legal, Other	Reason
Under what conditions should people be kept artificially alive?	Ethical, Religious	Can be answered by moral reflection related to what it means to be 'person' and who should have responsibility for someone else's life. Can also be influenced by religious beliefs.
What type of diet allows for the best athletic performance?		
Is killing someone always illegal?		
Is killing a murderer justified?		
What is the most appropriate way to worship?		
Should people be able to select the sex of their child in advance?		
How can a child's sex be determined in advance of their birth?		
How should we decide who receives organ transplants?		
At what age should people marry?		
Are same-sex marriages constitutional?		
What ice cream flavor should I buy?		

Possible Answers

Practice Sheet #1

Question	Ethical, Religious/ Cultural, Legal, Other	Reason
Under what conditions should people be kept artificially alive?	Ethical, Religious	Can be answered by moral reflection related to what it means to be 'person' and who should have responsibility for someone else's life. Can also be influenced by religious beliefs.
What type of diet allows for the best athletic performance?	Scientific	Can be answered by scientific analysis and testing.
Is killing someone always illegal?	Legal	Can be answered by examining the law.
Is killing a murderer justified?	Ethical	Asks us to consider what is fair when a life has been taken by another.
What is the most appropriate way to worship?	Religious	Depends on religious and/ or spiritual views.
Should people be able to select the sex of their child in advance?	Ethical	Asks us to consider how much control we should have over natural biological processes.
How can a child's sex be determined in advance of their birth?	Scientific	Asks us about a technical process for determining the sex of a child.
How should we decide who receives organ transplants?	Ethical	Can be answered by considering the value we place on the lives of different individuals, as well as considering what is fair.
At what age should people marry?	Religious/Cultural	Asks about cultural conventions. Religious teachings may also have bearing on the question.
Are same-sex marriages constitutional?	Legal	Asks us about whether a practice is legal according to our constitution.
What ice cream flavor should I buy?	Other	This question is a matter of personal preference even though the word 'should' is present.

NAME_____ Date_____ Period_____

Practice Sheet #2

Scenario	Questions that arise from the scenario	Type (Scientific, Religious, Cultural, Legal, Ethical, Other)
Example: You are driving over the speed limit because you need to take someone to the hospital who is in need of urgent care.	1. How fast over the speed limit can you legally go? 2. How fast do people usually drive over the speed limit? 3. Is it acceptable to risk harming others in order to benefit one who is clearly in need?	1. Legal 2. Cultural 3. Ethical
Your brother/sister is very ill and needs medication you cannot afford, so you steal it.	1. 2. 3.	1. 2. 3.
Your friend wants you to try performance-enhancing drugs.	1. 2. 3.	1. 2. 3.
You apply for a job and the employer requests access to your health records, including genetic tests you may have had.	1. 2. 3.	1. 2. 3.

Possible Answers

Practice Sheet #2

Scenario	Questions that arise from the scenario	Type (Scientific, Religious, Cultural, Legal, Ethical, Other)
Example: You are driving over the speed limit because you need to take someone to the hospital who is in need of urgent care.	1. How fast over the speed limit can you legally go? 2. How fast do people usually drive over the speed limit? 3. Is it acceptable to risk harming others in order to benefit one who is clearly in need?	1. Legal 2. Cultural 3. Ethical
Your brother/sister is very ill and needs medication you cannot afford, so you steal it.	1. What kind of illness does your sibling have? 2. Why is the medication not affordable? 3. Is it ever right to steal, even if you have a great need? 4. What legal consequences come from stealing the medication?	1. Scientific 2. Cultural/Other 3. Ethical 4. Legal
Your friend wants you to try performance-enhancing drugs.	1. What are the effects of the drugs on your body? 2. Is it fair to others if you are taking them and competing? 3. Are the drugs legal?	1. Scientific 2. Ethical 3. Legal
You apply for a job and the employer requests access to your health records, including genetic tests you may have had.	1. How does a genetic test work? 2. Who should have access to your healthcare information? 3. Is it legal for an employer to use genetic test information in hiring?	1. Scientific 2. Ethical 3. Legal

NAME_____ Date_____ Period_____

Practice Sheet #3: Ethical Questions that Arise from the Scenario

For each scenario, identify one or more ethical questions.

Scenario	Ethical Questions that Arise from the Scenario
Your classmate asks to see your homework because they didn't finish theirs.	Should you or should you not let them? Is it fair to the others in the class? What harm can it cause to you or others?
Your classmate asks to see your homework because they didn't finish theirs. They were in the hospital all night with their sick mother.	
Your classmate asks to see your homework because they didn't finish theirs. You have previously asked them for their work and you two are friends.	
You need to decide whether to kill one person to save the lives of many people.	

Possible Answers

Practice Sheet #3:
Ethical Questions that Arise from the Scenario

For each scenario, identify one or more ethical questions.

Scenario	Ethical Questions that Arise from the Scenario
Your classmate asks to see your homework because they didn't finish theirs.	Should you or should you not let them? Is it fair to the others in the class? What harm can it cause to you or others?
Your classmate asks to see your homework because they didn't finish theirs. They were in the hospital all night with their sick mother.	Is it fair to let someone copy your homework, even if they have had difficult personal circumstances?
Your classmate asks to see your homework because they didn't finish theirs. You have previously asked them for their work and you two are friends.	Should you let someone copy your homework if you have asked for theirs? What are your duties to your friend?
You need to decide whether to kill one person to save the lives of many people.	Is it ever right to kill someone? Does it matter that you will save many lives if you kill one?

Range of Perspectives: Four Corners

Summary

Students consider their own perspectives on issues as well as observe the range of perspectives that exist in a community.

Teacher Instructions

Make posters labeled 1 completely agree, 2 agree, 3 disagree, 4 completely disagree.

Put up one poster in each of the corners of the room

Make a statement regarding an issue, and ask students to consider their position relative to that statement. (For example, "Is biomedical research using animals justified?")

Invite students to stand near the poster that represents their position (they may have an intermediate position). Create an environment in which it is safe to have different opinions from classmates (see Discussion Guidelines)

Ask students to discuss their position with 2 or 3 others near them and to appoint a representative from their group to share the discussion with the class.

Probe students with additional clarifying questions and allow them to change positions if necessary. If appropriate, connect students' positions with ethical perspectives/theories.

This activity can be done as a pre- and post- assessment to check how positions might have shifted as a result of a unit. The numbers of students taking each position can be graphed.

Variations

Have students generate a list of stakeholders, or do so yourself. Write stakeholder names on index cards and distribute them randomly to students. Then ask students to go to the position that might correspond to the stakeholder they chose. Ask them to share what their stakeholder might say about their position.

Have students write their position and justification on a piece of paper and then crumple that paper into a ball. Ask the students to throw their papers into the middle of the room, and then to pick up someone else's paper. Have students stand in the location corresponding to the position described on the paper they read. Ask students to be prepared to discuss that position with others near them, as well as to read that position to the class. This variation allows for anonymity, which may invite greater disclosure on the part of the students.

Ask students to reflect on their position and write about it beforehand, thus committing to a corner before they can see 'what other people are doing'.

This activity can also be done in a line instead of four corners.

Range of Perspectives: Examples along a Line

Summary

Students examine a range of examples that fall within a continuum from 'acceptable' to 'not acceptable', noting subtleties that individual cases provide within controversial issues. They consider their own perspectives as well as observe the range of perspectives that exist in a community. This exercise helps to reveal the 'shades of gray' that are inherent in ethical dilemmas.

Teacher Instructions

Make a line on a board or wall and label one end 'acceptable' and the other 'unacceptable'.

Provide examples to place along the continuum. You may want to make large 'notes' that you can stick up along the line that are easily readable and can be reused.

Begin with cases where most students can agree on the acceptability or unacceptability of the example. Write these in the appropriate position on the line as determined by majority of the class, acknowledging that individual differences will persist.

Proceed to more difficult and less obvious examples.

(If working with the issue of animals in biomedical research, for example, most students will probably say that it acceptable to work on *C. elegans* worms, especially for important clues to human disease. However, what if the animal at issue is a pig for heart disease studies?)

If appropriate, connect students' positions with ethical perspectives/ theories. (Do potential outcomes matter? Are inalienable rights involved?)

Debrief and focus on the importance of acknowledging the subtleties that can exist in what might seem to be a 'black and white' issue.

Variations

Precede the large group activity with a small group one, asking students to place examples along a line with 2-3 other classmates.

Have *students generate examples* and have them place them along a line either individually or in small groups, before conducting a large group activity

Have students actually 'draw' a line where they believe the difference between 'acceptable' and 'not acceptable' lies.

The Lifeboat

Summary

Students discuss an ethical dilemma that is readily comprehensible – who to save in a lifeboat. The various ethical perspectives can be derived in students' own words. Alternatively, each group can assume one perspective and base their choices through that lens.

Student Handouts: Ethical Group Discussion – The Lifeboat

Teacher Instructions

Discussions about the lifeboat are influenced strongly by how the question is posed. Be sure to allow room for solutions that maximize fairness (i.e. drawing straws) by asking students to focus on how they are making their decision. Students often default to solutions that are outcome-based. It is useful to be able to show that there are other approaches that can be applied.

Although the lifeboat scenario does not directly address science, it has many applications to issues that may pertain to a science classroom. Examples are organ allocation (who should get the scarce organ for transplant?) and vaccine distribution (who should receive scarce supplies of vaccine?)

Provide students with the scenario, and specify how long they have to discuss it.

Have each group identify someone to explain *how* the decision was reached, and provide justification. From the debriefing, derive elements of the ethical theories. Also discuss some of the confusion, conflicts, benefits and limitations of each ethical theory.

Variation

Assign each group an ethical perspective, and ask them to base their choice according to that perspective. Refer to the 'Ethics as a Discipline' section of the Primer for more information about each perspective.

Moral Rules Groups may choose a rule such as "every life counts" in which case a certain set of people get chosen according to these rules, for example, by lottery.

Virtues Based Groups may hold "achievement" or "justice" as their priority, in which case a certain set of people get chosen according to who demonstrates the greatest possession of these values. In the interest of time, have the group choose one virtue as their priority.

Outcomes Based Groups may weigh how much benefit saving each person has on the person, other people, or society, in which case the most "beneficially effective" people get chosen.

Principles Based Groups may try to weigh and balance all four central principles, in which case a certain set of people get chosen according to the group consensus on this process. This group tends to have the most difficulty in deciding on the survivors (especially due to the time limitations).

Care Based Groups may decide to serve the typically underserved or honor the most equitable relationships, in which case a certain group get chosen according to these criteria.

Some of our teachers recommend doing the lifeboat twice – once without mention of perspectives, and a second time by assigning students to an ethical perspective, or asking them to compare all perspectives in terms of which individuals should be chosen.

Contributed by Rosetta Lee, Seattle Girls' School

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Ethical Group Discussion: The Lifeboat

Discuss the following scenario, and reach a decision as a group.

Someone should be prepared to explain *how* you reached your decision. Best of luck!

Scenario

The ship is sinking and the seas are rough. All but one lifeboat has been destroyed. The lifeboat holds a maximum of six people. There are ten people that want to board the lifeboat. The four individuals who do not board the boat will certainly die.

Woman who thinks she is six weeks pregnant

Lifeguard

Two young adults who recently married

Senior citizen who has fifteen grandchildren

Elementary school teacher

Thirteen year old twins

Veteran nurse

Captain of the ship

Notes and Result of the Discussion:

Classical Ethical Dilemmas

Summary

Students use simple, classical dilemmas to learn or reinforce their understanding of ethical theories and perspectives

Student Handout: Classical Ethical Dilemmas

Teacher Instructions

Before learning about ethical perspectives:

Have students brainstorm their solutions to the various problems in small groups. Use the discussion as a way to teach the ethical perspectives by introducing them and showing how each dilemma would be addressed using that theoretical lens.

After learning the ethical perspectives:

If students have already been exposed to ethical perspectives and theories, these dilemmas are a way of reinforcing that learning. Ask students to develop answers to the dilemmas from the various perspectives.

Note: These dilemmas can also be used in conjunction with the 'Introduction to the Decision-Making Model' activity. Additional sample cases are provided in the Appendix.

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Classical Ethical Dilemmas

The 'Heinz' Dilemma

Mr. Heinz is ordinarily law-abiding man. One day, his wife becomes gravely ill. Heinz takes her to the doctor, who prescribes a medication for her. She does quite well on this medication and begins to recover. However, Heinz has no insurance and runs out of money quickly paying for this expensive medication. After a few months, he can no longer purchase the medication and his wife begins to take a turn for the worse. One day, he is in the pharmacy and notices that no one is behind the counter. The medication is in plain view. Should he steal the medication to help his sick wife?

The Old Woman in the Airport

You are in the airport, trying to catch a flight that is about to leave. As you run down the crowded corridor, an elderly woman suddenly slips in front of you and falls to the ground with a cry. Do you stop to help, if you know you will miss your flight because of it?

The 'Trolley'

Trolley Scenario 1

A trolley is running out of control down a track. In its path are 5 people who have been tied to the track by a mad philosopher. Fortunately, you can flip a switch which will lead the trolley down a different track. Unfortunately, there is a single person tied to that track. Should you flip the switch? Why?

Trolley Scenario 2

As before, a trolley is hurtling down a track towards five people. You are on a bridge under which it will pass, and you can stop it by dropping a heavy weight in front of it. As it happens, there is a man next to you - your only way to stop the trolley is to push him over the bridge and onto the track, killing him to save five. Should you proceed? Why? How is this case different from the first?

The Old Woman in the Airport is modified from Zimmer, C, *Whose Life Would You Save?* Discover, April 2004

The Trolley Problem originates from Philippa Foot, *The Problem of Abortion and the Doctrine of the Double Effect in Virtues and Vices* (Oxford: Basil Blackwell, 1978). It has been elaborated on by Judith Jarvis Thomson, *Killing, Letting Die, and the Trolley Problem*, 59 The Monist 204-17 (1976) and Judith Jarvis Thomson, *The Trolley Problem*, 94 Yale Law Journal 1395-1415 (1985). Modified from Wikipedia, http://en.wikipedia.org/wiki/Trolley_Problem

Focus on the Principles

Summary

Through short skits and discussion, students are introduced to the biomedical ethical principles. A graphic organizer is provided to help them consider how these principles might apply to an ethical question.

Student Handouts: Background – Bioethical Principles, 4-box (Ethical Analysis Using the Principles), Background on Principles (from the Ethics Background portion of the Primer) may also be used.

Teacher Instructions

Many teachers prefer to focus on the bioethical principles when first introducing ethics to students or when teaching about bioethics for the first time, rather than using all five ethical perspectives included in our Ethics Background section.

Students are already aware of ethical principles, even though they may not have the vocabulary to explain it as such. Before explaining what the ethical principles are, choose pairs or small groups of students to come to the front of the class to improvise 30-second role-plays. Have them demonstrate ethical principles by simulating an interaction between a parent and a child, such as:

- Parent respecting the privacy of child's bedroom. (respect for persons, autonomy)
- Parent refraining from belittling a child out of anger. (nonmaleficence)
- Parent helping child with their homework. (beneficence)
- Parent being fair between siblings. (justice)

A compare/contrast method could be used, where a student playing a parent could demonstrate what it looks like when the principle is being honored and when it is not. It is also helpful for a student to 'give voice' to the ideas inside a person's head by saying them out loud.

After each dramatization, elicit the idea of 'ethical principles' from the class and briefly discuss how the sketches might reflect such principles. Point out that these scenarios themselves bring up other issues:

- What if the child is hiding something in their room that could harm others?
- What if the parent is doing too much of a child's homework?
- Does treating siblings fairly mean treating them equally?

Provide students with the 'Background-Bioethical Principles' sheet and review the Principles with students. Be sure to emphasize that other values or principles (such as the importance of strong and caring relationships) are often important to a case in addition to these!

Lastly, use the '4-box (Ethical Analysis Using the Principles)' sheet to examine an ethical question of your choosing through the lens of the principles. Not all principles will apply to a question equally.

Note that if you are asking your students to propose a solution to the ethical question and justify their position, you will want to ensure that they have considered the FACTS of the situation as well as the stakeholders involved. The 'Ethical Analysis Using the Principles' sheet can be used in combination with the Decision-Making Framework to help students come to a well-reasoned decision.

Background - Bioethical Principles

'Respect'

This principle focuses on respect for individuals. Part of respecting an individual has to do with respecting their autonomy. The word autonomy comes from the Greek autos (self) and nomos (governance). Autonomy emphasizes the responsibility individuals have for their own lives. Individuals have the right to self-determination and to make their own decisions and choices. The rules for informed consent in medicine derive from the principle of autonomy. In medicine, there is also a special emphasis on respecting individuals from vulnerable populations.

'Do Good' / 'Do no harm'

'Do Good" (beneficence) stresses directly helping others, acting in their best interests, and being a benefit to them. It requires positive action.

'Do No Harm' (nonmaleficence) relates to one of the most traditional medical guidelines, the Hippocratic oath (First of all, do no harm). It requires individuals to not intentionally or directly inflict harm upon others.

Justice- 'Be Fair'

This principle relates to 'Giving to each that which is his due' (Aristotle). It dictates that persons who are equals should qualify for equal treatment, and that resources, risks, and costs should be distributed equitably.

Some ethicists also add:

Care

Focus on the maintenance of healthy, caring relationships between individuals and within a community. The principle of care adds context to the traditional principles and can be used in a complimentary way alongside them.

NAME_____ Date_____ Period_____

4-box – Ethical Analysis Using the Principles

Consider how the principles apply to the ethical question.
Some principles may apply more than others for a particular situation.

- What would be respectful to the people (or other stakeholders) involved?
- How can we respect people and their right to make their own choices (autonomy)?

RESPECT

- How can we do the most good (beneficence) and the least harm (nonmaleficence)?
- What kinds of harms and benefits might arise from different solutions?

DO GOOD/DO NO HARM

ETHICAL QUESTION

- What would be fair?
- How can we treat others equitably?

JUSTICE

Are there any other ethical considerations?

OTHER

Ethical Perspectives Review

Summary

Students practice their understanding of ethical perspectives by matching them with different hypothetical scenarios.

Student Handout: Ethical Perspectives Review

Teacher Instructions

Provide students with the Ethical Perspectives Review sheet and let them match each perspective with a scenario.

Discuss in small groups and then as a class.

Answers to Ethical Perspectives Review Sheet

The scenarios are matched with the following perspectives:

1. Care (The group pays attention to the vulnerable population, and acknowledges the importance of relationships)
2. Principles (The doctor exemplifies the principle of respect for persons, in providing the patient with the autonomy to make their own self-determining choices)
3. Outcomes (Ultimately, the action of the soldier will save the lives of many more people)
4. Moral Rules and Duties (Ted is honoring a duty to aid his co-worker)
5. Virtue (The missionary's character and purpose in life is aligned with his virtuous actions)

Contributed by Elise Cooksley, Two Rivers School, Snoqualmie , WA

NAME_____ Date_____ Period_____

Ethical Perspectives Review

Identify the following decisions according to the ethical perspective being adhered to. Support your choice with the reasoning you used. The choices for ethical perspectives are: Principles, Outcomes, Moral Rules and Duties, Virtue Ethics, and Care.

CASE 1

A group of Peace Corps volunteers are sent to an East African country to help design homes for the people of a poor village. Once they arrive however, they discover the women and children are in greater need of a school and health care facility and that the homes would mainly benefit the high status males of the village. The volunteers decide to work with the women to design and build facilities for them.

Perspective: **Reasons:**

CASE 2

A doctor attending to the care of a young woman recovering from breast cancer discovers the cancer has spread to her lymph nodes and appears terminal. There is a new treatment that has a very slight chance of helping and is very painful and expensive. The doctor tells the young woman about this treatment along with other options to let her make the final decision.

Perspective: **Reasons:**

CASE 3

In Germany during 1942 a soldier, finds himself in a crowd with his leader, Adolf Hitler. He views Hitler as ruthless and dangerous to his country. He knows that many people have already died because of his policies, and many more are likely to die in the future. He decides to kill Hitler.

Perspective: **Reasons:**

CASE 4

Ted, an insurance agent, receives a phone call from a fellow agent who works in the same office, asking for a ride to work because his car has broken down. Ted had intended to use the drive to work to view some property he would like to buy but picking up his co-worker would not leave him time to do this. He decides not to refuse the co-worker's request. Ted believes that if he were in the same situation, he would want someone to give him a ride.

Perspective: **Reasons:**

CASE 5

Thomas, a missionary doctor in El Salvador, was told by the government to abandon his work and return to the United States. Thomas doesn't even consider stopping his work with the poor people of the countryside, which he considers his purpose in life.

Perspective: **Reasons:**

Ethical Perspectives and Familiar Examples

Summary

Students derive, construct, and explain the main ethical perspectives based on familiar examples (cheating, fairy tales).

Teacher Instructions

Cheating: Choose a familiar situation in which a straightforward ethical question is raised, such as the decision whether or not to cheat on homework. Elicit from students the reasons why one should not cheat. After all ideas have been recorded, ask students whether any reasons are similar and could be 'grouped' together. Usually, there are arguments that focus on each perspective:

Moral Rules: 'It is a rule that cheating is unacceptable, it is my duty not to cheat no matter what the consequences.'

Virtues: 'Good people don't cheat'

Outcomes: 'You might be punished if caught' or 'It might impact your ability to really learn the material'.

Principles: 'Each person needs to make their own decision about whether or not to cheat' (Autonomy), 'It's not fair to other kids' (Justice), 'It might hurt others' (Beneficence/ Nonmaleficence).

Care: 'Cheating might hurt my relationships with others, I might not be trusted again if caught'.

Point out to students the formal names of these general groupings.

Fairy Tales: Have students think about famous stories or fairy tales that emphasize one of the perspectives as their message. This could be done by eliciting stories from the students, or presenting them with a range of stories and asking them to select ones that typify the perspective. For, example:

Moral Rules: Little Red Riding Hood
(Little Red Riding Hood is compelled by duty to visit her grandmother)

Virtues: Pinocchio
(Geppetto tells Pinocchio to do the 'right thing')

Outcomes: Jack and the Beanstalk, Robin Hood
(The end justify the means)

(From Access Excellence: Using Fairy Tales to Promote Retention of Ethical Systems: http://www.accessexcellence.org/AI/AEPC/WWX/1992/fairy_tales.html)

Ethical Theories and Perspectives Skits and Quiz

Summary

Students create short skits that highlight different ethical perspectives.

Student Handouts: Ethical Perspectives/Theories Skit Notes, Ethical Perspectives Grade Sheet, Ethical Perspectives Quiz

Teacher Instructions

Students have the opportunity to practice their understanding through the development and presentation of dramatic skits. After reviewing the different ethical perspectives, divide students into groups. Provide each group with the name of an ethical perspective/theory. Instruct them not to let other groups know which perspective they have.

Review the Ethical Perspectives Grading Sheet, or highlight the important elements:

- A clear dilemma must be presented, with multiple possible solutions that could be justified
- Important key words and phrases must be used.
- Everyone should speak clearly and not simply read their lines, and groups should practice.
- The solution must clearly relate to the ethical perspective being demonstrated.

Provide approximately 15 minutes for each group to develop a 5-minute skit which will highlight the main points of their perspective and which involves all group members.

One especially helpful technique is to have students provide voices that highlight what characters are thinking.

Students are not allowed to actually name the perspective in their skit.

Allow each group to perform. During the performance, students should note key words that provide clues on their Skit Notes sheet. After each performance, ask each audience group to spend a minute discussing the skit, summarizing the dilemma, and trying to come to consensus on the perspective portrayed. Be sure that each audience group can verbalize the reasons why they chose that perspective, and to record those reasons on their Skit Notes sheet.

Use the Ethical Perspectives Grade Sheet for evaluation.

The Ethical Perspectives Quiz can be used to test for understanding afterwards. Alternatively, it can be given before the skits are assigned.

Answers to Quiz

Top 1. B 2. E 3. A 4. C 5. D

Contributed by Jamie Cooke, Mercer Island High School, Mercer Island, WA

Student Handout

NAME_____ Date_____ Period_____

Ethical Perspectives Skit Notes

Procedures: For each of the skits presented, you are responsible to take notes to familiarize yourself with each of the perspectives presented. The material from these skits will be referenced in future quizzes and tests. For each group:

- Provide a short summary of the dilemma.
- Indicate the key words or phrases used.
- Indicate the perspective or theory that you believe is being used. (Moral Rules and Duties, Virtue-based, Outcomes-based, Principle-based, Care-Based)
- Explain your reasoning for why believe the theory is being demonstrated.

Group 1

Summary of dilemma:

Key words or phrases:

Perspective demonstrated :

Reasoning:

Group 2

Summary of dilemma:

Key words or phrases:

Perspective demonstrated :

Reasoning:

Group 3

Summary of dilemma:

Key words or phrases:

Perspective demonstrated :

Reasoning:

Group 4

Summary of dilemma:

Key words or phrases:

Perspective demonstrated :

Reasoning:

Group 5

Summary of dilemma:

Key words or phrases:

Perspective demonstrated :

Reasoning:

Group 6

Summary of dilemma:

Key words or phrases:

Perspective demonstrated :

Reasoning:

Group 7

Summary of dilemma:

Key words or phrases:

Perspective demonstrated :

Reasoning:

Group 8

Summary of dilemma:

Key words or phrases:

Perspective demonstrated :

Reasoning:

Ethical Perspectives Grade Sheet

Group Names: _____ Period: _____

_____

_____

Description of Skit: _____

Key words or phrases: _____

Skit involved the following:

_____ Dilemma (5 points)

- ❏ Clear dilemma is presented that has multiple solutions that could be justified (5 pts.)
- ❏ Dilemma is presented that has multiple solutions but most are not very justifiable (4 pts.)
- ❏ Dilemma is presented that only has one solution that would be considered ethical (3 pts.)
- ❏ No clear dilemma is presented (0 pts.)

_____ Key words or phrases (5 points)

- ❏ Key words and/or phrases are used that are easily distinguishable and are clearly related to the perspective demonstrated. (5 pts.)
- ❏ Key words and/or phrases are used but do not clearly relate to only the perspective demonstrated. (4 pts.)
- ❏ Only 1 or 2 unclear keywords and phrases are used that do not easily identify the perspective demonstrated. (3 pts.)
- ❏ No key words or phrases are used (0 pts.)

_____ Presentation (5 points)

- ❏ Everyone speaks clearly and are not just reading. Group has clearly practiced (5 pts.)
- ❏ Everyone spoke but some where not clear and some practice was needed (4 pts.)
- ❏ Not everyone spoke and it was clear that practice was needed (3 pts.)
- ❏ Very few people spoke and the skit was very unorganized and demonstrated little to no practice (0 pts.)

Names of individuals who clearly showed little preparation:

(An additional point will be deducted from these students)

_____ Solution (5 points)

- ❏ Solution used only the perspectives demonstrated to solve and encompasses the ideals of the perspective – almost all students figured it out (5 pts)
- ❏ Solution uses the perspective demonstrated but could be confused with another perspective- most students figured it out (4 pts.)
- ❏ Solution uses some of the ideals but also included other – only about half of the students figured it out (3 pts.)
- ❏ Solution did not clearly demonstrate the perspective- Most students could not figure it out. (0 pts.)

_____ **Total** (20pts)

NAME_____ Date_____ Period_____

Ethical Perspectives Quiz

Match each ethical perspective below with the appropriate phrase. After choosing a perspective, explain why you did so.

A. Moral Rules and Duties **B**. Outcomes **C**. Virtues **D**. Principles **E**. Care

_____ 1. The ends justify the means.
Explain why you made this choice:

_____ 2. The focus is on the importance of personal relationships and helping those who may not be able to speak for themselves and are vulnerable.
Explain why you made this choice:

_____ 3. Actions are important, as well as the obligation to act in a moral way.
Explain why you made this choice:

_____ 4. Ethical decisions depend on the character of a person.
Explain why you made this choice:

_____ 5. Considering respect, harms/benefits, and justice are important.
Explain why you made this choice:

Foursquare/Carousel

Summary

A general classroom strategy adopted to focus on different ethical perspectives.

Teacher Instructions

Have students form groups of fours.

Provide each group with a large sheet of butcher paper and four different colored markers.

Divide the butcher paper into four equal squares and have the students each sit by a square.

Have students write the names of different ethical perspectives or principles in each square (Outcomes, Rules/Duties, etc. – see Ethics as a Discipline section of the Primer for more on perspectives).

Present an ethical question based on a case study or other source.

Have students write one comment someone from their perspective would make in response to that question or what arguments they would present.

Have students rotate the paper until everyone has had a chance to contribute to each square.

Variation

Have each person represent a different ethical perspective. (Outcomes, Rules/Duties, etc. – see Ethics as a Discipline section of the Primer for more on perspectives).

Write down four questions or dilemmas, one in each square, and have each person answer the questions from their ethical perspective.

Carousel Variation

Put four pieces of butcher paper up around the room.

Label each paper with the name of a different ethical perspectives or principles (Outcomes, Rules/Duties, etc. – see Ethics as a Discipline section of the Primer for more on perspectives)

Divide the students into four groups.

Present an ethical question based on a case study or other source.

Have students in each group discuss what comments someone from their perspective would make in response to that question or what arguments they would present.

Have students rotate around the classroom until each group has had the chance to contribute to each square.

These same strategies could be used to check for student understanding of the definitions of different perspectives, or for a reflective exercise.

Critical Reasoning Analysis Using the Elements of Thought

Summary

Students analyze information or an ethical issue using a table that emphasizes the elements of thought.

Student Handout: Critical Reasoning Analysis

Point of View: What is the point of view? How does the chosen perspective show through?

Purpose: What is the purpose of the material? Why was it written?

Questions: What questions does the author address? What questions does the material raise?

Concepts: What are the main concepts/ideas communicated by the material?

Information: What factual information is included?

Assumptions: What assumptions are behind the author's arguments? What is the author taking for granted, that might be subject to question?

Inferences: What can you infer from the material? What can you conclude based upon the material?

Implications: What are the consequences if the author's reasoning is correct? What if it is incorrect? What is the larger meaning?

The elements are discussed as a class, and can serve as a starting point for more involved approaches such as the enclosed Congressional Hearing Model.

Teacher Instructions

Students are either provided with information (for example, a newspaper article) or gather it themselves. They use the elements of thought to analyze different aspects of the information. Note that the elements do not necessarily have to be presented in a certain order.

Variation

The elements of thought can also serve as a framework for analyzing an ethical issue. The sample Congressional Hearing Model focused on Stem Cells demonstrates how such an approach might be used.

This analysis sheet can also be used before conducting a Socratic Seminar, to ensure that students have read the required material.

(from the Foundation for Critical Thinking, www.criticalthinking.org, and Paula Fraser, Bellevue School District PRISM Program)

Student Handout

NAME_____ Date_____ Period_____

Critical Reasoning Analysis

Point of view - What is the point of view, and how does the particular perspective show through?

Purpose - Why was this material written?

Questions - What questions are addressed by the author? What questions do you have about the material?

Concepts - What are the main ideas and concepts addressed?

Student Handout

Information - What are some of the most important facts included?

Assumptions - What is the author assuming that might be subject to question?

Inferences - What can you infer and conclude based on the material?

Implications - What is the larger meaning? What are the consequences if the author's reasoning is correct?

Identifying Stakeholders and Values

Summary

Students analyze one element of an ethical issue – the stakeholders and values involved.

Teacher Instructions

Present an ethical dilemma or issue.

Ask students who the stakeholders are. Which individuals and/or institutions have a stake in the outcome?

Students can brainstorm stakeholders in small groups and then share with the class. List the stakeholders as students describe them.

For each stakeholder, try to think of the values they might bring to bear on the issue. What are their concerns? What do they care about?

Once students become familiar with this process, it can become the basis for a Case Study Analysis or Congressional Hearing Model.

Creating a Decision-Making Model

Summary

Students create their own decision-making model based on the process they personally use to make decisions.

Teacher Instructions

Students can construct their own models before they are introduced to an existing decision-making model.

Have students think about an ethical decision that they have had to make. Allow them to brainstorm the various steps they went through in making that decision.

Ask them to make a 'flow chart' that illustrates their process graphically.

Variations

Have students attempt to resolve an unfamiliar ethical dilemma using their flow chart.

Show students an existing decision-making model and have them comment on the differences.

Allow students to share their models with each other and with the class before introducing established models and frameworks.

Introduction to a Decision-Making Framework

Summary

Students are introduced to a decision-making framework by working through a familiar example first, and then an ethical dilemma related to the content being studied.

Student Handout: Decision-Making Framework

This Decision-Making Framework is one of many similar frameworks that can be used to analyze an ethical dilemma. A one page summary version and a longer four-page version are included in the section of the Primer on Decision-Making Frameworks.

Teacher Instructions

Have students work through an ethical dilemma that may seem more familiar to them first. They may enjoy brainstorming possible examples with you. Several options are provided below:

1. After a very busy afternoon of soccer practice and an evening band concert, you arrive home at 10PM completely exhausted. Even though you have at least two hours of homework, you decide to go to bed and just deal with the consequences. At school the next morning, a friend offers to let you copy all of her homework. Do you accept her offer?
2. One of your friends has a new girlfriend. You see the new girlfriend out at the movies with somebody else. It is obvious to you that she is cheating on your friend. Do you tell?
3. Your younger brother would like to go skiing with his friends, but your family does not have the money to pay for the trip. At school, you see a suspected drug dealer drop a $100 bill in the hallway. No one will see you pick it up. Do you take the money and give it to your brother?
4. You are invited to a big party the same weekend of an overnight band trip. You REALLY want to go to the party and are considering telling your parents that you are going with the band. Unless something unexpected happens, it is unlikely that you will get caught. Do you do it?

Use one or more of these examples to discuss the application of different ethical principles or the perspectives provided by different ethical theories.

Proceed to having students work through the framework with a dilemma related to the science content being studied. In their analysis of alternative options, have them try to identify some of the ethical principles or perspectives involved.

Scenarios contributed by Carla Calogero, Nathan Hale High School, Seattle

Pro/Con Paper Using Ethics

Summary

This is a version of a classic essay, but focuses on ethical perspectives.

Teacher Instructions

Have students choose their essay topic.

The paper should clearly present the ethical question or dilemma.

Students must provide three pro arguments and three con arguments.

For *each* argument, they should state which ethical perspective/theory the argument relies on.

Students then provide their rationale why the pro or the con side has the more compelling argument, referencing the ethical perspectives in their justifications.

Contributed by Thom Faller, PhD, University of Portland

Position Analysis

Summary

Students analyze an ethical position or perspective taken by an author of a news article or opinion essay.

Teacher Instructions

Provide students with a news article or opinion essay.

Ask them to identify what ethical perspective or position is taken by the author, using particular elements of the text to support their thesis.

Variation:

Alternatively, focus on the biomedical principles. Pick a article and ask students to describe in writing how it addresses principles of respect for persons, beneficence/nonmaleficence, and justice. Specific examples from the text should be used to support their position.

Rules vs. Outcomes (especially for films)

Summary

Students analyze an issue through the lenses of two of the major ethical perspectives (moral rules/duties vs. outcomes). This strategy is particularly effective for debriefing a documentary film featuring an ethical issue.

Student Handout: Rules vs. Outcomes Argument Analysis

Teacher Instructions

Present a film that explores a complex issue and addresses different perspectives.

Use the 'Rules vs. Outcomes Argument Analysis' handout for students to record those arguments that are more grounded in the ideas of rights and rules, as compared to those that are focused on outcomes and consequences.

Debrief with the whole class following completion of the film, recording the different perspectives that are discussed.

Modified from Dr. Kelly Fryer-Edwards, University of Washington Department of Medical History and Ethics, 2003

Student Handout

NAME_____ Date_____ Period_____

RULES vs. OUTCOMES Argument Analysis

Ethical Issue:

Arguments from Rules/Duties/Rights	Arguments from Outcomes/Consequences

Which argument do you believe to be the strongest one?

State three reasons why you think the argument you chose is the most compelling.

1.

2.

3

Documentary Film Analysis

Summary

Students use a documentary to analyze arguments based on facts/opinions, to analyze pros/cons, and to map arguments to ethical perspectives.

Student Handout: Documentary Film Analysis

Teacher Instructions

As students watch the documentary, they take note of information and opinions, as well as arguments given by various people of pros and cons.

After watching the segment, they hold a discussion with tablemates to make sure that everyone has as many facts, opinions, and arguments as possible. They also try to identify ethical perspectives that are raised by the film.

Finally, students fill out the 'Know - Learn - Need to Know' chart found at the end to document their progress of learning about the issue and the science behind it.

Student Handout

NAME_____ Date_____ Period_____

Documentary Film Analysis

Documentary Title:

Facts vs. Opinions, Pros and Cons, and KLN

1. Watch clip and take notes
2. Discuss for 15-20 minutes and share notes
3. Fill out Know-Learn-Need to know chart for 10 minutes

Central Question:

As you watch the documentary, take note of information and opinions, as well as arguments given by various people of pros and cons. After watching the segment, hold a discussion with tablemates to make sure that everyone has as many facts, opinions, and arguments as possible. Try to match ethical perspectives to different arguments. Finally, fill out the chart found at the end to document your progress of learning about the issue and the science behind it. Use additional sheets if more space is required.

FACTS (dates, scientific process, numbers and figures, information that has a basis and can be verified)	**OPINIONS** (guesses, "what if"s, personal beliefs, information that seems to have no basis or cannot be verified)

ARGUMENTS PRO (some of the arguments that support the "yes" answer to the central question)	**ARGUMENTS CON** (some of the arguments that support the "no" answer to the central question)

Can you identify any ethical principles or perspectives in the arguments above? (For example, are any arguments focused on consequences or outcomes? Do any of them mention our rights, responsibilities, or duties? Are issues related to respect for individuals, doing good/not doing harm/or justice raised?)

KNOW (what did you know already about this issue before today?)	**LEARN** (what new things did you learn about this issue?)	**NEED TO KNOW** (what facts do you need to know or need to look up to verify?)

Contributed by Rosetta Lee, Seattle Girls School, Seattle, WA

Narrative Ethics (especially for films/stories)

Summary

Students analyze how the presentation of an issue influences how it is perceived.

Student Handout: Narrative Ethics Film or Story Analysis Sheet

Teacher Instructions

The Narrative Ethics Film or Story Analysis is a straightforward way to allow students to examine some of the underlying messages presented in the media or through literature, and to begin to frame questions that address such messages.

Stress to students that how information is presented influences how it is perceived, and review the Narrative Ethics Film or Story Analysis Sheet with them, highlighting the dimensions of Narrative Ethics.

Allow students to reflect on each of the four dimensions presented in the sheet while they are viewing the film or finishing the text, and discuss each dimension with the class as a whole.

Modified from Dr. Kelly Fryer-Edwards, University of Washington Department of Medical History and Ethics.

Student Handout

NAME_____ Date_____ Period_____

Narrative Ethics Film or Story Analysis Sheet

1. Philosophical

What ethical issues arise in the story? What does the story represent or portray?

Who are the characters? For each main character consider their actions, their motives, and their values:

2. Psychological

How do you respond to each of the main characters? (For example, do you like them? Worry about them? Distrust them?)

How does your reaction reflect your values and identity?

3. Aesthetic

How are the following used to tell the story or influence your perception of the issue?

- Language

- Images

- Music

- Metaphors

4. Practical

How does the story relate to your experiences? What have you learned about yourself through the story? How might you use the ethical/moral lessons contained in the story in your own life?

What can be learned about ethical issues related to scientific advances from this story? What lessons about science do you think audiences that didn't have much science background would take away?

Same Perspective, Different Arguments

Summary

This group strategy shows students that one ethical perspective can be used to argue both sides of an ethical dilemma.

Teacher Instructions

Divide students into groups of four.

Each group of four should split into two groups of two.

Have one pair represent an 'Outcome'-based perspective, and the other a 'Rules/Duties'-based perspective.

Present an ethical dilemma and have each pair develop both a PRO and a CON argument using their perspective.

Have the pairs share the arguments that they have developed.

Have the groups rank the strength of the arguments, to see if they can come to consensus on the most compelling argument, or clarify the nature of their disagreement.

Structured Academic Controversy: What Should We Do?

Summary

Through a sequence of scaffolded steps, small groups of students increase their understanding of a community (shared) problem. They consider alternative perspectives and engage in a shared decision-making process.

Student Handouts: Structured Academic Controversy Ethical Discussion Worksheet.

Teacher Instructions

1. Prepare

Select an enduring issue that is central to the course and where values are in conflict

Clarify for students the purpose of the deliberation — to come to a decision

State or elicit from students appropriate behavior and norms — for example:

- Hear all sides equally and speak one at a time
- Listen well enough to respond to and build upon each other's ideas
- Back up opinions with clear reasons

2. Background

Students read (or are presented) general background information on the issue. They identify relevant facts, as well as the stakeholders and their primary concerns.

3. Make groups

Students are split into groups of four, and further into pairs.

4. Read positions

Each pair reads about a different position on the issue.

5. Plan presentations

Each pair plans a presentation of its position and arguments. Having students focus on the three most important arguments is helpful.

6. One side presents, the other repeats

One side presents their three important arguments to the other side. The other side needs to listen carefully, take notes, and then repeat the arguments back in order to be sure that they understand them, asking clarifying questions as necessary.

7. The pairs switch and the process is duplicated

Now, the side which originally listened is the one to present their arguments.
As before, the other side will listen, take notes, and repeat the arguments back.

8. Each side provides feedback to the other until everyone is satisfied that their position has been heard and understood.

9. Dissolve pairs to come to consensus/disagreement

The students proceed as their own individual selves, using information both from their experiences as well as the background readings.
Prompt: "Forge a position as a group. Feel free to change your mind. See if you can come to consensus on this issue, or at least clarify the disagreement."

Handout contributed by Rosetta Lee, Seattle Girls School

Modified from David Johnson and Roger Johnson by Parker, Walter C. (2003). Teaching Democracy: Unity and Diversity in Public Life. New York: Teachers College, Columbia University

Student Handout

NAME_____ Date_____ Period_____

Structured Academic Controversy
Ethical Discussion Worksheet

The Issue:

_____

Team Members FOR

1. _____ 2. _____

Team Members AGAINST

1. _____ 2. _____

Relevant Facts:

Stakeholders and their primary concerns:

Student Handout

Main Argument(s) FOR:	Main Argument(s) AGAINST:
1. 2. 3.	1. 2. 3.
List possible solutions:	
Common ground reached:	

Case Studies

Summary

Students assume stakeholder roles within a case study in order to analyze an ethical issue. Case studies are one of the most powerful tools for helping students understand ethical issues, and for providing them with insight into diverse perspectives.

Teacher Instructions

1. Students are given a scenario (actual or fictional) that incorporates an ethical issue related to science.
2. Students identify what they know/don't know about the issue.
3. Students are divided into groups that represent different stakeholders. The stakeholders (in 'same-stakeholder' groups) decide on their values and perspectives on the issue.
4. Students are then divided into 'mixed-stakeholder' groups that contain one member from each stakeholder perspective. These mixed groups are asked to come to consensus (or clarify the nature of their disagreement) with regard to making recommendations about how to resolve the issue or designing policy to address the issue.
5. Have each 'mixed-stakeholder' group present the summary of their discussion to the class.
6. As a follow-up, provide students the opportunity to express their own position and recommendations in written form.

Variations

Students can brainstorm who the stakeholders are, then be provided with opportunities to research what the issue of concern to those stakeholders might be, and the arguments that those stakeholders put forth. Time is allotted for library/internet research.

The same activity can be done using only single or mixed stakeholder groups.

Students can also complete a Decision-Making Framework, either in their mixed-stakeholder groups, individually prior to making stakeholder groups, or individually following the discussion.

Congressional Hearing on Controversial Issue

Summary

Students analyze a controversial issue from the perspective of a stakeholder, and make a brief presentation to 'Congress'. They follow up with a written statement of their own position.

Student Handout: Congressional Hearing Notes.

Example: Mock Congressional Hearing for Stem Cell Research Issues

Teacher Instructions

1. Students collect background information individually
   - Individual students read/research articles related to question (can be assigned as homework).
   - Students complete Critical Reasoning Analysis (see section on Critical Reasoning Analysis using the Elements of Thought) in order to contribute to class discussion.
2. The larger class creates a community Critical Reasoning Analysis sheet
   - Individual students share research findings within larger classroom community.
   - Teacher gathers class input into a community Critical Reasoning Analysis form with special emphasis on Purpose, Question/s, Concepts and Perspectives.
   - Each participant receives completed copy of community critical reasoning analysis form in order to have a common basis for understanding the inquiry task and concepts at hand.
3. Students identify and research stakeholder positions
   - Students identify and choose (or are assigned) stakeholder positions to research further.
   - Individual students prepare two-minute testimony focusing on most salient points relating to specific stakeholder perspective.
4. Hold Congressional Hearing/Forum
   - Congressional Panel times/facilitates/moderates testimonies and questions participants
   - All participants take notes on all testimonies using form designed for this purpose (Congressional Hearing Notes)
   - Open Forum/Discussion including all participants moderated by Congressional Panel.
   - Congressional Panel announces decision/recommendations after deliberation.
5. Follow up with individual student perspectives
   - Students complete an ethical Decision-Making Framework.
   - Students write reflective essay emphasizing Critical Reasoning Elements: Inference, Conclusion and Implications.
   - Debrief and Reflect
6. Share Research Findings/Reflections within greater public context and/or with policymakers (legislators, newspaper editorials, President's Bioethics Commission, etc.)

(Washington State Social Studies Classroom-based Assessment YOU DECIDE), contributed by Paula Fraser, Bellevue School District PRISM program, Bellevue, WA.

Student Handout

NAME_____ Date_____ Period_____

Congressional Hearing Notes

1. Congressional Panel:

Representative- Moderate-

Representative-Pro-

Representative-Con-

2. Political Perspectives:

President-

Senator-Pro-

Senator-Con-

Representative-Pro-

Representative-Con-

3. President's National Bioethics Commission:

Bioethics Comm.-Scientist-

Bioethics Comm.-Ethicist-

4. Ethical Perspectives:

Ethics-Pro-

Ethics- Con-

5. Religious Perspectives:

Religious/Moderate-

Religious-Pro-

Religious-Con-

6. Legal Perspectives:

Attorney-Pro-

Attorney-Con-

7. Societal Perspectives:

Citizen-Pro-

Citizen-Con-

8. Economic/Business Perspectives:

Biotech. CEO-(U.S.)-

Biotech CEO-(Off-shore)-

9. Scientific/Biomedical Perspectives:

National Academy of Science-

Cancer Research Institute-

University Research-

National Institute for Health:

EXAMPLE: Congressional Hearing on Controversial Issue

Stem Cell Research: Pre-Hearing Critical Reasoning Analysis

PURPOSE (related to inquiry on stem cell research)

- To use critical and ethical reasoning to seek and look at all relevant facts and perspectives.
- To advance knowledge and understanding.
- To understand the role of ELSI—the Ethical, Legal, and Social Implications of Scientific Research.
- To learn to make informed decisions as citizens in a democratic society.
- To share our research findings with President Bush, the Presidents Bioethical Commission, and others.

QUESTION (for Hearing Inquiry)

To do Stem Cell Research or Not? That is the Question! (How should the United States proceed with stem cell research, given that this is a democratic society?)

PERSPECTIVE/S
(Stakeholders/Interests/ Positions/Values)

1. Congressional Hearing Panel:
   Pro- Con- And/Moderate-
2. Political Perspectives:
   -President-
   -U.S Senate- Pro- Con- And/Moderate-
   -U.S. House of Representatives- Pro- Con- And/Moderate-
3. President's Bioethics Commission:
   Ethicist- Scientist-
4. Ethical Perspectives
   Pro- Con- And/Moderate--
5. Religious Perspectives:
   Pro- Con- And/Moderate--
6. Attorney/ Legal Perspectives:
   Pro- Con- And/Moderate-
7. Societal Perspectives:
   -Cancer Patient-
   -Parkinson Patient-
   -Spinal Cord Patient-
   -Citizen: Pro- Con- And/Moderate-
8. Economic/Biotech Company (Private Funding):
   - Biotech CEO (U.S)- Biotech CEO (Off-shore)
9. Scientific/Medical Research (Public Funding):
   -National Academy of Science-
   -Cancer Research Institute-
   -University Research-
   -National Institute for Health-

CONCEPTS
(Related to Stem Cell/Cloning Controversy)

Embryo and Fetus, Therapeutic vs. Reproductive Purposes, Stem Cell Lines, Zygote, Pre-Embryonic vs. Embryonic vs. Adult, Fetal Cord Stem Cells, Blood Stem Cells, Progenitor Cells, Unspecialized Cells, Germ Cells, Somatic Cells, Bone Marrow, Cell Division, Cell Differentiation, Totipotent, Pluripotent, Multipotent, Blastocyst, In Vitro vs. In Vivo, Human Being, Abortion, Public vs. Private Funding, Fertility Clinic, Safety, ELSI (Ethical, Legal, Social Implications): U.S. Bill of Rights, Democratic Principles/Values, Ethical Principles (Justice, Respect, Beneficence, Nonmaleficence, Honesty, Autonomy, and Care)

INFORMATION

National Institute for Health (NIH)
President's Bioethics Advisory Committee
Department of Health and Human Services
Belmont Report
Nuremburg Code (Re. Human Subjects)
Human Genome Project (ELSI)

ASSUMPTION/S

Citizens in a democratic society within the context of a complex, interdependent world need to understand the science, as well as, the ethical, legal, social implications of biomedical research. Congressional Hearings/Testimony are ways for citizens to participate in democratic decision-making.

INFERENCES/CONCLUSIONS

If we go ahead with stem cell/cloning research, we can conclude that there will be costs and benefits.

If we don't allow stem cell/cloning research, we can conclude that we won't know the costs and benefits.

IMPLICATIONS

If we do/don't do stem cell/cloning research, then possible long range outcomes are…

If we have a temporary moratorium on doing stem cell/cloning research, then possible outcomes are…

Debate

Summary

A traditional class debate can be a useful tool for examining an issue. There are many debate formats – we provide one example.

Be sure to stress to students that there are many different perspectives that can fall in-between the extreme positions that are conventionally presented in a debate. Many of our collaborating teachers caution that debates tend to polarize an issue and should be used carefully. Setting norms with students and providing opportunities for discussion and debriefing are especially important.

Teacher Instructions

1 Divide students into teams. Assign one team to argue the yes (pro) position, and the second the opposing position. It is recommended that the assignment be made randomly.

2.Ask students to prepare briefs for each position as a team effort. Each team should prepare three arguments supportive of their position. Each argument should have three statements, each of which in turn is supported by three quotes. For each quote, a one-sentence summary must be provided, along with the source of the quote and a photocopy of the quote in its entirety. Visual aids are permitted, but can be used by the opposing side once introduced.

3. The debate has the following overall structure
(Note: If using the Student Position handout, be sure to provide some time for completion of the initial position)

Student Handouts

1. Debate Instructions

2. Position Sheet (for describing their position before and after the debate, and for recording questions)

A scoring checklist for the actual debate is provided for teacher or student use. Debate briefs should be collected and checked by the instructor.

Debate cont.

Side	Presentation	Time
Opening Statements and Clarification		
YES/PRO team	Opening statements using three arguments	5 minutes
NO/CON team	Asks any clarifying questions	2 minutes
NO/CON team	Opening statements using three arguments	5 minutes
YES/PRO team	Asks any clarifying questions	2 minutes
Rebuttal (No new arguments presented)		
YES/PRO team	Repeats their opponents' arguments and tells what is wrong with the positions	3 minutes
NO/CON team	Repeats their opponents' arguments and tells what is wrong with the positions	3 minutes
Summary		
YES/PRO team	Summarizes their position by speaking to their opponents' counterpoints and closes with why their argument is best	3 minutes
NO/CON team	Summarizes their position by speaking to their opponents' counterpoints and closes with why their argument is best	3 minutes

Each side can take questions from the audience.
While students are observing the debate, they can develop questions for each side.

Modified from lesson materials shared by William Monahan, Eastlake High School, Lake Washington School District, Washington

and

John Elyard, Trout Lake School District, Trout Lake, Washington

NAME_____ Date_____ Period_____

Debate Instructions

Preparation

Obtain current information from reputable sources.

Prepare a quality brief with all sections complete and properly formatted.

Present your information effectively and convincingly.

Reflect clearly on the ethical theory/theories and principles involved with the issue.

Components of the Debate Brief

Example (such as 'Should Thawing Unused Frozen Embryos be Permitted?):

Statement/Point #1:
(ex: Primary authority for frozen pre-embryos rests with the two gamete providers, and they must agree to any disposition of the pre-embryos).

Ethical Theory/Principle: (ex: Respecting the individual gamete providers and their autonomy).

Quote A:
Provide a one sentence summary of the quote, its source, and a photocopy of the quote in its entirety.

Quote B:
Provide a one sentence summary of the quote, its source, and a photocopy of the quote in its entirety.

Quote C:
Provide a one sentence summary of the quote, its source, and a photocopy of the quote in its entirety.

Statement #2:

Ethical Theory/Principle:

Quotes

A

B

C

Statement #3:

Ethical Theory/Principle:

Quotes

A

B

C

Note that in addition to preparing arguments for their position, each team should anticipate their opponents' arguments and identify possible flaws or weaknesses in those arguments.

NAME_____ Date_____ Period_____

Debate Format:

Side	Presentation	Time
Opening Statements and Clarification		
YES/PRO team	Opening statements using three arguments	5 minutes
NO/CON team	Asks any clarifying questions	2 minutes
NO/CON team	Opening statements using three arguments	5 minutes
YES/PRO team	Asks any clarifying questions	2 minutes
Rebuttal (No new arguments presented)		
YES/PRO team	Repeats their opponents' arguments and tells what is wrong with the positions	3 minutes
NO/CON team	Repeats their opponents' arguments and tells what is wrong with the positions	3 minutes
Summary		
YES/PRO team	Summarizes their position by speaking to their opponents' counterpoints and closes with why their argument is best	3 minutes
NO/CON team	Summarizes their position by speaking to their opponents' counterpoints and closes with why their argument is best	3 minutes

Each side will also be expected to answer questions from the audience.

Student Handout

NAME_____ Date_____ Period_____

Position Sheet

Based upon my prior understanding of this controversial issue, my position is:

The main reasons that lead me to this position are:

1)

2)

3)

Questions for Debate Presenters:

YES/PRO

1)

2)

NO/CON

1)

2)

NOTES:

Based upon my reflections on the debate, as well as my prior knowledge, I now/still conclude that:

Student Handout

NAME_____ Date_____ Period_____

Debate Scoring Sheet

Subject of Debate _____ Pro or Con (Circle one)

Debate Element	Score (1-10)	Comments
Appearance of team/seriousness of team		
Delivery: Team members addressed remarks to the audience in clear, loud voices.		
Opening statements were well organized, complete and included three arguments		
Team members participated equally in opening statement.		
Arguments were related to ethical perspectives and principles		
Rebuttal was specific to arguments made in the opposing team's opening statement.		
Team members participated equally in the rebuttal.		
Summary provided and opponents' counterpoints addressed.		
Answers to audience questions were well thought out.		
Respect was shown throughout the debate for the opposing team. (No name calling, interruptions, etc.)		

Points Earned: _____/100 Points

Socratic Seminar

Summary

The National Paideia Center, which has developed extensive materials on using seminars in classrooms, defines a Socratic seminar as a **'collaborative, intellectual dialogue facilitated with open-ended questions about a text.'**

Student Handouts: Open-Ended Questions and/or Critical Reasoning Analysis Sheet, Discussion Partner Evaluation

Purpose

The purpose of a Socratic Seminar is to achieve a deeper understanding about the ideas and values in a text. In the Seminar, participants systematically question and examine issues, and principles related to a particular content, and articulate different points-of-view. The group conversation assists participants in constructing meaning through disciplined analysis, interpretation, listening, and participation.

Background

In a Socratic Seminar, the participants carry the burden of responsibility for the quality of the discussion. Good discussions occur when participants study the text closely in advance, listen actively, share their ideas and questions in response to the ideas and questions of others, and search for evidence in the text to support their ideas. The discussion is not about right answers; it is not a debate. Students are encouraged to think out loud and to exchange ideas openly while examining ideas in a rigorous, thoughtful, manner.

Key Elements

There are several basic elements of a Seminar:

- Text
- Classroom Environment
- Questions

Text

All participants read the text in advance. The text (or article, film clip, or other artifact) should contain important and powerful ideas and values. It should be at the appropriate level for the students in terms of complexity, and should relate directly to core concepts and of the content being studied. A certain degree of ambiguity or potential for different interpretations also makes for richer discussion. *It is extremely helpful to number the paragraphs in a text so that participants can easily refer to passages.*

Classroom Environment

The classroom should be arranged so that students can look at each other directly. A circle or square works well. Some teachers like to use desks and have students use name card tents, others prefer simply to use chairs without desks.

The discussion norms should be prominently posted. Some teachers like to also post the initial key question.

Socratic Seminar continued

Questions

Prepare several questions in advance, in addition to questions that students may bring to class. Questions should lead participants into the core ideas and values and to the use of the text in their answers. Questions must be open-ended, reflect genuine curiosity, and have no 'one right answer'! Choose one question as the key interpretive question of the seminar to focus on and begin discussion.

During the seminar, use particular questions to move the discussion along. Towards the end of the seminar, some teachers like to use closing questions that encourage participants to apply the ideas to their personal experiences and opinions. These closing questions do not require the text to be answered but provide students with the chance to relate their own perspectives. Lastly, debriefing questions help students reflect on the process of the seminar.

- **Sample questions to serve as the key question or interpret the text:**
  What is the main idea or underlying value in the text?
  What is the author's purpose or perspective?
  What does (a particular phrase) mean?
  What might be a good title for the text?
  What is the most important word/sentence/paragraph?
- **Sample questions to move the discussion along:**
  Who has a different perspective?
  Who has not yet had a chance to speak?
  Where do you find evidence for that in the text?
  Can you clarify what you mean by that?
  How does that relate to what (someone else) said?
  Is there something in the text that is unclear to you?
  Has anyone changed their mind?
- **Sample questions to bring the discussion back to students in closing:**
  How do the ideas in the text relate to our lives? What do they mean for us personally?
  Why is this material important?
  Is it right that….? Do you agree with the author?
- **Sample debriefing questions:**
  Do you feel like you understand the text at a deeper level?
  How was the process for us? Did we adhere to our norms?
  Did you achieve your goals to participate?
  What was one thing you noticed about the seminar?

Socratic Seminar continued

Seminar Structure

The Seminar can be divided into three time periods:

Before the Seminar

- Introduce the seminar and its purpose (to facilitate a deeper understanding of the ideas and values in the text through shared discussion).
- Have students read the text. They may use one of several formats to process the information. The Open-Ended Questions and/or the Critical Reasoning Analysis Sheet can be used to help students understand the content. These can be used as the 'ticket' to participate in the seminar. Share any expectations related to assessment.
- Review the Discussion Norms
- In addition to the classroom discussion norms you may have already set, it is important to include the following norms, or ones that are similar:
    - Don't raise hands
    - Listen carefully
    - Address one another respectfully
    - Base any opinions on the text

  Additional norms might include
    - Address comments to the group (no side conversations)
    - Use sensitivity to take turns and not interrupt others
    - Monitor 'air time'
    - Be courageous in presenting your own thoughts and reasoning, but be flexible and willing to change your mind in the face of new and compelling evidence

During the Seminar

- Be seated at the level of the students and remind them to address each other and not you!
- Pose the key question.
- Ask participants to verify their statements to particular passages, to clarify, and to elaborate.
- If the conversation gets off track, refocus students on the opening question by restating it.
- Use additional questions to bring the discussion along.
- Invite those who have not spoken into the conversation. Some teachers use talking chips (each student is allotted a number of chips that they use when they make a contribution) or a talking chain (asking each person to comment or pass in a circle). The chips may be especially useful when working with very young children but should be used only until students 'get the idea'.
- You may wish to record for your own purposes the main ideas discussed and the contributions people make (using a shorthand or diagram) to refer to as you facilitate.
- It can be helpful to summarize the main points made in the discussion, either at a quiet point or towards the end of the discussion.

After the Seminar

- Ask debriefing questions of the students.
- Share your own experience with the seminar as a facilitator.

Socratic Seminar continued

Variation: Fishbowl

If you have a large class, it may be helpful to divide the students into half and use a fishbowl format.

One half of the class is in the 'center' facing each other and discussing the text, while the remainder is on the 'outside' observing and listening. Members of the outer circle can take notes or use an evaluation form to track the overall conversation or to focus on specific participants. The Rubric for Evaluating Classroom Discussions, as well as the Socratic Seminar Fishbowl Discussion Partner Evaluation could be used for this purpose.

During the seminar, some teachers reserve an empty 'hotseat' for those in the outer circle who really want to jump in to make a contribution and then leave.

At the end of the conversation, the outer circle can share their observations. The groups then switch to allow the outside group a chance to discuss.

Assessment

A rubric for evaluating a Socratic Seminar discussion is provided in the assessment section. This rubric may also prove useful to students who are evaluating other students or reflecting on their own participation.

A Socratic discussion is a text-based discussion in which an individual sets their own interpretations of the text alongside those of other participants. The aim is a mutual search for a clearer, wider and deeper ('enlarged') understanding of the ideas, issues, and values in the text at hand. It is shared inquiry, not debate; there is no opponent save the perplexity all persons face when they try to understand something that is both difficult and important.

— Walter Parker, PhD, University of Washington

Based on materials shared by Walter Parker, PhD, University of Washington, Paula Fraser, Bellevue PRISM program, Bellevue, WA, Jodie Mathwig and Dianne Massey, Kent Meridian High School, Kent, WA. We also gratefully acknowledge the influence of the Coalition of Essential Schools and the National Paideia Center.

Student Handout

NAME_____ Date_____ Period_____

Socratic Seminar
Discussion Partner Evaluation

Name of person you are observing _____

Your name _____

Seminar Topic _____ Date _____

1) Record a check for each time your partner contributed in a meaningful way: _____ _____ _____ _____ _____

2) On a scale of 1-5, with 5 being the highest, how well did your partner do at the following?

_____ Analysis and Reasoning
Did your partner….
Cite reasons and evidence for his/her statements with support from the text?
Demonstrate that they had given thoughtful consideration to the topic?
Provide relevant and insightful comments?
Demonstrate organized thinking?
Move the discussion to a deeper level?
Notes/Comments:

_____ Discussion Skills
Did your partner…
Speak loudly and clearly?
Stay on topic?
Talk directly to other students rather than the teacher?
Stay focused on the discussion?
Invite other people into the discussion?
Share air time equally with others (didn't talk more than was fair to others)?
Notes/Comments:

_____ Civility
Did your partner…
Listen to others respectfully?
Enter the discussion in a polite manner?
Avoid inappropriate language (slang, swearing)?
Avoid hostile exchanges?
Question others in a civil manner?
Notes/Comments:

Student Handout

NAME_____ Date_____ Period_____

Open-Ended Questions for a Socratic Seminar

When preparing for a Socratic Seminar, write questions using these sentence frames to stimulate your thinking about the article(s) you read. Choose and complete 5 of the following:

- What puzzles me is…

- I'd like to talk with people about…

- I'm confused about…

- Don't you think this is similar to…

- Do you agree that the big ideas seem to be…

- I have questions about…

- Another point of view is…

- I think it means…

- Do you think…

- What does it mean when the author says…

- Do you agree that…

Socratic Seminar Rubric

	Exemplary	Proficient	Partially Proficient	Developing	Comments
Analysis and Reasoning	• Clearly references text to support reasoning. • Demonstrates thoughtful consideration of the topic. • Provides relevant and insightful comments, makes new connections. • Demonstrates exceptionally logical and organized thinking. • Moves the discussion to a deeper level.	• Occasionally references text to support reasoning. • Demonstrates consideration of the topic. • Provides relevant comments. • Thinking is clear and organized.	• Rarely references text, may reference text incorrectly. • Demonstrates awareness of the topic but little reflection on it. • Comments are mostly relevant. • Thinking is mostly clear and organized.	• Does not reference text. • Demonstrates little or no consideration of the topic. • Comments are off-topic or irrelevant. • Thinking is confused, disorganized, or stays at a very superficial level.	
Discussion Skills	• Speaks loudly and clearly. • Stays on topic and brings discussion back on topic if necessary. • Talks directly to other students (rather than the teacher). • Stays focused on the discussion. • Invites other people into the discussion. • Shares 'air time' equally with others. • References the remarks of others.	• Speaks at an appropriate level to be heard. • Stays on topic and focused on the discussion. • Aware of sharing 'air time' with others and may invite them into the conversation. • May occasionally direct comments to teacher.	• Mostly speaks at an appropriate level but may need to be coached. • Sometimes strays from topic. • Occasionally dominates the conversation.	• Cannot be heard, or may dominate the conversation. • Demonstrates inappropriate discussion skills.	
Civility	• Listens to others respectfully by making eye contact with the speaker, and waiting their turn to speak. • Remarks are polite and demonstrate a high level of concern for the feelings of others. • Addresses others in a civil manner, using a collegial and friendly tone.	• Listens to others respectfully. • Uses appropriate language and tone. • Remarks demonstrate a concern for the feelings of others.	• Listens to others respectfully, but may not always look at the speaker or may sometimes interrupt. • Remarks demonstrate an awareness of feelings of others.	• May be distracted or not focused on the conversation. • Interrupts frequently. • Remarks demonstrate little awareness or sensitivity to the feelings of others. • Uses an aggressive, threatening, or otherwise inappropriate tone.	

Rubric for Evaluating Classroom Discussions

	Exemplary	Proficient	Partially Proficient	Developing
Recognizes and Understands Multiple Perspectives	• Beyond recognition and understanding, student is able to empathize with others' perspectives. • Student's own thinking becomes more complex and thorough with added perspectives.	• Student demonstrates recognition and understanding of multiple perspectives through reflection and paraphrasing.	• Student recognizes and understands some alternate perspectives through reflection and paraphrasing.	• Student struggles to reflect and paraphrase alternate perspectives accurately.
Participates in a Civil and Democratic Discussion	• Beyond meeting discussion guidelines, student is a discussion leader, soliciting others' viewpoints and enforcing discussion guidelines in a respectful manner.	• Meets all discussion guidelines.	• Meets some discussion guidelines, but some areas need development.	• Several areas of discussion guidelines need development.
Communicates Ideas Using Supporting Evidence	• Student states ideas with relevant supporting evidence from several of the following: content presented in class, experience, legitimate sources.	• Student states ideas with relevant supporting evidence from content presented in class, experience, or legitimate sources.	• Student sometimes states ideas using relevant supporting evidence from content presented in class, experience, or legitimate sources.	• Student rarely or never states ideas using relevant supporting evidence from content presented in class, experience, or legitimate sources.
Demonstrates Understanding and Application of Science Content	• Student consistently uses ample content vocabulary appropriately. • Scientific statements are factual and thorough. • Student is able to apply scientific concepts through examples and integration, even to areas outside the original content.	• Student uses content vocabulary appropriately. • Scientific statements are factual. • Student applies scientific concepts accurately through examples and integration of different concepts.	• Student is at times able to use vocabulary appropriately. • Some facts are incorrect. • Student shows limited ability to apply scientific concepts through examples and integration.	• Student rarely uses vocabulary appropriately. Facts are often incorrect. • Student struggles to apply scientific concepts through examples and integration.
Identifies Ethical Processes and Theories Used	• Student is able to correctly relate one's own and others' perspectives to schools of ethical thought and frameworks or reasoning tools used to arrive at the various perspectives. • Student demonstrates clear understanding of stakeholders, values, and issues, as well as the alternate decisions that may be made according to the various parties.	• Student demonstrates use of ethical frameworks and reasoning tools in arriving at perspective. • Student correctly identifies perspective to schools of ethical thought. • Student demonstrates clear understanding of stakeholders, values, and issues.	• Student demonstrates some use of ethical frameworks and reasoning tools in arriving at perspective. • Student makes limited connections between personal perspective to schools of ethical thought. • Student demonstrates limited understanding of stakeholders, values, and issues.	• Student arrives at a perspective without the use of any framework or reasoning tool. • Student is unable to relate personal perspective to the schools of ethical thought. • Student is often unable to identify stakeholders, values, or issues.

COMMENTS:

DISCUSSION GUIDELINES:
Student's tone of voice and body posture implies discourse and discussion rather than a debate or competition.
Student acknowledges and respects different viewpoints.
Student tries to resolve conflicts that arise in a manner that retains everyone's dignity.
Student advocates for own voice, as well as treats others' voices with equal importance.
Student does not interrupt others.
Student does not dominate the conversation.
Student critiques ideas rather than people.
Student is attentive.
Student contributes to enforcing above rules when appropriate.

Developed by Rosetta Lee, Seattle Girls School, Seattle, Washington, in collaboration with 'Ethics in the Science Classroom' teachers

NAME_____ Date_____ Period_____

Sample Policy Recommendation Letter Assignment

"On August 9, 2001, at 9:00 p.m. EDT, the President announced his decision to allow Federal funds to be used for research on existing human embryonic stem cell lines as long as prior to his announcement (1) the derivation process (which commences with the removal of the inner cell mass from the blastocyst) had already been initiated and (2) the embryo from which the stem cell line was derived no longer had the possibility of development as a human being."

-National Institutes of Health

Unfortunately, these stem cell lines have several limitations. Initially this policy covered sixty stem cell lines. Only 22 of these lines are now available for research using federal funding but recent studies have shown they cannot be used in human treatments. A team of researchers from the University of California has found that those lines approved are contaminated by mouse feeder cells that were used to grow them. This would lead the human immune system to attack the cells, making them unusable in any future treatments. New uncontaminated lines cannot be derived in the US with federal funds due to the August, 2001 policy.

Your assignment is to write a letter, addressed to the President, with your recommendations toward the current policies that restrict federal funding for embryonic stem cell research. In your letter, there should be a clear statement as to whether you support the current policy or that you believe there needs to be changes to it (and what those changes should be). You also need to support your reasoning and cite any sources used.

TASK: Write a policy recommendation letter containing the following:

Pre-write: Use the decision-making model to organize your ideas.

1. Describe the ethical dilemma surrounding stem cell research.
2. Clearly explain your recommendation(s) concerning funding and regulations to address the ethical dilemma.
3. Provide two supporting ethical arguments.
4. Provide two supporting scientific arguments.
5. Cite your sources.
6. Conclude your letter by thanking the recipient for their time.

Length: The paper should not be longer than 3 pages, 12pt font, 1.5 line spacing.

Use the evaluation rubric for additional guidelines for meeting criteria.

Recommendation Letter Due Date:

Student Handout

NAME_____ Date_____ Period_____

Policy Recommendation Letter Evaluation

	Exemplary	Proficient	Partially Proficient	Developing	Comments
Recognizes and Understands Multiple Perspectives	Student's own thinking becomes more complex and thorough with added perspectives.	Student demonstrates recognition and understanding of multiple perspectives.	Student recognizes and understands some alternate perspectives.	Student struggles to reflect and paraphrase alternate perspectives accurately.	
Communicates Ideas Using Supporting Evidence	2 Ethical arguments are provided. Student states ideas with relevant supporting evidence from several of the following: content presented in class, experience, legitimate sources that are cited in the body of the letter and works cited (at least 2 sources).	2 Ethical arguments are provided. Student states ideas with supporting evidence from content presented in class, experience, or legitimate sources cited in the body of the letter and works cited (at least 2 sources).	Less than 2 ethical arguments. Student sometimes states ideas using relevant supporting evidence from content presented in class, experience, or legitimate sources.	Less than 2 ethical arguments. Student rarely or never states ideas using relevant supporting evidence from content presented in class, experience, or legitimate sources.	
Demonstrates Understanding and Application of Science Content	2 Science arguments provided. Student consistently uses ample content vocabulary appropriately. Scientific statements are factual and thorough. Student is able to apply scientific concepts through examples and integration, even to areas outside the original content.	2 Science arguments provided. Student uses content vocabulary appropriately. Scientific statements are factual. Student applies scientific concepts accurately through examples and integration of different concepts.	Less than 2 Science arguments provided. Student is at times able to use vocabulary appropriately. Some facts are incorrect. Student shows limited ability to apply scientific concepts through examples and integration.	Less than 2 Science arguments provided. Student rarely uses vocabulary appropriately. Facts are often incorrect. Student struggles to apply scientific concepts through examples and integration.	

	Exemplary	Proficient	Partially Proficient	Developing	Comments
Identifies and Addresses Ethical Dilemma	Student correctly identifies dilemma and clearly explains major viewpoints surrounding debate. Recommendations for policy show thoughful reasoning incorporating both scientific and ethical ideas.	Student correctly identifies dilemma and can express some understanding of viewpoints. Recommendations for policy show thoughtful reasoning, incorporating both scientific and ethical theories.	Student shows limited understanding of dilemma and viewpoints surrounding debate. Recommendations for policy are poorly connected to scientific and ethical ideas.	Student is incorrectly identifies dilemma and has not shown understanding of viewpoints surrounding debate. Recommendations are not clearly connected to scientific and ethical arguments.	
Timeliness and Thoroughness / Grammar and Spelling	Student met all deadlines. Work meets all guidelines. In-class time given is always used efficiently and thoughtfully. Evidence also demonstrates much time spent outside of class in writing and improving. No mistakes are made with sentence structure, grammar and spelling.	Student met all deadlines. Work meets all guidelines. In-class time given is often used efficiently and thoughtfully. It is clear that additional time outside of class was spent. Few grammer and spelling errors.	Student met some deadlines. Work meets some guidelines. In-class time given is sometimes used efficiently and thoughtfully. Work reflects some time spent outside of class. Few to many grammar and spelling mistakes.	Student did not meet either deadlines. Work meets only a few of the guidelines. In-class time given is rarely used efficiently and thoughtfully. Work does reflects little time spent outside of class. Many spelling and grammar mistakes	

NAME_____ Date_____ Period_____

Letter to the Editor Writing Guide

Background

A Letter to the Editor is a short essay that expresses a writer's views on a topic, and tries to persuade others to accept or understand that view based on logical arguments. It is an effective way of participating in the dialogue surrounding an issue in the media.

Your Letter to the Editor will provide you a chance to demonstrate your understanding of the issues surrounding the use of animals in research and allow you to present your opinions in a well-reasoned and thoughtful way. Your Letter should build upon the conclusions you come to as a result of completing the Ethical Decision-Making Model.

You will not be graded on your opinion is, but rather in how well you support your points and present your case. Your message will be influenced by the vocabulary that you use and by the way your letter is presented, so these will also contribute to your score. Be sure to check your final draft against the checklist for the Letter to the Editor requirements.

Writing the Letter

1 Write a single sentence that sums up your position (sometimes called your thesis statement). This sentence will often contain the words should or should not. Make the statement as specific as possible. Explain what should be done, who should do it, and any other particulars that will clarify your position. If possible, your statement should suggest a particular course of action to address the issue.

2. Identify the basic BIOETHICAL PRINCIPLES involved and describe HOW they relate to your position.

3. Using the information from your Ethical Decision-Making Model, develop reasons that will support your position. How convincing your position is depends largely on the reasons you choose to support it.

    a. Your Letter to the Editor should have at least THREE reasons, each with its own paragraph.

    b. Each reason should be clearly DIFFERENT from the other.

    c. Each reason should RELATE directly to the position statement.

    d. Each reason should also have some EXAMPLES or EVIDENCE (facts, statistics) behind it.

    e. Do your reasons:
    Help support a good general rule for people to follow in similar situations?
    Help support or develop the character traits we value most as individuals?
    Respond to the individual needs of those involved and consider relationships among individuals?
    Respect the rights and dignity of all involved?
    Produce the most good and do the least harm?

4 Pick what you believe to be your opponent's strongest arguments and be sure to address each of those opposing reasons with evidence. Counter them in either a separate paragraph or as part of a preceding paragraph.

5. Conclude the letter in a way that ties things together. You may want to end your letter with a suggestion of some kind of action that the reader should take.

6. Consider the Following:

    a. Put your full name, address, phone number, and email at the top of the letter so that the newspaper can contact you.

    b. Identify by headline and date of publication any reference to a letter or article published previously.

    c. Address your opponents' arguments instead of attacking your opponents personally.

    d. Incorporate personal experience to your letter only if it is relevant.

NAME_____ Date_____ Period_____

Letter to the Editor Checklist

IDEAS and REASONING

- ❑ Position statement clearly stated.
- ❑ Bioethical principle(s) involved clearly defined.
- ❑ Relationship of bioethical principle(s) to position described.
- ❑ Minimum of 3 reasons clearly stated.
- ❑ Each reason is clearly different from the other.
- ❑ Each reason relates directly to the position statement and is relevant.
- ❑ Each reason has appropriate and credible examples or evidence supporting it.
- ❑ Opponent's position analyzed and evaluated.
- ❑ Effective closing statement provided.

LOGIC and ORGANIZATION

- ❑ Overall format is similar to the following:
  Position statement and description of bioethical principles involved.
  Reason 1 – Evidence/Examples
  Reason 2 – Evidence/Examples
  Reason 3 – Evidence/Examples
  (Opponents' position addressed, either as separate paragraph or part of a preceding one)
  Closing and/or Call to Action
- ❑ Sequence of the writing builds to a high point (has momentum)
- ❑ Smooth transitions

WRITING

- ❑ Voice: personal voice, aware of audience
- ❑ Vocabulary: strong, natural, and avoids repetition and clichés
- ❑ Sentence fluency: writing flows, sentence lengths are varied
- ❑ Conventions: accurate spelling, grammar, and evidence of proofreading

PRESENTATION

- ❑ Appropriate letter format: name and contact information, date, and signature
- ❑ Appropriate use of fonts (10 or 12 point, Arial, Helvetica, Times, or similar)
- ❑ Standard 1 inch margins
- ❑ Presentation enhances the writer's message.

	5 STRONG Shows control and skill in this trait; many strengths present.	4 COMPETENT Strengths outweigh the weaknesses; a small amount of revision is needed.	3 DEVELOPING Strengths and need for revision are about equal.	2 EMERGING Need for revision outweighs strengths.	1 NOT YET A bare beginning; writer not yet showing any control.	SCORE
Ideas and Reasoning Position statement clearly stated.						____X 1 =
Bioethical principle(s) involved defined and relation to position described.						____X5 =
Minimum of 3 reasons clearly stated. Each reason is distinct, relevant, and has appropriate and credible examples/evidence supporting it.						____X 5 =
Opponent's position analyzed and evaluated.						____X 1 =
Relates to outcome determined by decision-making model. Insightful conclusion and strong closing statement provided.						____X 5 =

Logic and Organization Follows overall suggestion for organization. Effective and logical sequence, good pacing, and smooth transitions. Builds to a high point, has momentum. Sense of resolution.						____X 1 =
Sentence Fluency, Word Choice, Voice Natural sentences with a variety of lengths and structures. No run-ons. Strong vocabulary used. Word choice is natural, not forced. Minimal use of repetition, clichés, or abstract language. Awareness of audience Commitment, involvement, and conviction conveyed. Text is lively, personal, and individual.						____X 1 =
Conventions and Presentation Accurate spelling, punctuation, capitals, paragraphs, grammar. Readable to a wide audience. Evidence of proofreading. The form and presentation enhance the writer's message. The presentation is consistent with a letter format. Appropriate use of fonts and font sizes, margins, spacing.						____X 1 =
TOTAL SCORE						/100

Modified with permission from the Northwest Regional Educational Laboratory, Portland, Oregon: 6+1 Traits™ of Analytic Writing

Decision-Making Frameworks

The strength of Decision-Making Frameworks or Models is that they provide a structured format for student thought. In teaching frameworks to students, teachers have found it helpful to begin with a familiar example or have students consider how they themselves make decisions (see Lesson Strategies section for ideas about how to introduce these models).

The model provided here is based upon one developed by the Hastings Center on Bioethics (Campbell, 1990) and has been widely used by educators in science classrooms. It has the following components:

- **Ethical Question**

  First, the decision-making framework asks students to consider the ethical question. This is in itself not trivial – awareness that an ethical dilemma actual exists requires 'moral sensitivity' (Rest, 1984) which often needs to be cultivated. Often, students will identify the ethical question only to return to modify it later. An ethical question often (but not always) includes the word 'should', and it is characterized by the fact that several competing solutions exist. In reflection of the moral nature of the dilemma, none of these solutions is without its problems, concerns, or issues. Examples of such questions include, "In which cases, if any, is the use of animals in research ethically justified?" "Is it ethical for scientists to pursue embryonic stem cell research?" or "How should donated organs be allocated?"

- **Facts: Known and Unknown**

  Students then determine which facts relevant to the question are known and which still need to be researched. If time permits, students can research the issue more deeply. This is an excellent place to incorporate additional science content. From additional research, or from content provided from the teacher, students identify stakeholders and their values.

- **Stakeholders and their Values**

  One of the most rewarding aspects of having students consider the position and values of different stakeholders is that it asks them to 'step into someone else's shoes'. While this is a valuable exercise at any age, it is particularly important for young people, who may struggle to view dilemmas from different perspectives. Such practice is also important for developing citizenship skills in students. In order to participate effectively in a pluralistic, democratic society, students need to be able to understand different perspectives, even though they may not agree with them.

Teachers can generate a list of stakeholders with their students, and then, in a classic 'case-study' approach, have student form stakeholder groups consisting of a single stakeholder position. Students discuss the values their stakeholder might bring to the issue, and the range of positions that the particular stakeholder might take. Next, the teacher can have mixed groups with one representative from each original stakeholder group form in order to try to address an ethical question (come to consensus or clarify the nature of their disagreement). This format is also explained in the Lesson Strategies section of the Primer.

- **Possible Solutions - Generating Options**

  Students are asked to generate several options for solutions. This is a brainstorming step, in order to provide a wide range of ideas. Thinking about solutions that different stakeholders would propose is one strategy. Solutions can be analyzed to consider which ethical principles are granted priority in each case.

- **Decision and Justification**

  When presented with an ethical dilemma, students are apt to quickly jump to their decision/position, without a sense of their justification. Alternatively, students may express that their position is 'simply what they believe' or what intuitively 'feels right'. The justification of the decision is a key element of the model. This section allows students to practice clarifying their reasoning. Here is where students can bring in their understanding of ethical perspectives and theories (highlighted in the Ethics as a Discipline section) in order to provide depth to their arguments. For example, ethical perspectives can help students clarify which of the possible solutions provides the best outcome for the greatest number (an 'outcome-based' perspective).

- **Action/Evaluation**

  The last steps consist of acting on the decision, and evaluating the decision. Students should be aware that they could change their decisions in light of new evidence or information. Many elements of this problem-solving strategy are shared with scientific decision-making processes. The focus is on a reasoned, thoughtful methodology rooted in critical thinking. Additionally, the process of decision-making itself should be considered, in order to determine the extent to which it was fair and just.

Student Handout

NAME_____ Date_____ Period_____

Ethical Decision-Making Framework

Ethical Question:

1. Relevant Facts (known)	2. Questions that remain (unknown, need to know)
3. Stakeholders (people and/or entities affected by the decision)	4. Concerns/Values of each stakeholder
..... ⇨	.....
..... ⇨	.....
..... ⇨	.....
..... ⇨	.....

5. Possible Solutions

a.

b.

c.

6. Decision

Justification

a.

b.

c.

Student Handout

NAME_____ Date_____ Period_____

Ethical Decision-Making Framework (4-page Version)

I. Identify the Bioethical Issue

WHAT is the ETHICAL QUESTION?

II. Gather the Facts

KNOWN: What are the relevant facts? What are the essential biological, ethical, economic, social or political considerations?

UNKNOWN: What additional facts, information, or evidence would be useful?

III. Consider the Controversy

WHO are the stakeholders? Which individuals or groups have an important stake in the outcome? Identify the concerns and values associated each stakeholder

stakeholder	stakeholder	stakeholder
↓	↓	↓
concerns/values 1. 2. 3.	concerns/values 1. 2. 3.	concerns/values 1. 2. 3.

stakeholder	stakeholder	stakeholder
↓	↓	↓
concerns/values 1. 2. 3.	concerns/values 1. 2. 3.	concerns/values 1. 2. 3.

IV. Address Alternatives	Pros	Cons
Option 1		
Option 2-		
Option 3-		

As you weigh each option, consider the following:

Rules/Duties: Does the option help support a good general moral rule for people to follow in similar situations?

Virtues: Does the option help support or develop the character traits we value most as individuals and in our society?

Outcomes: Does the option produce the most good and do the least harm?

Principles: Does the option address the bioethical principles (respect, do no harm/do good, beneficence, nonmaleficence, and justice) involved?

Care: Does the option focus mostly on protecting vulnerable individuals and maintaining important relationships?

V. Decide

What is your decision?

Justify your decision, using the language of ethical concepts and principles described above.

1.

2.

3.

VI. Action and Evaluation

After acting on your decision, you can evaluate it afterwards. You can also consider the process of decision-making itself — was it fair and just?

Modified from the Hastings Center, 1990

Ethical Decision-Making Model Scoring Guide	Points Possible	Points Received
Ethical question clearly identified 5 pts: Question that relates to an ethical dilemma clearly identified. 4 pts: Question suggests an ethical dilemma but is ambiguous, vague, or not clearly identified. 3 pts: Question does not clearly relate to an ethical dilemma or is inappropriate for topic. 0 pts: Question not identified.	5	
Basic bioethical principles at stake identified and explained 5 pts: Principles clearly identified and their logical relation to the ethical question is explained. 4 pts: Principles are identified, but their relationship to the question is illogical or not explained. 3 pts: Inappropriate principles are identified, and no explanation is provided. 0 pts: Principles are neither identified nor explained.	5	
Stakeholders clearly identified 5 pts: Major stakeholders clearly identified, and their claims, values, and assumptions are explored. 4 pts: Major stakeholders clearly identified, but without corresponding clarification of their position. 3 pts: Major stakeholders not clearly identified, or irrelevant stakeholders mentioned. 0 pts: Description of stakeholders is missing.	5	
Sufficient factual information gathered 10 pts: Factual information gathered reflects good use of the time and resources available to student. 8 pts: Factual information gathered reflects adequate use of the time and resources available to student. 6 pts: Factual information gathered reflects poor use of the time and resources available to student. 0 pts: Factual information is missing.	10	
Additional (unknown) information necessary for decision-making identified 10 pts: Additional information necessary for decision-making is thoroughly considered, clear explanation of what is lacking is provided. 8 pts: Additional information briefly considered, and explanation conveys what is lacking overall. 6 pts: An attempt to identify additional information is made, but explanation is unclear or not present. 0 pts: Additional information not considered.	10	
Minimum of 3 alternative options generated 5 pts: 3 alternative options described 4 pts: 2 alternative options described 3 pts: 1 option described 0 pts: Description of options is missing.	5	
Option 1 10 pts: Option thoroughly evaluated based on principles, consideration of perspectives, implications, concessions, and costs/benefits. 8 pts: Evaluation of option is adequate, but certain aspects lack depth. The discussion of principles, implications, concessions, and cost/benefits would benefit from further exploration and development. 6 pts: Evaluation of option is attempted, but important aspects may have been missed or are incorrectly interpreted. 0 pts: Option is not described.	10	
Option 2 10 pts: Option thoroughly evaluated based on principles, consideration of perspectives, implications, concessions, and costs/benefits. 8 pts: Evaluation of option is adequate, but certain aspects lack depth. The discussion of principles, implications, concessions, and cost/benefits would benefit from further exploration and development. 6 pts: Evaluation of option is attempted, but important aspects may have been missed or are incorrectly interpreted. 0 pts: Option is not described.	10	
Option 3 10 pts: Option thoroughly evaluated based on principles, consideration of perspectives, implications, concessions, and costs/benefits. 8 pts: Evaluation of option is adequate, but certain aspects lack depth. The discussion of principles, implications, concessions, and cost/benefits would benefit from further exploration and development. 6 pts: Evaluation of option is attempted, but important aspects may have been missed or are incorrectly interpreted. 0 pts: Option is not described.	10	
Decision clearly identified 5 pts: Final decision is readily identified. 4 pts: Final decision is identified, but may be unclear or vague 3 pts: Final decision is alluded to, but may be incomplete or fragmentary. 0 pts: Final decision is not identified.	5	
Justification provided based on comparison of options and reference to ethical perspectives 20 pts: Thorough reference made to the consideration of perspectives, facts, and principles involved. Clear articulation of the rationale behind the decision. Explanation is logical and presents at least 3 supporting examples, as well as thoughtful exploration of ethical perspectives. 18 pts: Reference made to the consideration of perspectives, facts, and principles involved. Articulation of the rationale behind the decision is mostly complete. Explanation is logical and presents at least 3 supporting examples., as well as discussion of ethical perspectives. 16 pts: Partial reference is made to the consideration of perspectives, facts, and principles involved, but key points may be missing. The rationale behind the decision may be incomplete. The explanation may not follow logically, may lack discussion of ethical perspectives, or have less than 3 supporting examples. 14 pts: The consideration of perspectives, facts, and principles involved is incomplete. The rationale behind the decision is not clearly explained. Evidence of a logical justification for the decision reached is scant or absent, ethical perspectives are not mentioned, or less than 2 supporting examples are present. 12 pts or less: The consideration of perspectives, facts, and principles involved is attempted. Evidence of a logical justification for the decision reached is scant or absent. Supporting examples, if provided, are insufficiently developed or do not relate to the decision made.	20	
TOTAL	100	

Student Handout

NAME_____ Date_____ Period_____

Alternate Decision-Making Framework #1

1. State the bioethical problem. State problem as an ought to do question (e.g., "What ought I do when…")

2. List at least five possible alternative actions or solutions to the problem, even if you don't agree with some.

	Ranking	Solutions
1.	_____	_____
2.	_____	_____
3.	_____	_____
4.	_____	_____
5.	_____	_____
6.	_____	_____
7.	_____	_____
8.	_____	_____

3. Rank these alternatives in order of preference by placing numbers beside them. For example, place #1 beside the first choice, #2 beside the second, etc. (Rank them from the one (#1) your values agree with most to the one (#?) your values agree with least.

4. Take your #1 solution and describe why it is your number one solution. How does it reflect your values?

5. What ethical perspective is given priority in your solution? (For example, are you mostly concerned with outcomes or with following a moral rule?)

6. List 3 reasons why others might not agree with your solution to the problem.

1.

2.

3.

7. How would you address their concerns?

Adapted in part from the Jon R. Hendrix/ Pat Somers Model, Ball State University

Student Handout

NAME_____ Date_____ Period_____

Alternate Decision-Making Framework #2

1. State the question or ethical issue.

2. Develop criteria for how you will decide on what is the most ethical course of action. How will you evaluate different solutions? What ethical perspectives, if any, should have priority?

3. Brainstorm a list of solutions.

4. Rank the solutions using the criteria you have established.

5. Explain how the solution you chose is the best one from among competing choices.

Appendix

Appendix

Sample Letter to Parents

A Sample Letter to Parents for a course on Science and Society is provided.

Topics List for Bioethics

A Topics List for Bioethics provides ideas for how bioethical issues might be addressed within the context of a Biology course.

Sample Case Study

The **Case Study: Pennington's Sweetie Pie** involves issues related to organ transplantation using genetically modified animals as donors. It is included as an example of ethical analysis and classroom application. In this section, the Case Study itself, as well as **Classroom Teaching Example**, are provided. A more detailed **Ethical Analysis** of the case follows. Lastly, **General Background Information** on genetically modified organisms is included.

Additional Case Studies

Three additional sample cases are provided:

Two Tales of Rice focuses on questions surrounding genetic modification of food.

Talk About Short explores the use of Human Growth Hormone for short stature.

One Family's Dilemma looks at the choices a family must make about their frozen IVF embryos.

These can be used in conjunction with some of the strategies provided in the primer (see the Case Study and Decision-Making Model sections).

Recommended Resources

Recommended **Online Bioethics Resources** are provided. These include curriculum units, teaching resources, and films, and further reading.

References

References cited in the Primer text are noted.

Model Letter to Parents

To: Parents/ Guardians of _____

Subject: Science and Society

Your student is enrolled in the course _____ .
As part of this course, we will be learning about issues related to science and society, and discussing them in class. I am very excited about the course, the issues to be discussed, and our class format. Most importantly, I am very pleased to have the opportunity to teach and exchange dialogue with your sons and daughters in our academic setting. This class will be discussing some very controversial issues and that has served as the primary initiative behind this letter.

This course will investigate the dilemmas that science and technology have created in modern society. Students will be expected to investigate and actively problem-solve selected issues that are currently being debated by scientists, politicians, and philosophers. Upon completion of this course, students will have a heightened awareness of the impact that scientific discoveries have on society.

Students will be expected to present their ideas in a structured and analytical way, and this course will strive to introduce philosophical reasoning into their intellectual growth. We will not advocate any one position in the issues we address – rather, we will try to investigate the perspectives of many different stakeholders. By learning about different ethical perspectives, points of view, and decision-making models, students will have tools to approach controversial issues systematically and thoughtfully, and be better-equipped to be effective citizens in our democratic society. We will respect and honor the family and cultural values that students bring to our discussions at all times.

Enclosed you will find the course syllabus, which lists the topics that will serve as the focus for class debate, discussion, and research. Some students may, with prior permission, elect to research topics not on the syllabus.

We will be using the following text: (list text if appropriate, and indicate whether the text has been approved by the district's Instructional Materials Committee). We will also be using materials for class discussion from various sources including newspapers, periodicals, professional medical journals and several bioethics publications. I will supplement the issues with films that are related to the topics being discussed. Should you wish to review the reference materials, I will have them available in my classroom. Feel free to call and come by to visit.

I am personally committed to making this class a meaningful one that will provide your student with the thinking skills necessary to resolve some of these issues as they confront them in their personal lives. I am looking forward to an exciting semester, and your student is what will make it all worthwhile. Thank you for the opportunity to be a teacher for them.

Based on a letter provided by William Monahan, Eastlake High School, Lake Washington School District, Washington.

Topics List for Bioethics

Cells
- Use of stem cells
- Use of patient cells for cell lines (who owns the cells and discoveries made with them?)

Characteristics of Life/Death
- Termination of care for anencephalic infants
- Definitions of death in relation to terminating life
- Assisted suicide for the terminally ill
- Artificially sustaining and prolonging life

Environmental Ethics
- Fair allocation/use of resources
- Intrinsic value of species

Genetics
- Privacy of genetic information
- Ownership of genetic information (patenting)
- Genetic modification of bacteria, plants, animals, or humans
- Genetic modification of food
- Gene therapy
- Genetic testing issues
- Personal responsibility and genetic determinism (how much is your behavior due to your genes?)

Human Biology/Organ Systems
- Use of growth hormone (therapy vs. enhancement)
- Use of steroids
- Xenotransplantation (transplantation of animal parts to humans)
- Organ transplantation
- Combining humans and computers (what makes us human?)

Microbiology
- Compulsory vaccination
- Quarantine for infectious individuals

Reproduction
- Eugenics
- Use of Pre-Implantation Genetic Diagnosis, either to select for or against certain traits
- Reproductive cloning of humans
- Cloning of animals and plants
- Sex selection
- Having one child to save another

Research Ethics
- Use of humans for clinical trials (testing new treatments, devices, or drugs)
- Human testing in vulnerable populations or in less developed countries
- Use of animals in medical research, dissection, or in testing of personal care products
- Appropriate use of genetic material sampled from indigenous populations

Other
- Health care justice
- Drugs, children, and behavior control
- Race (definition, value, use of genetic difference in medical treatment)
- Gender (definition, value)

Pennington's Sweetie Pie

Robert Pennington was a normal healthy seventeen-year-old working in a family-owned carpet store when he came down with what he thought was the flu. After a few weeks, he was not feeling better, and in fact, he felt much sicker. A glance in a bathroom mirror revealed that the whites of his eyes had turned yellow.

Alarmed, Robert went to a local medical clinic where the physician saw him. The doctor examined Robert and asked for a urine sample. Astounded by the coffee-colored brown urine sample, the doctor referred Robert to a specialist. Four days later, Robert was admitted to Baylor University Medical Center diagnosed with sudden and overwhelming liver failure.

Dr. Marlon Levy, a transplant surgeon at Baylor, knew that Robert would die in a few days without a liver transplant and reacted immediately by placing Robert at the top of the transplant list. However time was critical since Robert was showing signs of acute ammonia poisoning as a result of the liver's inability to clean toxins from his blood. He was already hallucinating and approaching a comatose state. Dr. Levy soon realized that no human liver would be available in time to save Robert's life.

Dr. Levy began to evaluate another possibility. An experimental procedure known as extracorporeal perfusion using a transgenic pig liver had been approved by the FDA for testing at Baylor Medical Center. This research was funded by a company that had developed a process to insert human genes into pig liver cells to prevent humans from rejecting a transplanted pig liver. The company then sought research hospitals willing to test the transgenic pig livers on humans with liver failure who needed a new organ. The data collected and the outcomes of these experimental surgeries, if positive, would be submitted to the FDA to support a marketing application.

The company had shipped the transgenic animals to the Baylor animal labs and they were there at the time that Robert Pennington was admitted to the hospital. Dr. Levy had also been trained in the use of these pig livers in extracorporeal perfusion. This procedure involves removing the patient's blood through plastic tubing and cleansing it by passing it through the pig liver before returning the blood to the patient. This is a temporary measure referred to as a "bridge to transplant", and it is intended to support liver function and the patient's life until a suitable human liver can be found.

Within a short time, Robert lapsed into coma and was placed on life support. Dr. Levy notified Robert's grandmother, his guardian, that she was needed in the intensive care unit for a discussion on Robert's condition. Charlotte Pennington listened as Dr. Levy explained the procedure. He also explained that, since the procedure was new, there were unknown risks that included the possibility that some dangerous animal viruses might infect Robert. He would need to be tested for animal source infections possibly for the rest of his life. Dr. Levy also told Mrs. Pennington that Robert would be his first pig liver transplant patient. Mrs. Pennington gave her consent the next morning.

Dr. Levy then removed the liver from a 15-week-old, 118-pound transgenic pig from the Baylor animal lab and moved it to Robert's bedside to be used as Robert's external support liver. Shortly after the liver was attached to Robert through the plastic tubing, perfusion began and was used for six and half hours over three days. At that point, a suitable human liver for Robert was found in Houston and delivered to Baylor for transplant. The transplant was successful and Robert made a full recovery. However, no one could forget that his survival was due to the experimental procedure Dr. Levy used to keep Robert alive until the human liver was found. In fact, Robert's grandmother keeps a snapshot of the pig, named Sweetie Pie by one of Baylor's animal handlers, in a scrapbook.

Sailing into uncharted waters, Pennington (with his grandmother) was the first subject of an experimental procedure in which his blood was circulated through a pig's liver outside his body. While all went well with Robert Pennington (and another 5 patients who received the same experimental surgery), the FDA shut down the perfusion trial three weeks after Robert's procedure. A group of virologists in England had found evidence that human cells could be infected with pig viruses* in test tubes and that the genes for two separate viral strains had been found in several varieties of pigs, making it unlikely that pigs could be bred to remove the virus.

No one knew at the time whether pig viruses could make humans sick but precaution seemed justified. Ultimately, the FDA lifted the ban when companies producing transgenic pigs developed a pig viruses detection test for both pigs and patients. Yet, this test alone did not resolve concerns about the infectious risk. The fact that pig viruses had been undetectable with any test for many years led researchers to suspect that pig tissues could harbor other unknown infectious agents.

**porcine endogenous retroviruses*

This case is derived from: Stolberg, S.G., Could this pig save your life? New York Times, October 3, 1999.

Classroom Teaching Example

This section describes how the Pennington Case might be used in a classroom incorporating elements of the Lesson Strategies included in this Ethics Primer.

This example focuses particularly on the use of a Decision-Making Framework, as well as a Case Study approach.

Decision-Making Framework Elements

1. Ethical Question: Identify the ethical problems confronted by the actors in the case. What has to be decided?
   - Should animals be used in research to provide "bridge organs"?
   - How do we treat patients ethically in end stage of their disease?
   - How should we balance the potential benefits of genetic engineering with the possible risks to public safety?
2. Relevant Facts: Assess the factual information available to the decision makers.
   - How are the animals cared for in lab facilities or any research facilities?
   - Who monitors research facilities that house animals?
   - What is the therapeutic worth of using pig livers as bridge transplants as opposed to mechanical devices? When should the use of a bridge organ be proposed for a patient (i.e., at what stage of their disease)?
3. Stakeholders and Values: Identify the "stakeholders" in the decisions and their concerns/values

   Who has a stake in this decision?
   - Patients and families
   - Doctors, researchers, and the surgical team
   - Animal caretakers
   - Donor animals
   - Insurance companies
   - Biotech companies
   - FDA
   - Patients that may benefit from further animal research

In what ways might each stakeholder be affected?

- Human patients must consider their life, health and the well being of their families (financial and emotional burdens)
- Families and friends of the patients will be invested in the well being of the patient.
- Doctors, researchers and surgical teams will be affected by knowledge gained, prestige of success and their own satisfaction in providing patients with life saving measures.
- Animal caretakers may or may not be distressed by the use of the animals in this research study.
- The lives and well being of animals raised to human purpose should be considered.
- The health care system and society in general may be asked to share a financial burden.
- Society in general may be put at risk for undetected viruses or other infectious agents.
- The research company has business interests in the success of the therapy.
- Stockholders in the research company stand to gain with successful therapies; stand to lose with catastrophic therapies.
- Regulators must develop guidelines to govern the research and implementation of these therapies.
- Transgenic organs will reduce the waiting time for patients in organ failure.

Identify the values at stake in the decision

- Promotion of human and animal well being
- Protection from risk – the avoidance of harm or injury to others (non-maleficence)
- Compassion – sympathetic and caring response to others
- Fairness – a procedure for decision making that respects the concerns of all involved
- Justice – the distribution of harms and benefits
- Risk perception – assessing the likelihood and severity of potential harms
- Pursuit of scientific inquiry (integrity in scientific inquiry)
- Relief of animal and human suffering from disease through research development
- Protection of the innocent
- Economic profits

4. Possible Solutions: Identify the options available to the decision makers
    - With FDA approval, research with "bridge transplants" could be allowed in limited circumstances to provide patients in end-stage disease a chance of survival until a suitable human organ is found. This would also provide the researchers with more data.
    - Continue other research with transgenic animals that may have therapeutic benefits in Parkinson's and diabetes, but discontinue use of transgenic animals as "bridge transplants".
    - Perfect mechanical liver perfusion for patients in end-stage disease.
    - Place patients on transplant waiting lists in the hope of receiving a suitable organ. Advocate for social change in increasing the number of available donor organs through educational programs.

Case Study Approach

Have students form groups based on the 4-6 stakeholder groups identified as most important to this case. For example, students could be grouped into researchers, doctors, veterinarians, animal activists, patients and families, insurance companies, etc.

Have each group derive the concerns and values that are most important to them. If time permits, have each group conduct research on their stakeholder. If time is limited, provide each group with a 'position sheet' to take.

Create mixed groups consisting of students from each individual group. Have students present the position of their stakeholder to the mixed group. Allow the groups time to come to consensus on an ethical issue related to the case, or ask them to clarify the nature of their disagreement.

Afterwards, allow individual students to present their own position through a debrief session or through a written assignment.

Extension Activities:

Anatomy and Physiology:

Have students research the anatomy and physiology of the liver. This should include the normal development, structure, and function of the liver. Review the tests used to determine normal liver function and disease state. Encourage students to consider the quality of life issues surrounding someone in organ failure. Have the students link the symptoms of Robert Pennington to the physiology that they have learned.

Transplant Information:

Have students access the United Organ Sharing Network for information on:

- The number of people currently waiting for transplants
- The number of transplants that occur annually and the organ type
- The number of medical centers performing transplant surgery
- The cost of a liver transplant and the necessary follow up care
- The tissue match criteria for a successful liver transplant
- The types of tissue and solid organ transplants

Ethical Analysis of the Case: Pennington's Sweetie Pie

Robert Pennington's case exemplifies both the promise and potential peril associated with the introduction of genetically modified therapeutic animal tissues into humans. The creation of bioengineered animals as a source of tissue to treat human disease is a rapidly progressing phenomenon that has raised several practical, scientific, medical, regulatory, ethical, and social policy concerns.

Practical problems include the access to an appropriate source and number of suitable animals. Scientific concerns include the ability to adequately and reproducibly "humanize" animals with genetic alterations that effectively prevent tissue rejections in human recipients. Medical problems include the potential that these animals are a source of undetectable zoonotic infections that can infect the human recipients with symptoms arising sometimes years after transplantation during which time the patient may pass on the infection to others. Other medical problems include the unknown longevity of animal organs, the degree to which they can eliminate severe organ failure and the inability to predict the risks (both immediate and long term) of the transplant procedure. Since the field of xenotransplantation is advancing at such a fast rate, regulatory systems such as the FDA often lag behind the technology development resulting in inconsistent and spotty controls and guidelines. Also, since corporate scientists many times hold the expertise in the field, FDA learning often comes from the companies the FDA is authorized to regulate. The combination of the promise of the technology and the related concerns (1) has generated multiple ethical and social policy issues and concerns that this teaching module is designed to address.

The ethical and social issues linked to xenotransplantation to date include:

Use of Animals

The protest of animal rights activists is exemplified by the statement of one such group: "Should xenotransplantation ever become a reality, pigs will be turned into spare part factories, plundered for their organs. Genetically-mutated and raised in artificial conditions, these remarkably intelligent animals face an unnatural and distressing existence.(2)" The questions that flow from a concern about animal welfare include:

- What acuity of human need justifies the use of animals to obtain therapeutic tissue and organs?
- Are the numbers of animals used in the process of developing the technology justified?
- Is the process of retrieving tissues and organs humane?
- How do we balance the need to save human lives and improve human health with the need to respect the lives of animals?

Human research integrity

In order to justify the introduction of xenotransplantation into humans, research must be able to demonstrate that the benefits to the patient of the experimental treatment outweigh the risks. This is a difficult task, many argue, since too much is unknown about the consequences of xenotransplantation. Yet, others argue that lab and animal research are never sufficient to be able to predict human risks and benefits with any degree of reasonable surety.

A second important consideration relates to the integrity of human subject consent.

Since the patients on an organ transplant waiting list are often close to death and therefore desperate, can they rationally weigh and balance the information about the consequences of animal organ transplantation to provide free and full and valid consent? How do researchers responsibly balance the need for informed consent, take into account the vulnerability of the potential human subjects, and still pursue this potentially valuable research.

Timing of deployment

Scientific adventuring versus steadfastness in the pursuit of alleviating human illness

The great medical need for organs and the absence of viable therapeutic alternatives drives this technology development. The fact that patients with failing organs will often die before a suitable human organ is available tempts physicians to deploy the technology to save a life despite the lack of full understanding about the consequences of the transplant. Some ethicists believe that patient need and the lack of other options makes it ethically defensible to proceed with research despite the unknowns(3). The drive to introduce transgenic xenotransplantation in humans has been lauded by some who view these physicians as heroes willing to take risks on behalf of the preservation of human life. Others criticize scientists and doctors who push the envelope and suspect that their pursuit of personal glory dives them more than does a concern for patient welfare. These differing views often influence the speed with which new medical technologies are deployed in humans. And when they are deployed, there is always a question about whether more research is needed to ensure patient benefit. This question was addressed by one ethicist who wrote that "There is a widespread misperception that medical treatments and surgical procedures are easily classified as either experimental or accepted. In fact, all treatments have an element of experimentation, and new surgical procedures are based on extrapolations from prior work...When does a surgeon decide to apply a new operation to a patient?...the decision is based on balancing, on the one hand, the experimental evidence suggesting that the procedure may succeed, and, on the other, the clinical urgency...(4)"

Regulatory integrity

Commensurate with the ethical concerns above, commentators have asked whether the FDA has prematurely approved the research of bioengineered livers. Faith in the regulatory system can falter when, as in the case of xenotransplantation, the Agency approves of and then halts research because of the risk of harm to human subjects. In light of this public trust issue, others have asked whether the regulatory agencies should consider public as well as scientific opinion before approving human research on xenotransplantation. A European poll at the time showed that only 36% of people found xenotransplantation acceptable. In another poll, those in Britain were only 21% in favor. Others take a different approach and favor proceeding with the research but only under careful controls. The problem with this approach is that consensus on the definitions of transplant success and what constitutes adequate control and surveillance is not widespread and is likely to change as information advances.

Patient welfare

Concern for patient welfare prompts several questions:

- How many liver failure patients can be sacrificed in the process of researching the efficacy and safety of animal tissue transplantation in humans?
- How much should be known about the risks (including that of zoonosis) before the deployment of bioengineered pig tissues into humans with organ failure?
- What constitutes a reasonable balance of risks and benefits from animal organ transplantation?

Obviously, differences of opinion exist with respect to each of these questions.

Some argue that any survival benefit is justified in patients facing imminent death and any delay in the research will only lead to more deaths from organ failure.

Critics argue that we should not proceed in the face of unknown and potentially dangerous adverse consequences since we are "literally, interfering with something we do not understand.(5)"

Public safety

Retroviruses such as PERV (Porcine Endogenous Retroviruses) and HIV (Human Immunodeficiency Virus) integrate into the DNA of the cells that they infect, allowing them to persist in the infected individual or animal indefinitely. Also, animals can pass infectious agents to humans, such as the prion that causes Bovine Spongiform Encephalopathy (BSE or "mad cow disease") in cattle and variant CJD in humans. The prospect of confronting infectious agents like these in xenotransplant patients (zoonotic infection) who might infect others worries some scientists, public health officials, and regulators.

As one alarmed researcher put it, "The individual can sign a consent form and say, 'I'll take the risk because I'm going to die anyway.' But that person is signing a consent form for the whole population, the whole human race.(6)" To prevent such contamination, the United Kingdom agency charged with producing guidelines for xenotransplantation advised that recipients of animal organs be required to sign a document of consent agreeing to be perpetually monitored for signs of infection, to take drugs for the rest of their lives to maintain their health, to use barrier contraception constantly, to have their sexual partners consistently monitored, and to refrain from pregnancy or fathering a child.

Commercialization conflicts of interest

Any time that companies sponsor research on products intended for a lucrative market, conflicts of interest concerns arise. This is especially the case when a small biotechnology company is relying on its first product to sustain corporate viability. This situation prompts questions about whether the promise of profits prompts companies to engineer the clinical trial protocols to enhance the probability of good outcomes or to push the technology into human trials prematurely. The concern about conflicts is heightened in situations where the regulatory agencies must rely on corporate scientists to become sufficiently informed about the technology to promulgate regulatory guidelines.

Distributive justice and the cost of medical care

In 1996, the Institute of Medicine calculated that if animal organs made it possible to offer a transplant to everyone in the United States who needed one, annual medical treatment expenditures would rise to $20.3 billion, from $2.9 billion.(7) This cost estimate prompts the question of whether the potential benefit to organ failure patients is sufficient to justify the risk that constraints on medical budgets will lead to denial of medical care to patients with other diseases.

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Ethical Concerns Regarding Genetic Modification of Organisms

The genetic modification of plants and non-human animals normally involves the alteration of individual traits to increase the usefulness of the organism for human purposes. Genetically modified (GM) crops may be more productive, more resilient, or more resistant to insects or disease than their natural, non-modified counterparts. Similarly, animals may have GM traits that make them more efficient sources of food or other useable products. Proposed genetic modifications in human beings involve either the alleviation of disease or disability caused by some genetic malfunction or abnormality of the individual or the attempt to enhance the phenotypic properties or functioning of the individual.

Although the genetic modification of plants and animals tends to be widely accepted in North America and Asia, it has been more controversial in Europe and in some developing countries, particularly in Africa. There are basically three sources of ethical controversy in the area of GM plants and animals.

First, some believe that ethical principles of justice, respect, dignity, the avoidance of suffering, and rights all apply to at least some species or forms of life other than human beings. According to this perspective, plants and animals should not be used instrumentally as a means to an end, but should be respected as an object of integrity in their own right. Proponents of this view argue that inherited genetic structures of individual plants and animals, or whole species, should not be deliberately altered without good reason.

The second basis of ethical concern on the topic of GM plants and animals is the potential risk to natural evolution, ecosystems, and to human health and well-being. Some feel that in the field of genetics, human scientific and technical knowledge may exceed human wisdom and prudence. Critics would say that while GM has the potential for tremendous human economic and health benefits, it has the potential for catastrophic mistakes and dangers as well.

For instance, genetic modification in agriculture tends toward genetic simplification of a population or species and undermines genetic and biological diversity. Over long periods of time, species that are genetically diverse have a greater capacity to adapt and survive in the face of changing evolutionary and environmental pressures. Genetic modification practices increase the need for human, technological support to ensure the survival of genetically simplified species, hence the increased use of insecticides and fertilizers. Over time, genetic modification may contribute to the decline of biodiversity and the disappearance (extinction) of species that is now occurring worldwide at an alarming rate. Moreover, genetically modified organisms that come into uncontrolled contact with natural organisms may spread the modified traits across an entire habitat. Genetically modified corn that was intended for use only in animal feed, for example, became accidentally mixed with corn intended for human consumption. The discovery of this

accident caused considerable economic disruption because the GM species was associated with serious allergic reactions and other health risks in some persons.

The third source of ethical controversy surrounding genetic modification in plants and animals derives not so much from the biological aspects of GM itself as from its social, economic, cultural and political implications. In areas where it has been widely developed, GM in agriculture has tended to alter patterns of family farming and landholding, giving competitive advantage of larger types of agro-business and making farmers more dependent upon the international corporations that own seed-lines and sell the kinds of pesticides and fertilizers that GM crops require. In the developing countries, genetic technologies have prompted countries to emphasize monocultural practices and to abandon crop rotation in favor of intensive fertilizer use. This has often made developing economies and the agricultural labor force in developing countries vulnerable to shifts in global commodity prices and has increased their need to import a range of foods and other products needed by their own population. When human interference with phenotypes that have slowly evolved and adapted to local ecosystemic conditions continues for some time, a danger can be posed to the sustainability of those ecosystems, and the traditional cultures and ways of life built around them.

The genetic modification of domestic animals also raises both concerns of inherent wrongdoing to the rights and welfare of the animals themselves and concerns of risks to human health. The maximization of meat, milk, or egg production has led to genetic modifications in animals that have made them unable to engage in normal repertoires of behavior and left them susceptible to various kinds of infections and disease. Farmers have responded by the widespread use of antibiotics in their herds or flocks, which raises the issue of the evolution of resistant microorganisms.

Genetic Modification in Medicine

Another important motivation for the genetic modification of animals is to make them suitable for medical research that eventually may benefit humans. Selective breeding of rat species for use in the laboratory has been practiced for many decades; quicker and more efficient recombinant methods have more recently come to the fore to produce animals selectively designed to be good models for the study of various kinds of disease. For example, mice have been genetically engineered to model a variety of human diseases including cancers and neurodegeneration.

One of the most interesting and potentially important areas of genetic modification in human medicine is in the field of xenotransplantation. This is the use of organs or tissues from one species in another species. Therapeutic xenotransplantation remains an experimental treatment, but it has a long history that flows from the first use of human organ transplantation. Early experiments with human organ transplantation eventually generated an interest in the use of animals as a source of transplantable tissue. Early experiments involved the attempt to transplant the heart of baboons into human infants; more recently pig livers have been used outside the body to sustain human liver function for short periods of time while a patient who is suffering from liver failure awaits transplant.

Aside from the sacrifice of healthy adult animals that xenotransplantation entails, ethical concerns here mainly focus on the unknown long-term risks. Genetic modification enters into this technology because normally the human body will reject an organ from a non-human source. Bioengineering of the donor animal generally involves the introduction of human genes into an animal to create tissues that are immunologically compatible with humans. These bioengineered (or transgenic) tissues are then harvested and used to replace the tissues or organs that are destroyed, diseased or failing in patients. A decisive objection to animal to human xenotransplantation at this time remains the possibility that viruses indigenous to one species may inadvertently be introduced into the human recipient. This could be very deleterious to the health of the human patient, even fatal, and might threaten others as well if the agent were to prove contagious or infectious.

Xenotransplantation Time Line

1923	First cited xenotransplant: lamb kidney was transplanted into a human who dies nine dayslater.
1960s	Xenotransplants involving baboon or chimpanzee kidneys.
1960	Transplant experiments with dogs begin.
1963	Dr. Thomas E. Starzl of University of Colorado, Denver attempts the first liver transplant. The patient dies within a few days.
1964	Cross-species transplantation experiments.
1967	Barnard performs fi rst human heart transplant (patient dies of pneumonia 18 days after transplant).
1967	Dr. Stazl performs the fi rst successful liver transplant. The liver functions for 13 months.
1967–69	More than 100 transplants performed (65% of patients died within three months of the procedure).
1969–74	Dr. Starzl transplants chimpanzee livers into children. The survival rate ranges from 1 to 14 days.
1968	Colley and Ross transplant sheep and pig hearts, respectively, into dying human recipients. Both patients died.
1984	"Baby Fae" infant with hypoplastic left heart syndrome receives a baboon heart. She dies 20 days later.
1992	Doctors at Duke University use a pig liver as a bridge to keep two women alive who were awaiting transplants. In one patient, the liver is kept outside the body and hooked to the liver arteries. She survives long enough to receive a human liver. In the other, the pig liver is implanted beside the patient's liver and she lives for 32 hours.
1992	Cazplicki reports an attempt to transplant a pig heart into a human patient using novel immunosupression therapy. The patient died 24 hours later.
1992	Makowka transplants a pig liver into a 26-year old woman dying of acute liver failure.The organ immediately failed.
1997	Robert Pennington receives a "bridge" to transplant extracorporeal pig liver.
1997	More than 250 pig farmers in Malaysia became ill with encephalitis and 101 died. Pigs were identified as the source of the virus.
1997	FDA and its U.K. counterpart call for moratorium on all xenotransplantation.
2003	FDA, NIH, CDC and HRSA develop guidelines on xenotransplantation and clinical trials can resume.
2000's	Ten Swedish patients with diabetes receive cells from pig pancreas. The cells do not produce insulin as hoped; however, none of the patients become ill from the xenografts.

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Two Tales of Rice

Rice is the major source of calories for approximately half of the people on the planet. In much of Southeast Asia, people get more than half of their total calories from rice! In China, an average person consumes over 200 pounds of rice a year (in the United States the figure is only 20 pounds a year). In many of the regions where rice is the main food staple, there is also very high childhood mortality caused by malnutrition, diarrhea and infections resulting from compromised immune systems.

In the United States, rice may not be as common a food source as wheat, but it still occupies an important role for producers/exporters, and for those who retain its cultural value. For many Americans, the subject of rice is only important when we are ordering take-out food and are asked "steamed rice for how many?" However, rice is at the heart of much controversy throughout the world.

Consider these two different tales involving rice and genetic modification.

Golden Rice

In the early 1990's various publicly funded international scientists teamed to develop rice that would provide Vitamin A; which had been identified as one of the three main diet deficiencies in developing nations (the others were iron and iodine). The project proposed to genetically engineer genes from the pathway that creates beta-carotene in daffodils into rice endosperm. Beta-carotene is then converted by the body into Vitamin A. The process of trial and error took ten years. The potential product was called "golden rice" for its distinctive colored grains.

In 2000 the scientists announced their successful results. They had created transgenic rice plants that were capable of producing the yellow-colored endosperm that contained Vitamin A and other related compounds of nutritional value. The July 2000 issue of *Time* magazine featured the most outspoken of the creators, Dr. Ingo Potrykus, Professor Emeritus of the Swiss Federal Institute of Technology with the headline: "This Rice Could Save a Million Kids A Year," which referred to the number of childhood deaths attributed to Vitamin A deficiency by the World Health Organization. At the time of that publication golden rice was considered a major breakthrough in biotechnology because the researchers had engineered an entire biosynthetic pathway. The scientific process for genetic engineering of rice had been a success, but the battle for acceptance was just beginning.

Golden rice has faced opposition primarily from environmental groups that are opposed to any use of biotechnology on the food supply, and view Genetically Modified Organisms (GMOs) as a possibly leading to problems such as decreased biodiversity, human health and environmental risks and the economic exploitation of subsistence farmers in developing countries. Golden rice 2 has now been developed, and provides 23 times more beta carotene than the original, but the rice is not yet available for human consumption in any part of the world.

Golden rice was developed with public funds and its creators carefully tried to keep their patent in the hands of a humanitarian organization so that its distribution could more readily serve their goal of meeting an urgent need. In the Time magazine article of 2000, golden rice was said to be "the first genetically modified crop that was inarguably beneficial." Its methodology involves transgenics, moving genes from one species of plant to another. Vitamin A deficiency (VAD) has been

associated with one million childhood deaths per year; with up to 230 million children at risk of VAD, and 500,000 cases of blindness per year. Opponents state that there are other ways to alleviate Vitamin A deficiency.

Ventria's Rice

In May 2006 a company with sixteen employees, Ventria Biosciences, announced that they were developing a drug that would be used to fight diarrhea. According to Unicef: "The State of the World's Children 1998,"diarrhea ties with Acute Respiratory Infections as the cause of 18% of deaths in children under five in developing nations, worldwide. Deaths due to diarrhea are considered preventable, and it would seem that a drug to fight diarrhea would be welcome news. Instead the small company's announcement caused a furor among environmental groups, food corporations and thousands of farmers. The reason involved their plan to grow the experimental drug in rice that had been genetically engineered by splicing human genes into the crop. The US Rice Producers Association has been particularly vocal in their criticism of Ventria's experimental work and the company had been forced to relocate from California to North Carolina, after rice customers in Japan refused to import California rice as long as Ventria was operating in that state.

The opposition to the experimental drug that is the proposed product of Ventria's genetically engineered rice stems from its use the most controversial form of agricultural biotechnology, known as "biopharming." Biopharming involves splicing human genes into crops to produce proteins to be used for medicinal purposes. The proposed drug from Ventria would be a protein powder milled from the rice and would contain two human proteins that are commonly found in a mother's milk, saliva and tears. This protein powder is designed to help patients hydrate and may lessen the severity of serious diarrhea attacks (3.67 days versus 5.21 days in data presented at the Pediatric Academics Societies Meeting, San Francisco, 5/06).

Ventria's proposed product involves the use of human genes spliced with those of a crop, and grown as part of a for-profit endeavor. The company hopes that the resulting protein powder could be marketed as a "medical food" rather than a pharmaceutical and has applied to the Food and Drug Administration (FDA) for approval as such. If the protein powder is considered as a pharmaceutical it will be subject to human tests, resulting in a far lengthier process for approval. Diarrhea is considered a major childhood killer in developing countries. However the protein powder, while lessening the severity of attacks does not have any preventive properties. Opponents also point out that other preventive measures are more useful in preventing diarrhea along with educating health care providers and caregivers on the necessity of rehydration.

The arguments against the development of golden rice and Ventria's rice are similar, with opponents stating that growing genetically engineered crops will threaten the safety of conventional crops and decrease needed biodiversity. Trade groups and producers such as Riceland Foods Inc. (the world's largest rice miller) fear that nations that completely oppose GMO's, such as Japan, will refuse to buy US crops. Exports account for 50% of the rice industry's sales. The scientists involved with each GMO rice counter that rice is "self-pollinating" therefore it is virtually impossible for genetically engineered rice to cross breed with traditional crops.

To Think About

The case describes two different projects involving genetically engineered rice. Would you support one over the other? If only one type of rice could get approval, which rice would you choose?

Do you think that genetic engineering of foods is ever justified, if so when?

Does it make any difference in your decision-making process about who stands to profit?

Does biopharming using human genes seem more threatening than genetic engineering using plant genes? Why?

Could opposition to biopharming lead to a decrease in opposition to transgenic work such as golden rice?

Should golden rice be available for human consumption in developing nations? What about in the U.S.?

Do you think the FDA should consider Ventria's product as a "medical food" or a drug? What would you consider in deciding?

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Case written by Peggy Sturdivant

Talk About Short

Zack knows the waiting room drill by heart. From the second the door opens he can sniff out new patients and how late the doctor is running on his appointment schedule. Pediatric Endocrinology. Zack used to wish that he'd never heard the words in his life. If he were a late night comedian there could be some very non-PC material in the waiting room. "How short were they?" the audience would shout. He could say, "The patients were so short that the fish tank was at floor level. They were so short that there were step stools so that they could climb onto the kindergarten size chairs..." But it's not really true. Short stature isn't the only metabolic disorder. Still, the waiting room always has a disproportionate number of boys, most of them still baby-faced. The first-timers usually have two parents with them. Everybody looks at one another but tries not to get caught doing so. Zack often wonders if the other patients are already taking recombinant growth hormone (rGH) or whether the family is in the early stages of trying to learn why "Johnny is so short."

Zack is aware that he's older than most of the others. He is getting dangerously close to puberty cut-off, when he may not even be a candidate for growth hormone. And at age thirteen, 4'11," what are the real chances that his own pituitary gland will kick start a growth spurt? There have been times that he wished that he were anywhere but in Dr. Bass' waiting room or at the Pediatric Clinic for tests. Zack does still wish that that he wasn't an on-line expert in growth hormone literature (diagnosis, prognosis and ethical concerns!) and that he had never heard of "Idiopathic Short Stature". He laughs to himself when he thinks about this term. Maybe because his short stature is of unknown origin (his parents are of average height and his pituitary gland is apparently able to produce growth hormone) some people want to coin him an idiot for caring about his height when other people have "real problems."

He's the older of two boys. His younger brother Ben (he can't call him his 'little' brother any more), is four years younger. When Ben was as tall at five years old as Zack at nine, his parents seemed to freak out. First there was the family doctor for more measurements, then the referral to a specialist and since then there have been the X-rays of his left wrist, the nutrition consultations, the sleep study, and mostly, the years of blood tests. It seems kind of funny that the specialists don't have one single test to determine what they really want to know, which is whether Zack's endocrine system is working properly to signal the pituitary gland to produce growth hormone and the other hormones that control his thyroid glands, adrenal glands and sex glands. The hormone is produced in spurts, usually during deep sleep and so doctors have to look indirectly for the byproduct (Somatomatin) in his bloodstream. The tests have showed that Zack is not completely deficient in growth hormone; his body makes it, but not enough to help him grow enough to be considered "normal." There's also a possibility that he's simply a male whose growth spurt is going to occur somewhat later than the average.

Anyway, the insurance company turned down the doctor's recommendation for growth hormone treatment when he was eleven years old and four feet tall. They said that since his body was producing growth hormone, and he was not at the crucial 2.5 deviations from the norm, that the treatment was not warranted based on medical need. That was fine with Zack when he was in fifth grade. His parents had tried to sound so gung-ho like it would be fun to mix up powder and water every day and inject it into himself. A powder, that he'd overheard a hundred times in his mother's crusade, which cost $20,000 a year, up to $40,000 if it was injected every day of the week. But the average gain in height with growth hormone is only 1-2 inches. Zack can see why the insurance company thinks that $20,000 an inch is too expensive.

What's really strange is that Zack didn't ever think of himself having a problem until his parents got so concerned about his height. He had friends; sure they were each a bit taller than him but it hadn't been a big deal. No one had ever picked on him because of his height, maybe teased him about the bat being too big for him but it hadn't stopped him from hitting quite a few three-base hits.

When the specialist first confirmed that Zack's growth was not keeping up with the average it seems that his "problem" wasn't abnormal enough.

If his body wasn't producing any growth hormone then no problem, the insurance company would pay for treatments and he would be an old hand at self-injection by now. His mom had an entire stack of letters that she had exchanged with the insurance company as she waged a battle to get them to cover his treatment on the grounds that "early treatment works best" and that psychological damages would continue to mount. He tried to tell his parents that he thought he was going to have a late growth spurt, he didn't really feel "psychologically" damaged, but they were adamant that the world is very cruel for short people. They were going to battle the insurance company for his right for treatment. Zack didn't know how to feel about it; sometimes he was tempted to ask his mother, "Would you be fighting to get me growth hormone if they still had to extract it from corpses?"

Zack is sure that he and his mother are reading the same web sites, reviewing the latest articles cited on the Human Growth Foundation site and the links that he finds when he does a Google search. His mother as always seemed so sure about what they should do, but he's not as certain. When the FDA approved human growth hormone use for "short stature" in 2004, the review committee said they weren't convinced that short stature constituted a medical condition, but that the treatments didn't seem harmful. The possible side effects include headaches, bone aches, a diabetes-like condition and potential effects later in life from having stimulated cell growth. He has read that boys are twice as likely to be referred to specialists as girls, but that once there, girls are the ones who usually have a diagnosable health problem. There's also a quote from Dr. Alan Rogol that appears on all the web sites against growth hormone therapy. The quote says, "Short stature became a disease when unlimited amounts of growth hormone became available."

Growth hormone therapy does not work overnight. Zack has read that many people think that small kids are like a seed that is ready to germinate if you add water, and Miracle-Gro. Meanwhile he has been rechecked, resized, his blood work updated and he is getting his first injection today. After nine months of a plateau of 4'11," the insurance company has agreed to cover three injections a week for up to three years. For the first month he will receive the injections at Dr. Barr's office, to monitor and get him used to proper mixing and injection techniques. After all the years of wishing that his parents wouldn't make such a big deal he is actually excited about trying the treatments. His friends have all shot up recently and he has that sense of being smaller than everyone else. At the library, the librarians eye his friends with skateboards under their arms like they are a dangerous menace, but their smiles at him seem to be saying, "Oh, isn't he cute?" Zack knows he is never going to be tall. If all goes well he'll be at least 5'3" since he could still have a natural growth spurt. He had always thought that it wasn't that bad being different from others, but that was before felt so different. The girls have gotten so tall. Of all the couples that have suddenly developed in eighth grade, not one of the girls is taller than the guy. Maybe his parents had always been right to fight for this; they had known before he did that he was going to want to be more normal. It's strange because after his mom won the fight with the insurance company, she told him that the decision about whether to have the therapy was up to Zack. "I just always wanted you to have the choice," she told him. "Didn't you know that?"

One day there was a really pretty girl in the waiting room; she looked about his age. But she looked at Zack like she hated him. He'd seen a lot of short kids over the years, and could usually tell by their proportional bodies or chubby faces whether their short stature or size was a result of more severe endocrine malfunction. This girl was small all over and Zack had to admit that he found himself thinking how doll-like she was, like a magazine model but in miniature. She looked at him with loathing as though assuming (correctly) that he was thinking that she just looked "so darn cute." It was one time that he wished that he were shorter so she would like at him as an ally, instead of an enemy. But after that day he started noticing when people were looking at him as though he were cute and adorable. It made him feel angry too. He used to wonder why appearance seemed to be so important at school, in movies, everywhere. Now Zack has stopped wondering; it is a reality. He lives in a culture that prefers men to be tall; and a few headaches or bone aches don't seem like much of a price to pay. He can't wait to start the therapy and make up for all the lost years.

The inner door opens and the nurse announces, "Zack, we're ready for you."

To Think About

Zack's family has health insurance and the treatments will be covered. What if it this was an uninsured male teenager, should they have the same right to treatment?

Do you think the Short Stature should be considered a medical condition? How would you define it?

If you were a short girl instead of a short boy do you think it would make a difference?

What points would you make to convince Zack not to have the treatments?

What if Zack were against receiving Human Growth hormone but his parents insisted; at what age do you think a child should decide versus a parent?

If Short Stature is not considered physically dangerous should potential psychological damages need to be proven before treatment is approved?

Should treatment criteria be different for treating an illness that is life-threatening or will be fatal in the long-term?

Pediatrician, Alan D. Rogol has stated, "Short stature became a disease when unlimited amounts of growth hormone became available." Would it make a difference in considering treatment to think that the demand was due to pharmaceutical marketing instead of actual need?

If you had Idiopathic Short Stature, would you want to receive recombinant (biosynthetic) growth hormone? What if the growth hormone that was harvested from the pituitary glands of corpses was more effective and still available? Would you use it?

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Case written by Peggy Sturdivant

One Family's Dilemma

Kathleen knew that there was quite a bit of controversy regarding stem cell research in the news, but it didn't occur to her that it really affected her in any way. Then again, she had never thought the word 'infertility' would apply to her either. Kathleen was raised Catholic and she married a Catholic. She and Tom both come from large families; the kind of large Irish Catholic families that became a stereotype growing up near Boston. Between their families, their parents now have 27 grandchildren. It wouldn't appear that there are any problems with reproduction. How could there be?

Kathleen and Tom made careful plans before their marriage so that they would be prepared for a family: researched career choices, accepted positions with growing software companies in the Seattle area, purchased a house in an area where the schools were highly recommended. Why couldn't she get pregnant? Two years passed, then three before they were able to bring themselves to discuss their apparent infertility and learn about the mind-boggling possibilities in fertility treatments, none of which they wanted to discuss with their seemingly problem-free siblings.

After a long journey through tests and research, Kathleen and Tom had two children through in vitro fertilization. The process was lengthy and expensive. After months of painful injections to boost her egg production, Kathleen underwent procedures to have 6-8 eggs removed. The eggs were then fertilized with her husband's sperm in a Petri dish, and the resulting embryos were incubated for several days in a carefully controlled environment.

Four blastocysts (embryos with about 150 cells) were implanted back into Kathleen. They were each smaller than a period at the end of a sentence, had no heartbeat and could not develop into a person without successfully implanting in a womb. Statistically, one out of every four implanted embryos results in a full-term pregnancy, but the first time none of Kathleen's embryos developed into a fetus. They had to repeat the procedure two more times. There were six potentially good embryos remaining when Kathleen became officially pregnant. The excess embryos were frozen and stored in a special tank.

At holiday gatherings no one would ever know that Kathleen and Tom's children had been conceived any differently than any other cousin running around the back yard. Yet the path to parenthood had put them at odds with their faith. The U.S. Conference of Catholic Bishops does not approve of in vitro fertilization because of the risk to potential embryos and because of the use of technology for procreation. However Kathleen and Tom felt sure that they were meant to have children. Although there is more initial uncertainty with IVF than with a regular pregnancy (*What if the embryo doesn't implant? What if all four of them do?*), once the pregnancy is advanced it is no different than any other. Occasionally Kathleen and Tom remembered the excess embryos and were glad: if they decided to have a third child it would be possible. Then Kathleen learned that she was pregnant, after the years of fertility treatments she didn't even know to recognize the signs. Her doctor told her that it is not uncommon for women with infertility problems to be somewhat "cured" by having children. Their family is now complete. Their older children are five and three years old now, and the baby has just been born.

But they still have these excess embryos and the insurance company has notified them that the $500/year storage is no longer covered.

The notification letter came in the same mail with an invitation to yet another school fundraiser. However, the insurance company also included a letter from a research institute citing a desperate need for embryos. That's when Kathleen learned that the debate over stem cell research involves her family, and also the family of her best friend.

The letter stated that there are potential medical breakthroughs that can be made on virtually every disease known if researchers are able to use stem cells in their research. According to the information (from Harvard's Stem Cell Center, no less) there are only about twenty-two stem cell lines available to researchers who use federal funding for their research. At the same time, an estimated 400,000 unused embryos are in storage tanks throughout the United States. Most stem cell lines have been grown on feeder cells derived from mice. The paper cites the need for more human embryonic stem cell lines. In the letter, one researcher wrote about his personal stake in creating more stem cell lines for research. His son and daughter have Type 1 diabetes and his son is insulin-dependent. He believes that scientists will be able to cure diabetes, perhaps using stem cells to grow insulin. Kathleen's best friend Clare has three children, and her oldest was diagnosed with diabetes when she was just two years old. Clare practically devotes her life to raising money for diabetes research, in addition to trying to make her daughter's life seem as normal as possible. Kathleen knows that if Clare had embryos to donate she would do it in a heartbeat.

Kathleen and Tom find time to sit down together to discuss their options. The embryos belong to them, but they do not plan to use them. The storage cost is $500 per year, which would pay for a lot of new shoes. They hate the idea of their embryos, the embryos similar to the ones that became Caitlin, Tom Jr., being discarded as medical waste. They believe those embryos have the possibility of life, even if they do not have heartbeats. Their church's position is that these stem cells are sacred and should not be used for research. The Stem Cell Center states that due to the current government policy, they are not able to use any Federal dollars and must rely on private funding. The Center also notes that they will make the stem cell lines available to any scientist in the field. They estimate that from 350 donated embryos they could double the number of stem cell lines available for research.

They read over the page again that gives specifics about research. It says that the embryos have been frozen for varying amounts of time; they do not always survive thawing. Those that survive may not develop into a blastocyst. The letter states that cells generated by the embryos cannot be identified with the donors. Kathleen and Tom talk about their own children and how they would feel if they were diagnosed with a disease. In the past they have talked about whether they would donate their organs if anything happened to them. They believe that life is sacred and that it begins at conception. Tom suggests that they pay the $500 for another year, while they learn more, but Kathleen feels strongly that it is time for them to decide how they feel about stem cell research. Her children are like miracles, exhausting, but miracles. What research led to in vitro fertilization breakthroughs that allowed them to be born?

She fingers the gold cross at her neck while thinking, "the embryos don't have heartbeats and they could help to save lives. But don't we have a duty to protect them? What should we do?"

To Think About

What are the options for Kathleen and Tom?

What do you think Kathleen and Tom should do with the excess fertilized eggs? Why?

Which bioethical principle is given the most weight in your solution?

Explain why you chose that ethical principle.

Please see NWABR's Stem Cell Curriculum, available online at www.nwabr.org, for a full classroom lesson based on this case.

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Dreifus, Claudia, "At Harvard's Stem Cell Center the Barriers Run Deep and Wide" New York Times, January 24, 2006.

Wade, Nicholas, "Stem Cell News Could Intensify Political Debate" New York Times, July 24, 2006.

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Bioethics Curriculum Online

Access Excellence
http://www.accessexcellence.org
Entering 'bioethics' into the search brings up many useful pages related to teaching bioethics.

Bioethics.net
http://www.bioethics.net/
http://highschoolbioethics.org/
Site of the American Journal of Bioethics/University of Pennsylvania. Updated news stories, bioethics background, and an active bioethics blog. This site also provides a high school bioethics resource.

EIBE Units
http://www.eibe.info/
Collections of classroom activities from the European Institute for Biotechnology Education, including a variety of experimental protocols, practical activities, role-plays, information and debates. The units are very clearly written, provide information at an appropriate level, and are well-illustrated. Both biotechnology and bioethics units are featured.

Ethics Updates - University of San Diego
http://ethics.sandiego.edu
Ethics Updates is designed primarily to be used by ethics instructors and their students. It is intended to provide updates on current literature, both popular and professional, that relates to ethics. It provides classic texts, case studies, background on theory and helpful resources such as ethics lecture videos.

Genetic Science Learning Center
http://gslc.genetics.utah.edu/
Many helpful resources on stem cells, genetic disorders, and ethical issues.

Howard Hughes Medical Center
http://www.hhmi.org/research/bioethics/
A web page and companion free DVD on bioethics. Features research ethics, animal research scientific integrity, and genetic alteration. The HHMI web site also has additional resources related to topics such as stem cells.

The High School Human Genome Project at the University of Washington
http://hshgp.genome.washington.edu/teacher_resources/modules.htm. Provides an case study and a bioethical decision-making template. The Ethics curriculum module, which can be downloaded, allows students to explore ethical issues related to the genetic testing of Huntington's disease.

Human Genome Project Information - Ethical, Legal and Social Issues
http://www.ornl.gov/hgmis/elsi/elsi.html
The U.S. Department of Energy (DOE) and the National Institutes of Health (NIH) have devoted 3% to 5% of their annual Human Genome Project (HGP) budgets toward studying the ethical, legal, and social issues (ELSI) surrounding availability of genetic information. This represents the world's largest bioethics program, which has become a model for ELSI programs around the world.

Kennedy Institute
http://www.georgetown.edu/research/kie/
http://highschoolbioethics.georgetown.edu/
The Kennedy Institute is a teaching and research center offering ethical perspectives on major policy issues. It is the largest university based group of faculty members in the world devoted to research and teaching in biomedical ethics and other areas of applied ethics. The Institute also houses the most extensive library of ethics in the world, the National Reference Center for Bioethics Literature; produces bibliographic citations relating to bioethics for the online databases at the National Library of Medicine; and conducts regular seminars and courses in bioethics. The high school bioethics project has developed case studies on topics of interest to secondary school teachers and students.

National Center for Case Study Teaching in Science
http://ublib.buffalo.edu/libraries/projects/cases/case.html
The University of Buffalo has many examples of case study teaching in science - try a search with 'ethics'

NIH Bioethics Resources on the web
http://www.nih.gov/sigs/bioethics/
A great place to start for background information and various positions on a variety of bioethical issues.

Online Ethics Center for Science and Engineering
http://onlineethics.org/index.html
This site contains a wide variety of useful resources and links on research ethics, moral leaders in science and engineering, women and minorities in science and engineering, and codes of ethics. Especially useful are the links for precollege curriculum, ethics in the biological sciences (which features a unit on the ethics of animals and research) and the case studies involving research ethics.

President's Council on Bioethics
http://www.bioethics.gov

Your Genes, Your Choices: Exploring the Issues Raised by Genetic Research.
http://ehrweb.aaas.org/ehr/books/index.html
This resource is published online by the American Association for the Advancement of Science and features 8 case scenarios easily adapted to a classroom setting.

Wellcome Trust
http://www.wellcome.ac.uk/
The mission of the Trust is 'to foster and promote research with the aim of improving human and animal health'. Reflecting the profound impact today's research will have on society, the Wellcome Trust also seeks to raise awareness of the medical, ethical and social implications of research and promote dialogue between scientists, the public and policy makers. *LabNotes* provides teachers with up-to-date information on research findings in biomedicine and the social and ethical implications of this research. The Wellcome Trust commissioned the Institute of Education, London, to find out the importance teachers attached to the study of socio scientific issues and how they went about tackling such issues. A summary of the research —'*Valuable Lessons: Engaging with the social context of science in schools*' - was published in July 2001.

Additional Bioethics Resources Online

Socratic Seminar Websites:

http://www.paideia.org
The National Paideia Center has several excellent resources for teaching using seminars. We especially recommendation their "Active Thinking Through Dialogue" publication, available to order online.

http://www.studyguide.org/socratic_seminar.htm
Description of Socratic Seminar, pre-seminar activities, discussion of difference between debate and dialogues, student guidelines, and seminar rubric.

http://www.middleweb.com/Socratic.html
Lynda Tredway.
Educational Leadership. Discussion about how to engage middle level students in intellectual discourse through Socratic Seminars. Connects students to ethics by having them examine ethical quandaries and to develop moral principles.

http://www.ncsu.edu/literacyjunction/html/tutorialsocratic.html
A tutorial on Socratic Seminars with explanation organized around pre-seminar activities, during-seminar activities, and post-seminar activities, stressing the "essential question" approach.

Films

Bioethics Films Available for Loan from the Kennedy Institute of Ethics, bioethics@georgetown.edu
http://bioethics.georgetown.edu

Commerical Films Dealing with Bioethics Topics
http://bioethics.georgetown.edu/hsbioethics/
Select bibliographies, then commercial films dealing with bioethics topics

Further Reading

Beauchamp, T., and J. Childress, The Principles of Biomedical Ethics, Oxford University Press, 2001. 454 p.

This book has long been used as an introduction to bioethics. It is based on the approach developed by Beauchamp and Childress entitled "principlism" and focuses on the principles of autonomy, beneficence, nonmaleficence, and justice. The book refers to cases (in an appendix) and provides a very good comparative overview of the varieties of philosophical theory and evaluates each theoretical approach from the authors' perspective. The authors provide great references and address "moral character" (virtue theory); ethical theory is very much a part of this introduction. Used frequently at a college level.

Pence, Gregory, Accounts of Cases that Have Shaped Medical Ethics, with Philosophical, Legal and Historical Backgrounds, 3rd ed. Boston: McGraw-Hill, 2000. 509 p.

Dr. Pence examines some of the seminal cases in bioethics, those that advanced the development of the field and are still talked about and taught today. The legal and legislative process in bioethics and philosophical debate and perspectives may be covered on a variety of topics - removal of respirators, artificially provided nutrition and hydration, anencephalic infants, etc. Used both at high school and undergraduate level.

Veatch, Robert M., The Basics of Bioethics, 2nd ed. Upper Saddle River, New Jersey: Pearson Education, Inc., 2003. 205 p.

Dr. Veatch is a scholar at the Kennedy Institute of Ethics and is one of the early educators and ethicists in the field. He offers an introduction that addresses major issues in bioethics, but with a good dose of the ethical theory that grounds the discussion. The book contains descriptive text, history, case studies, definitions, some contemporary treatment of the issue, and a bibliography for each chapter. The second edition has been updated to track developments in clinical medicine and ethical theory. This book has been used successfully in both elective high school courses on bioethics and at the undergraduate level.

Anthologies

Beauchamp, Tom and Walters, LeRoy, eds., Contemporary Issues in Bioethics, 6th ed. Belmont, CA: Wadsworth, 2003. 800 p. [ISBN 0-534-58441-1]

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Steinbock, Bonnie; Arras, John D.; and London, Alex John. Ethical Issues in Modern Medicine, 6th ed. Boston: McGraw-Hill, 2003. 830 p. [ISBN 0-7674-2016-0]

Teays, Wanda and Purdy, Laura M., eds., Bioethics, Justice, and Health Care. Belmont, CA: Wadsworth/Thomson Learning, 2001. 683 p. [ISBN 0-534-50828-6]

Other Useful resources

Crigger, Bette-Jane, ed. Cases in Bioethics: Selections from the Hastings Center Report. Third Edition. New York: St. Martin's Press, 1998. 295 p.

Levine, Carol, ed. Taking Sides: Clashing Views on Controversial Bioethical Issues. Ninth Edition. Guilford, CT: McGraw-Hill/ Duskin, 2001. 380 p.

Reich, Warren Thomas, ed. Encyclopedia of Bioethics. Revised Edition. New York: Simon Schuster Macmillan, 1995.

Journals

Hastings Center Report (bimonthly journal) published by the Hastings Center, Route 9D, Garrison, NY 10524; tel. 845-424-4040; fax. 845-424-4545. Short, scholarly articles; case studies and commentaries

Journal of Bioethics
Online at http://www.bioethics.net/

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