er Image

# Innocent at Birth?: Genetic Discrimination

## Genetics and Ethics

K20 Center, Quentin Biddy
Published by *K20 Center*



| | | | |
|---|---|---|---|
| **Grade Level** | 8th – 12th Grade | **Time Frame** | 150 minutes |
| | | **Duration** | 2-3 class periods |

## Essential Question

Overarching: Is everything that is legally acceptable always ethically acceptable? Topical: What are the ethical dilemmas surrounding genetic information?

## Summary

In this lesson, students will research the concepts of genetic discrimination and discuss the ethics involved. Then, students will use the information to make an informed decision about genetic science and its role in today's society.

## Snapshot

### Engage

Students discuss what it means to be human.

### Explore

Students work in groups and act as either a prosecution team or defense team. Students rotate through stations to gather research about genetically modified organisms.

### Explain

Students prepare their opening and closing statements, including claims and citing evidence, as well as questions for the opposition.

### Extend

Students debate the pros, cons, and ethical concerns regarding genetic discrimination by writing and presenting claims supported by evidence. Students should follow debate/mock court protocol.

### Evaluate

Students not involved in the debate actively listen to the "court proceedings" as members of the jury. Students use the provided analysis document to "judge" the winner of the case for each group.

## Standards

*Next Generation Science Standards (Grades 6, 7, 8)*

**MS-LS4-5:** Gather and synthesize information about the technologies that have changed the way humans influence the inheritance of desired traits in organisms.

*Next Generation Science Standards (Grades 6, 7, 8)*

**HS-LS1-2:** Develop and use a model to illustrate the hierarchical organization of interacting systems that provide specific functions within multicellular organisms.

*Oklahoma Academic Standards (8th Grade)*

**LS4:** Biological Unity and Diversity

*Oklahoma Academic Standards (8th Grade)*

**PH.PS4.5 :** Communicate technical information about how some technological devices use the principles of wave behavior and wave interactions with matter to transmit and capture information and energy.*

## Attachments

- Case Evaluation Form - Spanish.docx
- Case Evaluation Form.docx
- Case Evaluation Rubric - Spanish.docx
- Case Evaluation Rubric.docx
- Case Preparation Notes- Student Handout - Spanish.docx
- Case Preparation Notes- Student Handout.docx
- Case Preparation Notes- Teacher Handout.docx
- Debate Format - Spanish.docx
- Debate Format.docx
- EvidenceData Research Collection Sheet.Final - Spanish.docx
- EvidenceData Research Collection Sheet.Final.docx

## Materials

- Speakers
- Podcast link (can be streamed or downloaded): "Mutant Rights"
- Evidence Collection Form (attached)
- Preparation Notes Document (attached)
- Jury Case Analysis Document (attached)
- Articles that cover topics such as genetic engineering, the human genome project, genetic defects, genetic diseases, etc. (see the Explore section for possible links)
- Public Debate Refresher Notes (see the Extend section for more information and possible links)

# Engage

Begin by playing the first 4:18 seconds of the Radiolab podcast, "Mutant Rights." Pause the podcast and pose this question: "What does it mean to be human?"

**Teacher's Note**

Make sure students understand that the question is regarding classifiable traits and/or physical characteristics of humans, not the philosophical aspect of humanity.

# Explore

Inform students that they will be taking part in a “mock trial” in which they will be debating the issue of genetic engineering and the ethics involved. Use the following debate format. Show students the debate format so they can plan and be familiar with how the debate will proceed:

- Opening Statement (Affirmative: 1 minute)
- Opening Statement (Negative: 1 minute)
- Rebuttal (Negative: 1 minute)
- Rebuttal (Affirmative: 1 minute)
- Cross Examination (Affirmative: 2-3 minutes)
- Cross Examination (Negative: 2-3 minutes)
- Second Rebuttal, or Second Statement (Negative: 1 minute)
- Second Rebuttal, or Second Statement (Affirmative: 1 minute)
- Closing Statement (Negative: 1 minute)
- Closing Statement (Affirmative: 1 minute)
- Audience Questions (Optional: 2-5 minutes. Can be moved before Closing Statements.)

You will act as moderator during the debates to keep students confined to the time limits set. Explain to students the format and the time allotted for each portion of the debate. You may want to show them sample debates via video clips to prepare them to review this.

Here is a two-part tutorial for public debate:

- “YFD Mock Debate Tutorial Part 1”
- “YFD Mock Debate Tutorial Part 2”

During the debate the rest of the class will serve as the jury and will evaluate the arguments based on the rubric you will hand out.

Place students into groups of 4-5. Assign half of the groups to serve as prosecution teams and the other half to serve as defense teams on the issue. Tell students they will be conducting research to use in their debate. They need to locate and cite evidence from a range of sources to support their conclusions. (This will give them a perspective lens with which to analyze the information they will be reviewing.)

Assign one prosecution and defense team to each of the following topics or similar topics related to ethics in genetics:

- Human Genome Project and Genetic Discrimination
- Mutations, Genetics, and Genetic Discrimination

Students will be rotating through all the stations to gain a broad perspective on the assigned topic and to be able to focus on their concentrated area of research. Each station will have multiple sources such as a: news article, research paper, podcast, or some other piece of information regarding genetic information and discrimination. At each station there will be information presented for both sides of the debate, that is, either supports or opposes.

**Teacher's Note**

Evidence collection can be done as a gallery walk where students rotate to each station or all the resources could be provided directly to each group for independent research. However, students should view resources for both sides of the debate in order to multiple sources such as a: news article, research paper, podcast, or some other piece of information regarding genetically modified organisms. At each station there should be information presented for both sides of the debate, that is, either supports or opposes genetic engineering and/or the use of genetic information. Resources should include multiple sources such as a: news article, research paper, podcast, or some other piece of information regarding genetically modified organisms. Information should be presented for both sides of the debate, that is, either supports or opposes genetic engineering and/or the use of genetic information.

Hand out the Evidence Collection Form for students to use during their research. You will need to prepare the stations in advance of the class. Students will spend about 15 minutes at each station. Be sure to monitor students' progress. Stations could include articles or resources similar to those listed below.

**Possible Resources**

The links provided below are only examples. Use articles or resources similar to those linked below.

Human Genome Project and genetic discrimination:

- National Human Genome Research Institute: "Genetic Discrimination"
- Medline Plus: "Genetics"
- Huffington Post: "Tenth anniversary of the mapping of the human genome: What it means for us all"

Mutants, genetic manipulation, and discrimination:

- Students may finish listening to the short podcast on "Mutant Rights" from Radiolab
- Fox News: "Sorry, Avengers: US gov't says mutants aren't human"
- Google Scholar: "Toy Biz, Inc. v. United States (2003)"
- NPR: "Critics lash out at Chinese scientists who edited DNA in human embryos"
- "Not So Weird Science: Why Tracker Jackers and Other Mutts Might Be Coming Soon to a Lab Near You" by Cara Lockwood, an essay found in *The Girl Who Was On Fire: Your Favorite Authors on Suzanne Collins' Hunger Games Trilogy*

Students may independently research topics using available resources (i.e., the library or internet).

# Explain

Have students work with their team to prepare for the presentation of the case. Hand out the Case Preparation Notes Student Handout (see Teacher Instructions and Guidelines are included on the Case Preparation Notes Teacher Handout).

Have students prepare their opening and closing statements as well as constructing an opening and closing statement for the opposition. They will use the statement they prepared for the opposition to help prepare and anticipate the argument that will be constructed against them.

Have students list the 5 main points for their argument, including claims and citing evidence, as well as the opposition's argument. Students will also need to begin to compose a rebuttal to the opposition's argument and construct questions they will use during the debate to either strengthen their argument or weaken the opposition's argument.

# Extend

Have students present their arguments for their case. Use the debate format outlined in the Explore section.

You will need to act as moderator during the debates keeping students confined to the time limits set. Explain to students the format and the time allotted for each portion of the debate. During the debate the rest of the class will serve as the jury and will evaluate the arguments based on the rubric you will hand out.

# Evaluate

Inform the class that as the debates are occurring groups not actively debating will serve as jury members who will be evaluating the arguments presented and deciding which is the winning team. Hand out the Case Evaluation Rubric and Form. Instruct students as to how they should evaluate the arguments based on the information presented in the rubric.

Before each debate, name the debate as Case #1 or Case #2, etc. Have students fill out the evaluation form appropriately. At the end of each debate you may take a poll of the class to get the total number of points awarded to each team and to determine the winner of each debate. Tell students to take notes as they listen to the debates to support the score they give each debate team and to form questions they will ask at the end of the debate.

Have students answer the essential questions in light of what they know now.

- Overarching: Is everything that is legally acceptable always ethically acceptable?
- Topical: What are the ethical dilemmas surrounding genetic information?

At the end of the lesson, have students turn in their response to the essential questions, the evaluation forms, the evidence collection handout, and the Case Preparation Notes.

**Teacher's Note: Possible Differentiation**

The research students will be looking at may be scaled back or highlighted in order to help students find relevant information. You may choose groups that will compliment each other in the various roles needed to complete the research and the debate.

## Resources


- ColumbiaYFD. (2013, April 16). YFD mock debate tutorial part 1 [Video]. YouTube. https://www.youtube.com/watch?v=oN6Z1WKVh8g
- ColumbiaYFD. (2013, April 16). YFD mock debate tutorial part 2 [Video]. YouTube. https://www.youtube.com/watch?v=zeposE11lrg
- Radiolab. (2011, December 26). Mutant rights [Podcast episode]. https://www.radiolab.org/episodes/177199-mutant-rights