

Ban on Gene-edited Babies Proposed

Debate Preparation Sheet

Directions: After your teacher has assigned teams and viewpoints for the upcoming debate, read through the team roles and debate protocol. Then read through the debate preparation section answering as many questions as you can in advance of the debate. You can also use this section to take notes during the debate and prepare your rebuttal and closing remarks.

Team roles

All students should become familiar with the debate protocol and focus on their team's speaking assignments. Pay close attention to the amount of time allotted to prepare and speak for each section of the debate. Each student in a group should prepare to speak during the debate. All team members must speak before a team member can speak a second time.

Using the debate preparation questions below, Teams 1–3 should research and prepare a general opening argument and answers to the Debate Questions, which will be asked during the debate. You'll also want to do enough background research for possible rebuttals and a closing argument that aligns with your viewpoint. Be prepared to speak confidently about your viewpoint. You may want to prepare notecards that capture your speaking points.

Team 4 will be responsible for monitoring, moderating and judging the debate. Using the debate preparation questions below, members of Team 4 will introduce scientific concepts by answering the Background Questions, moderate the debate by asking questions, keep track of speaking time per team, take notes throughout the debate and present the debate results and reasoning.

After all groups have presented their closing arguments, Team 4 will convene with the teacher to decide on a winner. Teams 1–3 should be evaluated based on the persuasiveness of their arguments, and how much those arguments are based on scientific fact. Team 4 should use notes from the debate to prepare and present an explanation of the decision using examples and evidence.

Debate protocol

Openings:

Overview from Team 4, including Background Questions: 4 minutes

Opening remarks from Team 1: 3 minutes

Opening remarks from Team 2: 3 minutes

Opening remarks from Team 3: 3 minutes

Questions and rebuttal:

Debate Question 1 Team 1: 2 minutes

Debate Question 1 Team 2: 2 minutes

Debate Question 1 Team 3: 2 minutes

Brief caucus for preparing rebuttal: 30 seconds

Rebuttal Team 1: 1 minute and 30 seconds
Rebuttal Team 2: 1 minute and 30 seconds
Rebuttal Team 3: 1 minute and 30 seconds
Debate Question 2 Team 1: 2 minutes
Debate Question 2 Team 2: 2 minutes
Debate Question 2 Team 3: 2 minutes
Brief caucus for preparing rebuttal: 30 seconds
Rebuttal Team 1: 1 minute and 30 seconds
Rebuttal Team 2: 1 minute and 30 seconds
Rebuttal Team 3: 1 minute and 30 seconds

Closing remarks:

Brief caucus for preparing closing remarks: 2 minutes
Closing remarks from Team 1: 4 minutes
Closing remarks from Team 2: 4 minutes
Closing remarks from Team 3: 4 minutes
Clarifying questions from Team 4, deliberation and final verdict: 10 minutes

Debate preparation for Teams 1-3

What is your team's viewpoint?

Briefly list your main arguments for that viewpoint.

Debate Question 1: How should the scientific community proceed at this point in time?

Debate Question 2: How should national governments proceed at this point in time?

What arguments do you expect the other teams to make and how will you respond to them during your rebuttal time?

For your rebuttal, consider whether another team done any of the following. If so, explain.

Used an incorrect fact.

Taken a correct fact but applied it incorrectly.

Failed to support an argument with factual evidence.

Used a hypothetical situation, ethical principle or societal argument inappropriately.

What facts seem to disprove another team's arguments?

What hypothetical situation, ethical principle or societal argument seems to disprove another team's arguments.

During your closing remarks, you will want to restate your team's viewpoint and briefly restate your main argument for that viewpoint. Have you modified your viewpoint based on the discussion during the debate?

What are your major objections to the arguments from the other teams?

Debate preparation for Team 4

Your team will give an overview to open the debate by answering the following Background Questions:

1. What is gene editing? Name one technique that has been used to edit genes. What type of gene editing is this debate specifically focused on?
2. How has gene editing been used so far for the creation of human babies?
3. According to the *Science News* article "[Ban on gene-edited babies proposed](#)," what is the current thinking on whether creating gene-edited babies should be allowed?

During the debate, make notes about the other teams' arguments.

What have you found most persuasive about the arguments?

Team 1

Team 2

Team 3

What did you find least persuasive?

Team 1

Team 2

Team 3

What questions do you need answered to clarify your understanding?

Team 1

Team 2

Team 3

Explain which team you found most persuasive and why. (Remember: You are not judging based on your personal beliefs but rather based on your observations of which team made the most effective arguments for its viewpoint and the most effective arguments against the viewpoints of the other teams.)

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Teacher Tips for The Great Gene-editing Debate

The following information provides possible viewpoints, opening arguments and Background and Debate Questions and answers for a debate focused on the creation of gene-edited babies, as discussed in the *Science News* article "[Ban on gene-edited babies proposed.](#)" Don't let this information limit or narrow what students come up with on their own. When talking to students during the preparation period, encourage them to explore answers broadly before narrowing their focus and answers.

Viewpoints:

Team 1 (pro): Unlimited gene editing for the creation of human babies should be allowed.

Team 2 (intermediate): Limited gene editing in eggs, sperm and human embryos for specific diseases and not for enhancement should be allowed.

Team 3 (con): No gene editing for the creation of human babies for any reason should be allowed.

Team 4 (moderators/judges)

Team 4: Background Questions

1. What is gene editing? Name one technique that has been used to edit genes. What type of gene editing is this debate specifically focused on?

Gene editing is the ability to target specific genes to add, remove or modify them, including in humans, human eggs, sperm and embryos. One gene-editing technique is called CRISPR/Cas9. Using the CRISPR/Cas9 technique, it is possible to delete, add or replace genetic material in a cell, including in germ line cells and embryos that may then develop into an organism. This debate is specifically focused on whether genes that can be passed on to the next generation should be edited.

2. How has gene editing been used so far for the creation of human babies?

At least one scientist, Jiankui He, claims to have produced gene-edited embryos that resulted in babies.

3. According to the *Science News* article "[Ban on gene-edited babies proposed,](#)" what is the current thinking on whether creating gene-edited babies should be allowed?

Many scientists and officials have called for a five-year moratorium on creating gene-edited babies to sort out the technological and ethical issues. At least one scientist, however, has gone forward with it.

Teams 1–3: Arguments and Debate Questions

After the teams state their opening remarks, they will make the main arguments for their viewpoints. Sample arguments include:

Team 1: Unlimited gene editing for the creation of human babies could eliminate genetic diseases and disease predisposition from the gene pool. It could make children as intelligent, strong and attractive as possible.

Team 2: Limited gene editing for the creation of human babies could save children from being born with serious genetic diseases and allow people with serious genetic diseases to have children without fear of passing on their genetic problems. At the same time, limited gene editing would not alter what it means to be human, or allow some people to make their children “superior” to others.

Team 3: We oppose all gene editing for the creation of human babies because the risks are too high that gene editing may cause harmful unintended side effects. Because of the costs of gene editing, there are risks that gene editing for the creation of human babies could lead to a class of genetic “haves” and “have-nots.” There are also risks that the technology could be misused to mutate, enslave or wipe out humanity.

Sample Debate Questions include:

Question 1: How should the scientific community proceed at this point in time?

Team 1: The scientific community should monitor the first gene-edited babies for any signs of problems. It should continue to improve gene-editing techniques and applications, and test those in humans as soon as possible.

Team 2: The scientific community should investigate the accuracy and safety of gene-editing techniques, and improve techniques if necessary. The scientific community should continue to investigate various applications of gene-editing technology in human eggs, sperm and embryos and should focus research on serious genetic diseases. Once a consensus is reached within the community that a technique is safe, scientists should begin using it.

Team 3: The scientific community should continue to develop and test gene-editing technologies, but only apply those to organisms other than humans, or to human cells and tissues that cannot develop into new humans or pass on genetic information to the next generation.

Question 2: How should national governments proceed at this point in time?

Team 1: National governments should allow the creation of gene-edited babies. They should also fund the development of improved methods and new applications for gene editing. Governments should consider trying to beat other countries at a “genetic arms race” to make as many of their future citizens as healthy, as intelligent and as strong as possible, in order to maximize their economic competitiveness in the coming decades.

Team 2: National governments may want to ban the creation of gene-edited babies for a few years until the safety and accuracy of gene-editing technology has been optimized and proved. After that time, governments should allow the use of gene-editing technology to correct serious inherited genetic diseases, but not to make other heritable genetic improvements. In order to decide which specific human applications should be allowed and which should not, governments should set up panels of scientific, ethical, legal,

political and religious experts to establish specific guidelines, or to review proposed applications as they come up.

Team 3: All national governments should ban the creation of gene-edited babies. Governments should make sure that such work is not being carried out in secret. Governments may allow and even fund the development and use of gene-editing technologies for other applications though, such as combating pathogenic diseases, improving agriculture and so on.