BIOTECHNOLOGY AND ITS APPLICATION

Activity: Gene Therapy Debate

Objective: To engage students in a debate about the benefits, ethical considerations, and future implications of gene therapy as a revolutionary medical treatment.

Materials:

1. Research materials on gene therapy (books, articles, online resources)

- 2. Debate topic cards (prepared in advance)
- 3. Timer or stopwatch
- 4. Whiteboard or chart paper
- 5. Writing materials (pens, pencils, paper)

Procedure:

Introduction:

- 1. Begin by providing an overview of gene therapy and its potential as a medical treatment.
- 2. Explain that the activity will involve a debate on the topic of gene therapy, where students will explore different perspectives and arguments related to its benefits and ethical considerations.

Debate Preparation:

1. Divide the class into two groups: Group A (proponents of gene therapy) and Group B (opponents of gene therapy).

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- 2. Assign each group with the task of conducting research to gather information, facts, and arguments supporting their respective positions.
- 3. Provide research materials and online resources for students to explore the topic in depth.
- 4. Instruct the groups to prepare their arguments, making sure they consider scientific, ethical, social, and economic factors.

Debate Format:

- 1. Distribute the debate topic cards, which will contain specific statements or questions related to gene therapy.
- 2. Each group will select a representative to present their arguments and lead the debate.
- **3.** Create a structured debate format, such as: a. Opening statements: Each representative presents a brief overview of their group's position (2-3 minutes per representative). b. Rebuttal round: Representatives take turns responding to each other's arguments,

presenting counter-arguments or providing evidence to support their claims (1-2 minutes per response). c. Cross-examination: Allow representatives from each group to ask questions directly to the opposing group's representative (2-3 minutes per round). d. Closing statements: Each representative concludes their group's position, summarizing key points and reinforcing their arguments (2-3 minutes per representative). e. Class discussion: Facilitate a class discussion where students can express their thoughts, ask questions, and offer additional insights.

Debate Execution:

1. Begin the debate with the opening statements from each group's representative.

- 2. Use a timer or stopwatch to ensure equal speaking time for each participant.
- 3. Encourage students to provide evidence, examples, and scientific research to support their arguments.
- 4. Facilitate cross-examinations by allowing representatives to ask questions in a respectful and constructive manner.
- 5. Encourage students to listen actively, take notes, and prepare rebuttals during the debate.
- 6. After the closing statements, open the floor for a class discussion, allowing students to share their thoughts, express agreement or disagreement, and ask questions to further explore the topic.

Conclusion:

- 1. Summarize the main arguments presented during the debate and the points raised in the class discussion.
- 2. Emphasize the importance of critical thinking, research, and considering multiple perspectives when discussing complex topics such as gene therapy.
- 3. Discuss the potential future implications of gene therapy and its ongoing advancements.

Assessment:

- 1. Participation during the debate, including the quality of arguments and the ability to present clear and concise points.
- 2. Active engagement in the cross-examination round, demonstrating critical thinking skills and the ability to respond to opposing arguments.
- 3. Contributions to the class discussion, showcasing thoughtful insights and the ability to consider multiple perspectives.
- 4. Written reflection or response on the ethical considerations and potential impact of gene therapy as a medical treatment.

