**GENETICS MAJOR PROJECT**

**OBJECTIVE**:

By yourself or in a group of 2, investigate a current genetic biotechnology that potentially has significant medical, social, economic, or other benefit, but also has moral and ethical difficulties.

**AUDIENCE:**

In a “Science Fair” format, you will be stationed at a table, and for the duration of a block, students from a Biology 11 class, and potentially other teacher/students will be circulating around and you will be asked to “present” your project to them.

**FORMAT:**

With the audience in mind, the format is up to you. Traditional techniques, like poster-boards, powerpoint or prezi presentations are an option. However, alternate delivery techniques are also possible and encouraged: creating an informative video, illustrating a graphic novel explaining your topic, having a debate between you and your partner and filming it, etc…

**LENGTH:**

While there is no specific length, you should be able to present your topic in about 5 minutes. As always, it is important to cover the required content and to allow for some creativity.

**CONTENT**:

There are certain elements that must be present in every project. This include, but are not limited to, the following:

* An explanation of how your technology works
* This must be specific and explain on a genetic level what is being done. For example, it is not enough to say, ”Changes are made to DNA that causes disease and new DNA is put in”.
* The possible applications of this technology
* What are the positive benefits of this technology? Who could it help? What could it cure?
* What are some of the possible side-effects? What risks does it entail?

* A brief history of the technology and its current status
* Who invented it and when?
* Is it still in research and development phase? Is it commercially available? Legal or illegal?
* An examination of the controversy and ethical implications on human society
* REFLECTION: Your own personal stance on whether this technology should be supported in Canada. This needs to be more than just a yes or a no answer.
* A works cited, listing all the resources used for research and information.

POSSIBLE RESEARCH TOPICS

De-extinction CRISPR Technology Genetically Modified Organisms

Stem cell therapy Gene editing Three parent babies

Genetically grown meat Gene Drive Techniques DNA and forensic science

Designer Babies Reproductive Technologies Growing transplant organs

ASSESSMENT

You will be assessed on your productivity, as well as according to the rubric below.

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| --- | --- | --- | --- | --- | --- |
|  | **Does not meet expectations****(2)** | **Minimally meets expections****(4)** | **Fully meets expectations****(6)** | **Exceeds expectations****(8)** | **YOUR MARK** |
| **Evidence of research** **(Scientific components)** | There is no evidence of research. The scientific components were missed. | There is little evidence of research. Some elements of science are present. | There is some evidence of research. Most scientific elements are present. | There is strong evidence of research. All scientific and elements are present, strong and clear. |  |
| **Written (Sentence Structure and Organization)** | Students create sentences that lack meaning and structure. Project is difficult to understand. | Elements of the project are vague or unclear. Students create some sentences that lack meaning and structure. | Project needs some clarification and organization. Students create some sentences with minor errors, but meaning is still clear. | Clear writing with good organization. Students create few sentences with minor errors but meaning is still clear. |  |
| **Visuals** | Visuals are not included or do not relate to the project. | Some visuals are included and relate somewhat to the project.  | Visuals appear throughout the project and relate to the project. | Visuals appear throughout the project and reinforce the project. |  |
| **Process** **(Editing and effort)** | Students did not edit their project. Students show little effort was put into the final project. | Limited amount of editing was demonstrated. Students show some effort was put into the final project. | Students edited project but some mistakes remained. Students show good effort was put into the final project. | Students carefully edited project. Students show great effort was put into the final project. |  |
| **Content (are all required aspects of the project completed)** | Several, 3 or more, components are missing, OR several components are lacking or incomplete  | Two components are missing, OR two components are lacking or incomplete. | No sections are lacking, although several could be expanded or explained better. | All sections are included and all sections are thorough, elaborate and well-articulated. |  |
| **Creativity****and Innovation** | Very little creativity and innovation was present.  | Some creativity and innovation was present. Student attempted something new. | Creativity and innovation are present, and adds somewhat to final project. | Creativity and innovation are present and adds significantly to final project. |  |