GENETIC ENGINEERING

"Suppose parents could add 30 points to their children's IQ. Wouldn't you want to do it? And if you don't, your child will be the stupidest child in the neighborhood."

Lester Thurow, Professor of Economics and Management at MIT

1. Genetic Engineering Discussion

1. Why are scientists exploring the possibilities of genetic engineering? What is the purpose?
2. Which health problems could be solved by genetic engineering?
3. If you could, how would you like to genetically modify yourself?
4. Should we ever clone humans? Why or why not? Why would we ever want to clone a human? What would the purpose be? If you had a clone of yourself, what would you use it for?
5. If you could clone a human from the past or present, who would you like to clone and why?
6. Should we clone dinosaurs and put them in a dino-zoo? Would you visit this? Why or why not?
7. Is cloning the solution to prevent animal extinctions, including of humans?
8. If the technology permitted it, would it be a good idea to genetically modify humans to live for 200 or more years? What would the advantages and disadvantages be?

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2. Genetic Engineering Vocabulary

- **GM food (genetically modified food) / GMO (genetically modified organism)** (noun) – *food from organisms (plants or animals) whose genetic material (DNA) has been modified in a way that does not occur in nature to provide some benefit (lack of disease, better taste, longer lasting shelf life, etc).*
- **designer baby** (noun) – *a baby whose genes have been edited to eradicate a defect, or to ensure particular features are present.*
- **stem cell** (noun) – *a cell that can become any other type of cell.*
- **genetic discrimination** (noun) – *the unfair treatment of people based on genetic conditions, for example in employment or in insurance applications.*
- **super soldier** (noun) – *a genetically modified soldier with enhanced abilities compared to a normal human (e.g., strength, sight, stamina, etc).*
- **to play God** (verb), **playing God** (noun) – *to act as if all-powerful; to make decisions (or believe you have the right to make decisions) that have a powerful effect on people's lives, especially when this effect is considered excessive or negative.*

Using the vocabulary words above, complete the following sentences (remember to use the correct form of the word, e.g. verb conjugation or plural noun):

1. After scientists announced that they were going to clone a human to harvest its organs, they were accused of **playing God**.
2. By editing the genome sequence in **designer babies**, hereditary diseases could be eliminated.
3. In the future, those who have genetic defects will face increasing **genetic discrimination** from the wider population whose defects were eradicated at birth.
4. Instead of genetically engineering **super soldiers** to be stronger, they should be engineered to see in the dark.
5. Scientists hope to be able to use **stem cells** to grow new organs for people who need transplants.
6. While **GM food** has been grown for decades in the United States, in the EU it is highly regulated.

Genetic Engineering vocabulary comprehension questions

1. What are the pros and cons of GM food? How do you feel about eating GM food?
2. If people in your country had the opportunity to create a designer baby, what features do you think they would choose? Would it be male or female? What colour eyes, hair and skin would it have?
3. Should we use stem cells to grow new organs for people that need transplants?
4. Will genetic discrimination become the dominant type of discrimination in the future? Why or why not? Will people who have not been genetically modified become second class citizens?
5. Do you think countries will create genetically modified super soldiers in the future? How would these super soldiers be modified?
6. Is genetic engineering playing God? Shouldn't we just let nature take its course?

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3. Video: The History & Future of Genetic Engineering

You are going to watch a video by Kurzgesagt – In a Nutshell called "Genetic Engineering Will Change Everything Forever – CRISPR."

Watch the video here: https://yourenglishpal.com/blog/esl-conversation-lesson-plan-genetic-engineering/

While you watch the video, answer the following questions:

Multiple choice

1. How have humans been engineering life for thousands of years?
   a) selective breeding *b) inbreeding* *c) modifying DNA*
2. What does DNA contain genetic codes in?
   a) molecules *b) cells* *c) atoms*
3. What benefit did the flavr savr tomato have?
   a) it was bigger ***b) it lasted longer*** *c) it tasted better*
4. What proportion of bacteria is killed by bacteriophages in the ocean every day?
   a) 30% ***b) 40%*** *c) 50%*

Sentence completion

5. Scientists discovered that CRISPR is programmable, meaning it can be given a copy of DNA and put into a **living** cell.
6. CRISPR could edit **immune cells** to enable them to identify cancer more efficiently.
7. Over 3,000 genetic diseases are caused by just a single incorrect **letter** in DNA.
8. The first designer babies will be modified to eradicate a deadly **(genetic) disease** running in their family.

Short answer

9. As technology progresses and becomes more widely used, people might argue that not using genetic modification could be what? **Unethical**
10. Who might we need to convince to solve the problem of aging? **A (smart) billionaire**
11. What might gene edits accidently trigger? **Unwanted changes**
12. A totalitarian regime might create an army of what? **(Modified) super soldiers**

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4. Genetic Engineering Conversation Questions

1. What are some ethical considerations associated with designer babies?
2. When the technology is available, should we create designer babies to eradicate hereditary diseases?
3. Will designer babies lead to an imbalance in the world between men and women? Why would this happen? Will there be more men or women? What would the consequences of this be?
4. Will humans ever stop reproducing in the traditional way? What might some consequences of this be?
5. What are some unethical things genetic engineering could be used for?
6. Why would we need to genetically modify humans to travel in space?
7. Does genetic engineering scare you in any way? Should it be banned? Why or why not?
8. Isn't genetic engineering just the next evolutionary step for an intelligent species? What would society be like in the future if genetic engineering were widely used?

5. Genetic Engineering Writing Task

Write about your opinion of genetic engineering. Try to use some of the vocabulary you learned earlier in this lesson. In your answer, you could include some of the following topics:

- The benefits of genetic engineering.
- Whether or not humans should be cloned.
- The effect of designer babies on society.

Alternative exam practice question:

For some people, genetic engineering has the potential to bring untold benefits to the human race. For others, however, genetic engineering is dangerous and has the potential to change society beyond all recognition. Do the advantages of genetic engineering outweigh the disadvantages?

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