Editing the Future

Weigh the benefits and costs of changing human DNA.

FB.4.6 "Enrichment: Debate the pros and cons of using biotechnology to manipulate genetic information for human purposes (society)."

NAME _____ DATE _____

1 READ AND MARK

Read it twice

YOUR JOB Underline two possible benefits, circle two possible harms or concerns, and write 1 and 2 beside two groups affected by different choices. Use your marks to compare arguments about gene editing.

A Decision at the Clinic

1. At a community meeting, a family asks whether gene editing should be offered to adults with sickle cell disease. A change in a gene can cause red blood cells to become stiff and block blood flow, leading to severe pain and organ damage. In one form of treatment, clinicians remove a patient's blood-forming stem cells, edit them in a laboratory, and return them after preparing the body with chemotherapy. The edited cells can produce blood cells that reduce painful episodes. This treatment edits the patient's blood-forming cells, not eggs or sperm, so the edit is not expected to be inherited.

2. Supporters argue that fewer pain crises could mean more time at school or work and fewer hospital stays. A patient might welcome an option that could reduce lifelong symptoms, even if it requires weeks of treatment. Critics point out that the treatment carries medical risks, and long-term outcomes still need careful tracking. It also requires specialized hospitals and costs a great deal. If insurance does not cover it, families with fewer resources may have less access. A decision about public funding therefore raises a question beyond biology: Who receives the benefits when an expensive technology is available?

3. At the meeting, a student suggests editing embryos instead, hoping to prevent the disease before birth. Unlike editing a patient's blood stem cells, an embryo edit could be passed to future generations, who cannot agree to that change. An advocate replies that preventing suffering matters, but unknown effects could also reach those generations. The group does not have to choose between unrestricted use and a total ban. It could support treatment for informed adults while requiring follow-up studies and plans to improve access. Such a policy weighs relief from illness against uncertainty, consent, and fairness.

2 ANSWER WITH EVIDENCE

Use the passage

1. How might a supporter and a critic evaluate the adult treatment differently? Give one passage-based reason for each view.

2. How could public funding strengthen the case for offering the adult treatment? Give one concern that funding alone would not settle.

3. What benefit might someone claim for embryo editing, and what concern makes its effects different from editing an adult's blood stem cells?

4. Does the group's proposed policy answer every objection? Explain one concern it addresses and one it leaves unresolved.

3 YOUR TURN

Your own words

A town is considering releasing genetically modified mosquitoes designed to reduce the number of mosquitoes that spread a disease. In five to seven sentences, recommend a decision that weighs fewer infections against a possible effect on the local food web, identifies a group affected, and proposes a safeguard.

ANSWER KEY

Editing the Future

PART 1 · READ AND MARK

Underline two possible benefits, circle two possible harms or concerns, and write 1 and 2 beside two groups affected by different choices. Use your marks to compare arguments about gene editing. Accept any marking that follows this job and points at the right text.

PART 2 · ANSWERS

#	QUESTION	ANSWER
1	How might a supporter and a critic evaluate the adult treatment differently? Give one passage-based reason for each view.	**A supporter might value fewer painful episodes and hospital stays. A critic might worry about the treatment's medical risks or uncertain long-term outcomes.**
2	How could public funding strengthen the case for offering the adult treatment? Give one concern that funding alone would not settle.	**Funding could help families with fewer resources gain access to an expensive treatment. It would not remove the treatment's medical risks or settle questions about long-term outcomes.**
3	What benefit might someone claim for embryo editing, and what concern makes its effects different from editing an adult's blood stem cells?	**Embryo editing might prevent the disease before birth. Its effects could be inherited by future generations who cannot consent, unlike the adult blood-stem-cell edit described.**
4	Does the group's proposed policy answer every objection? Explain one concern it addresses and one it leaves unresolved.	**No. Follow-up studies address the need to track long-term outcomes, but the treatment would still carry medical risks.**

PART 3 · YOUR TURN (SAMPLE ANSWER)

I would support a small, monitored trial rather than a townwide release. Fewer disease-spreading mosquitoes could mean fewer infections for residents. However, a drop in mosquito numbers could affect animals that eat them. Local residents and wildlife researchers should have a voice in the decision. The town should track infections and local animal populations during the trial before deciding whether to expand it.

Accept other passage-supported benefits, concerns, and policy judgments in Parts 1 and 2. For Part 3, look for a reasoned recommendation that addresses both possible outcomes, names an affected group, and includes a relevant safeguard.