Teacher's Key

Genetic Engineering: What Comes Next, Before and After Birth (Level C1)

Vocabulary Matching

1 heritable = **N**
2 bespoke = **A**
3 pathway = **H**
4 scalable = **L**
5 equitable = **G**
6 robust = **M**
7 contentious = **I**
8 mosaicism = **E**
9 theoretically = **D**
10 feasible = **O**
11 irreversible = **J**
12 prospect = **K**
13 enhancement = **B**
14 proponents = **C**
15 safeguards = **F**

Fill in the Blank

1 heritable
2 bespoke
3 pathway
4 scalable
5 equitable
6 robust
7 contentious
8 mosaicism
9 theoretically
10 feasible
11 irreversible
12 prospect
13 enhancement
14 safeguards

True or False

1 **True.** Germline editing is heritable.
2 **True.** It treats sickle cell disease.
3 **False.** It says most live in sub-Saharan Africa.
4 **True.** It involved dozens of scientists.
5 **True.** The treatment must target it directly.
6 **False.** They say as few as five to ten patients might support approval.
7 **False.** It ranks embryos; it does not edit them.
8 **False.** It said it remains unacceptable at this time.
9 **True.** Preventive said it would not attempt a pregnancy unless safety could be shown.
10 **False.** It says they are social as much as scientific.

Language Focus: The Mandative Subjunctive: Require That, Urge That

Example answer: The committee requires that the company **publish** its data.

Comprehension Questions: Model Answers

1 Somatic editing changes cells in one person and is not inherited; germline editing changes embryos, eggs, or sperm, so the change is heritable. The two differ in risk and in how scientific societies judge them: many that urge caution on germline editing support somatic therapy.

2 Casgevy shows that editing can treat a serious disease, and its use was extended to children aged two and older in 2026. Its $2.2 million US price, set against about 7.7 million people with the disease, most in sub-Saharan Africa, shows that access is the main limit.

3 Doctors built a base editor for one infant's single mutation and delivered it to his liver in fat particles, which took about six months. It is bespoke because it was made for one patient. The caution is that one case cannot show whether the benefit lasts.

4 It would allow approval when a disease has a known cause and the treatment targets it directly, with close safety monitoring after approval; results in five to ten patients might support a whole platform of related editors. Ethicists warn that the pathway could be stretched too far.

5 It ranks IVF embryos by adding up thousands of small genetic differences. It may spread faster because it does not alter DNA and faces fewer legal barriers, even though its predictive value is disputed.

6 He Jiankui announced edited twins in 2018 and was jailed; the 2023 London summit called heritable editing unacceptable; societies urged a ten-year pause in 2025; a 2020 survey found 75 of 106 countries prohibit it. Mosaicism is the main technical problem, and two start-ups have closed.

7 They mark the limits of the evidence: theoretically shows a result is not yet proved, and probably and is likely to show that the outcomes are predictions, not facts.

8 Open answer. Example: the growth of personalized somatic therapies seems most likely, since some already exist; the future of enhancement is least certain because it depends on law and public opinion as well as science.

9 Open answer. Best supported: regulators' decisions, the Global Burden of Disease estimate, and peer-reviewed studies. Weaker: companies' own statements, such as Preventive's promise, and reports that rely on one hospital's account.

10 Not Given. The reading mentions a University of Tokyo study that used data from BioBank Japan, but it does not say where Orchid offers its service.

11 Yes. The writer says that forecasts about a young technology are easily wrong and that none of the likely outcomes is certain.

12 To separate what is already in the clinic from what is still speculative, so that the reader can see how far each technology has actually come.

Notes on the Evidence

- Sources checked (27 September 2026). Casgevy: FDA press release (December 2023); Vertex release of 1 July 2026 and Healio, Pharmacy Times (expanded US use to ages two and older; previously 12 and older); Patient Worthy (price about 2.2 million dollars; more than 500 patients had started treatment by early 2026, not used in the reading). Sickle cell burden: GBD 2021 Sickle Cell Disease Collaborators, Lancet Haematology 2023 (7.74 million living with the disease in 2021; births concentrated in sub-Saharan Africa and the Caribbean). Baby KJ: CHOP news release; UC Davis and Cell summaries (base editing, lipid nanoparticles, CPS1). Plausible mechanism: NEJM article by FDA leaders (November 2025); draft guidance of 23 February 2026 (RAPS, Faegre Drinker, Foley, Hogan Lovells summary noting heightened postmarketing safety scrutiny); STAT (ethicists' concerns). Screening: NOEMA (Genomic Prediction, 2019); Orchid website (2,500 dollars per embryo); ESHG statement, Forzano et al., Eur J Hum Genet, December 2021; ESHRE position statement; Namba et al., University of Tokyo, BioBank Japan simulation presented at the ESHG conference, May 2024 (no two methods chose the same embryo more than half the time). Heritable editing: Third International Summit statement, London, March 2023 (via GEN); ASGCT and partner societies, 10-year moratorium call, May 2025; Baylis et al., The CRISPR Journal, October 2020 (106 countries surveyed; 75 prohibit, 5 of them with exceptions; none explicitly permits); Wired and The Information (Bootstrap Bio and Manhattan Genomics shut down, money problems and co-founder conflict); MIT Technology Review, October 2025, and Forbes Italia, January 2026 (Preventive, 30 million dollars, pledge not to proceed unless safety is shown); Visscher et al., Nature 2025 (theoretical modelling).
- Evidence limits. Reports of Baby KJ's improvement come from the treating team and hospital; no independent long-term data were found. The sentence that the draft guidance asks developers to monitor safety after approval paraphrases secondary summaries, not the guidance text itself. Preventive's plans come from the company and press reports; in May 2026 Le Monde described Preventive and Origin Genomics (a new company founded by a Manhattan Genomics co-founder) as active. The arguments of enhancement proponents and critics are summarized generally, not from one named source. The reading does not cover China's current rules, agriculture and animals, gene drives, or other in vivo therapies.
- Revision (September 2026). Replaced the sickle cell figure of 3 million or more (unnamed review) with the GBD 2021 estimate of about 7.7 million. Replaced the by-one-count claim of more than 70 countries with the named 2020 CRISPR Journal survey (75 of 106 countries prohibit). Dated and sourced the start-up closures. Replaced the unattributed critics of screening with the ESHG 2021 statement and the University of Tokyo simulation (a non-US and non-UK source). Fixed the last paragraph's logic (heritable editing is always irreversible, so irreversibility cannot be a temporary condition) and the claim that enhancement proponents point to disease prevention. Removed so far. Language Focus: dropped two examples that were not mandative subjunctives and added three that are. Vocabulary: tailored (near-synonym of bespoke) replaced by robust. IELTS items: the True/False/Not Given item was ambiguous and the Yes/No/Not Given model contradicted itself; both replaced. Translations: enhancement (Japanese, Hindi) and mosaicism (Hindi, previously a calque meaning an ideology) changed.
- Scope and caution. General information, not medical advice. Discussion questions do not ask about personal genetic conditions. mosaicism is a very rare word, included as a key term. The Hindi and Arabic translations have not been checked by a native speaker.