

Research Changes Lives

Trace how evidence, people, and choices shape society.

7.4.A “relate the impact of past and current research on scientific thought and society, including the process of science, cost-benefit analysis, and contributions of diverse scientists as related to the content;”

NAME _____

DATE _____

1 READ AND MARK _____ Read it twice

YOUR JOB Underline research actions or evidence, circle effects on scientific thought or society, and write 1 beside each benefit and 2 beside each cost or risk so you can trace how research leads to decisions.

From Inoculation to mRNA

- ① Long before modern laboratories, Onesimus, an enslaved African man in Boston, explained a protection method used in parts of Africa to Cotton Mather. A small amount of material from a person with smallpox was placed into a cut, often causing a milder illness and later protection. During Boston's 1721 outbreak, physician Zabdiel Boylston used the method on volunteers and kept records. His results suggested that inoculated people died less often than people who caught smallpox naturally. This evidence challenged fears about the unfamiliar practice.
- ② In 1796, English physician Edward Jenner investigated whether cowpox could protect people from smallpox. His early work helped move scientific thought toward testing ideas with evidence, but one child took part, a method that would not meet today's research ethics. Later studies and vaccination programs added stronger evidence. In 1980, the World Health Organization declared smallpox eradicated. This past research changed society by preventing disease worldwide and showed why scientists must repeat studies, share results, and protect research participants.
- ③ During the COVID-19 pandemic, viral immunologist Kizzmekia Corbett helped lead research on a vaccine that used messenger RNA, or mRNA, to give cells instructions for making a harmless viral protein. Her team's work built on years of mRNA research by many scientists, including Katalin Karikó and Drew Weissman. Before public use, trials compared vaccinated and unvaccinated groups and monitored side effects. Society weighed benefits, such as fewer severe illnesses, against costs, including research funding, vaccine delivery, and rare health risks. Evidence and cost-benefit analysis guided health decisions.

2 ANSWER WITH EVIDENCE _____ Use the passage

1 What evidence did Boylston's records provide, and what fear did that evidence challenge?

2 Why would Jenner's 1796 research method not meet today's research ethics?

3 How did past smallpox research affect both scientific thought and society?

4 What was Corbett's contribution to COVID-19 research? Name one benefit and one cost or risk that society considered.

3 YOUR TURN _____ Your own words

Imagine that a town is studying a low-cost water filter. Write four sentences that state a test question and evidence plan, name a contribution a community scientist could make, explain one benefit and one cost or risk, and make a decision based on the results.

PART 1 • READ AND MARK

Underline research actions or evidence, circle effects on scientific thought or society, and write 1 beside each benefit and 2 beside each cost or risk so you can trace how research leads to decisions. Accept any marking that follows this job and points at the right text.

PART 2 • ANSWERS

#	QUESTION	ANSWER
1	What evidence did Boylston's records provide, and what fear did that evidence challenge?	The records suggested that inoculated people died less often than people who caught smallpox naturally. They challenged fears about the unfamiliar inoculation practice.
2	Why would Jenner's 1796 research method not meet today's research ethics?	Only one child took part, and the method would not meet modern protections for research participants.
3	How did past smallpox research affect both scientific thought and society?	It moved scientific thought toward testing ideas with evidence, repeating studies, and sharing results. It helped lead to vaccination programs and the worldwide eradication of smallpox.
4	What was Corbett's contribution to COVID-19 research? Name one benefit and one cost or risk that society considered.	Corbett helped lead research on an mRNA COVID-19 vaccine. A benefit was fewer severe illnesses. A cost or risk was research funding, vaccine delivery, or rare health risks.

PART 3 • YOUR TURN (SAMPLE ANSWER)

Our team will ask whether the filter removes harmful bacteria from three water samples and compare the results with unfiltered samples. A local environmental scientist can help choose water sources and explain community needs. A benefit is safer drinking water, while a cost is buying and replacing filters. If the tests show fewer bacteria at a reasonable price, the town should use the filter.

Accept equivalent evidence-based explanations that correctly connect research methods to changes in scientific thought or society. For Part 3, accept varied decisions when the student includes a test plan, a relevant contribution, and a clear cost-benefit comparison.