

# TEACHING THE GENOME GENERATION

*Ancestry Testing & Personal Identity*



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## Sam's Story: Take the test?

Sam is at home, alone in their room. They're thinking about all of the things that happened this week: their birthday wish for an ancestry test, the reactions from their family, and everything they learned about ancestry tests in school, like how they work and what information these tests can reveal. Sam feels so many emotions, from excitement to nervousness. Should they take the test or not? Sam isn't sure what to do.

Read the scene below from Sam's life. If you're in a class or group, assign one person as Sam, and read the scene out loud.

*Sam: What a week! I never thought one little birthday wish would be so complicated!*

*Gran and Tan had such different reactions to the ancestry test. And now that Dr. V helped me learn how the test works, I realize it could reveal a lot more information that affects both me and my family.*

*I was so excited about taking an ancestry test. I've always wanted to know more about our roots. I think the results could be so cool, it's the first time in history we have a chance to explore our genomes! But now I know the test isn't looking at the entire genome, and results depend on each testing company and the references they use. What if I learn something unexpected? Will that change who I am?*

*Should I be considerate of Gran's feelings, that she doesn't think taking the test is a good idea? Should I share Tan's excitement in getting a chance to explore our family DNA? What if I end up like some of the stories I read about, where people discover unexpected things about their identity or their family history? Will I have to share the news with the family? What will that mean about me and who I am?*

*There's so much to think about...*

## Prediction

Sam isn't sure that they should take an ancestry test. These feelings stem from the reactions of their family, all the things they learned about how the test works, and knowledge that test results will also affect their family.

Do you think Sam will choose to take the ancestry test? Provide two reasons why you chose your answer.

What is the most important factor that would help you decide whether you want to take an ancestry test?

Describe a scenario where you were challenged to change your opinion about a topic or a change a decision you had made, after learning more information or hearing someone else's point of view. Describe the scenario and why you did or did not change your mind.

Do you think Sam should take an ancestry test? Provide two reasons why you chose your answer.

## Background

Sam isn't sure whether to take an ancestry test. To help them decide, they're going to review what they've learned about genetics and inheritance, genetic tests, and genetic data and privacy. They also will practice new skills around decision making and debate and argumentation. Familiarize yourself with the topics on genetic testing and privacy, as well as decisions and debates.

### Genetics & Inheritance

When someone talks about their personal genetics, they are often referring to aspects of their own **DNA** and **genome**. The human genome is the complete set of DNA in an individual that encodes the instructions for making each of us who we are. Where does this DNA come from? Typically, each person has two biological parents, four grandparents, eight great-grandparents, etc. as shown in the **pedigree** in Figure 1. Each of these biological ancestors can contribute DNA to the individual. Individuals inherit half of their DNA from each of their two biological parents, one quarter of their DNA from their four biological grandparents, one eighth of their DNA from their eight great-grandparents, and so on. Therefore, individuals are a mix of DNA from their ancestors; biologically related individuals often share some of the same DNA.

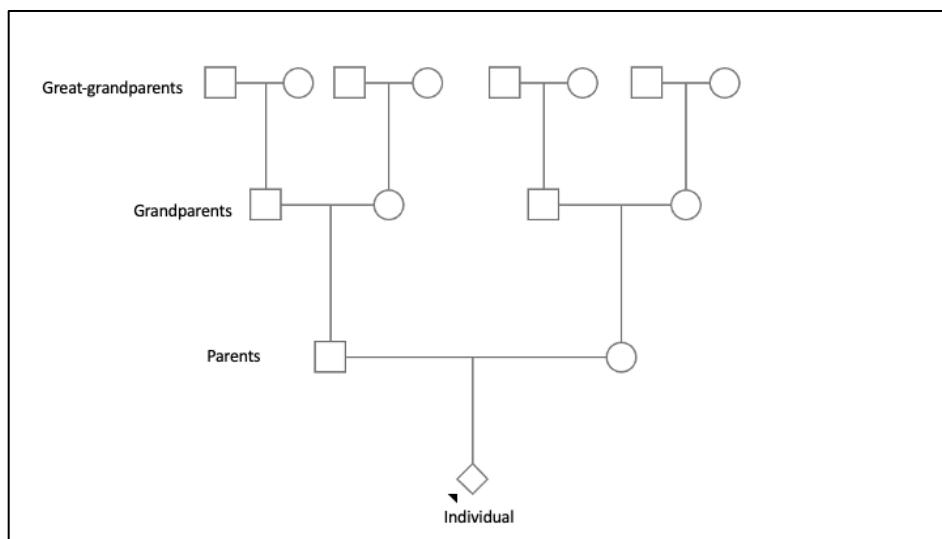


Figure 1. In this pedigree, or family tree, an individual is shown at the bottom. Going up the tree reveals some of their biological ancestors: parents, grandparents, and great-grandparents.

### Genetic Testing

**Genetic testing** is a category of laboratory tests that examines an individual's genes or other biological factors that influence genetic functions and traits. A small sample of cells, typically from blood or saliva, is taken from an individual and DNA, **RNA**, and/or **protein** molecules are examined. The goal of genetic testing is to better understand a person's DNA features, RNA patterns, or protein levels and how they influence a person's health, traits, or genetic heritage. Many types of genetic tests have been developed for a variety of purposes, including **karyotype** tests that count the number of **chromosomes** per cell to

look for genetic conditions such as trisomy 21 (Down Syndrome); **tumor** tests that examine tumor cells to determine drivers of and treatments for cancer; and paternity tests that reveal an individual's biological relatives.

Most genetic tests are conducted through healthcare professionals like doctors; these types of tests are called **clinical genetic tests**. Doctors often determine a test is needed due to a specific medical reason, such as a family history of a genetic disorder or symptoms that suggest a genetic condition. Samples like blood or saliva are collected in a medical setting and analyzed in a clinical laboratory. Once the test is complete, the results are sent to the healthcare professional who then shares them with the individual. With clinical genetic tests, health insurance may cover some or all of the cost of the test.

In contrast, **direct-to-consumer genetic tests** are tests that can be purchased directly by people without a doctor's order. They are often advertised as a way to learn about your ancestry, genetic traits, or health risks directly from your DNA. Individuals choose what test they want performed, and collect and send their own samples to the testing company. The testing company analyzes the samples, and once the test is complete the results are sent directly to the individual. With direct-to-consumer genetic tests, the individual pays for all of the cost of the test.

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*Thought questions:*

*Have you ever had a test performed at the doctor's office? Was it a genetic test?*

*Have you seen advertisements for direct-to-consumer genetic tests? What information would the test reveal?*

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## Ancestry Testing

DNA **ancestry tests**, or genealogical DNA tests, are a type of direct-to-consumer genetic test that examines specific locations in an individual's DNA to find similarities between groups of people and predict their ancestral origins. Since DNA is passed from biological parents to their offspring, it is possible to trace genetic ancestors by examining a person's DNA. This process relies on comparing an individual's DNA to reference databases containing genetic information from populations of people worldwide. Each company uses a different approach to for the ancestry test, and may offer additional features such as health reports and family matching.

Ancestry testing has gained popularity in recent years due to its ability to uncover previously unknown family connections, shed light on migration patterns, and help individuals better understand their roots and cultural identities.

## Genetic Information & Privacy

Genetic tests offer valuable insights into an individual's genetic makeup, and can advance understanding of a person's ancestry, disease predisposition, and personalized medical treatments. However, they also raise profound concerns about privacy and ethical implications of sharing one's most intimate biological data. Since DNA is inherited, one person's genetic test results may reveal information about other biological relatives. The sharing of genetic data can expose individuals and families to risks such as genetic discrimination, breaches of confidentiality, and unauthorized access to sensitive information.

In the United States, the Genetic Information Nondiscrimination Act (GINA) provides protection for genetic information. This federal law protects the confidentiality of genetic information, and orders that genetic information be part of a person's confidential medical record to be stored and shared under strict privacy standards. GINA also specifically protects against discrimination based on genetic information for health insurance and employment. GINA prohibits health insurance companies from using genetic information to alter a person's health insurance benefits. This law also prohibits employers from making decisions about hiring, firing, or promotions based on genetic information.

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*Thought question:*

*GINA protects genetic information specifically regarding health insurance and employment. In what other contexts might genetic information privacy be relevant?*

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## Decision making skills

When making important decisions, especially ones that involve personal health, family, or privacy, it's helpful to think through both the short-term and long-term consequences. What impact will this decision have immediately? What effects might be more long lasting? Good decision-making involves gathering accurate information, considering different perspectives, and reflecting on your own values and goals. For example, deciding whether to take an ancestry test might require weighing curiosity about your family roots against concerns about privacy or unexpected results.

A key part of responsible decision-making is **informed consent**. This means understanding what you're agreeing to, including the possible outcomes, risks, and how your information may be used or shared. It's also important to recognize when emotions or outside influences (like ads or peer pressure) are shaping your thinking, and to take a step back to focus on what matters most to you personally. Being aware of this kind of **bias**, both in ourselves and in the sources we use, helps us make more thoughtful and balanced decisions.

## Debate and argumentation skills

**Debating** is a way to explore different sides of an issue using evidence and reasoning. In a debate, you make a **claim** (your main point), support it with **evidence** (facts, examples, or data), and use **reasoning** to explain how that evidence supports your claim. Strong arguments are clear, **logical**, and based on trustworthy information, not just opinions or emotions.

Good debaters also listen carefully to opposing views and respond respectfully. This means thinking about **counterarguments** and preparing **rebuttals**, or responses that explain why your position still holds. Whether you're debating in class or in real life, it's important to stay calm, be respectful, and focus on ideas, not personal attacks. These skills help you express your point of view and understand others, even when you disagree.

## Quick Knowledge Check

Check your understanding of the background material by answering these questions.

1. What is informed consent?
2. In a debate, good arguments are constructed using
  - a. Emotion, opinion, and evidence
  - b. Opinion, claim, and bias
  - c. Bias, emotion, and reasoning
  - d. Claim, evidence, and reasoning
3. True or False? Genetic tests will never reveal unexpected information, because they're based on analyzing a person's DNA.

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4. Which statement(s) is/are true about genetics and inheritance? Select all that apply.

- a. Genetic material (DNA) is inherited from biological parents.
- b. Ancestry tests are used to identify all of an individual's biological ancestors (like parents, grandparents, great-grandparents, etc.)
- c. Taking a genetic test may reveal information about other biological relatives.
- d. GINA is an optional protection of genetic information.

## Activity

Sam is still deciding whether or not to take an ancestry test. What's the right decision to make? In this activity, you will help Sam gather data about the pros and cons of ancestry tests, formulate arguments for and against taking the test, and ultimately decide whether or not to take the test.

### Part 1. Take a position

Sam can make one of two decisions: to take the ancestry test, or to not take the ancestry test. In this activity, you will choose one of these sides: whether you are for or against Sam taking an ancestry test. You will choose individually, or you may be assigned this position by your teacher.

Circle which of the two sides you are taking for this activity:

- Team A: In Favor of Sam Taking an Ancestry Test
- Team B: Against Sam Taking an Ancestry Test

### Part 2. Research your position

Now that you know the position you will take in the debate, you will need to find evidence to support your arguments. As you're performing your research, organize the information you gather using **Table 1 Debate Research Worksheet**. Additional copies of this worksheet can be made if you need more space.

Be sure to use reliable sources to gather evidence for your debate position. Some resources are provided to get your research started. Record your sources in **Table 1 Debate Research Worksheet**.

When searching for sources, look for:

- Scientific principals of ancestry testing (how does ancestry testing work?)
- Personal benefits and concerns of ancestry testing (what are pros and cons of ancestry tests?)
- Social, ethical, and privacy implications (what do results mean beyond genetics?)
- Real-life stories or case studies
- Laws or regulations like GINA
- Company policies on data use and privacy

These are some ways to go about researching your side:

- Read a scenario about an individual who uses ancestry testing to discover long-lost relatives and the potential consequences of this discovery.
- Research a case study about how ancestry testing was used in a medical diagnosis.
- Research an example of how ancestry testing was used in forensic investigations.
- Read a scenario about how ancestry testing was used to solve a legal dispute.

**Sample resources:****1) Genetics & Ancestry**

- a) WEBSITE from MedlinePlus & The NIH National Library of Medicine: [Help Me Understand Genetics](https://medlineplus.gov/genetics/understanding/#inheritance) <<https://medlineplus.gov/genetics/understanding/#inheritance>>
- b) ARTICLE from the National Human Genome Research Institute: [Human Origins and Ancestry](https://www.genome.gov/dna-day/15-ways/human-origins-ancestry) <<https://www.genome.gov/dna-day/15-ways/human-origins-ancestry>>
- c) VIDEO from PBS Learning & Finding Your Roots: [What is "Race"?](https://cptv.pbslearningmedia.org/resource/fyr14.socst.us.whatrace/what-is-race) <<https://cptv.pbslearningmedia.org/resource/fyr14.socst.us.whatrace/what-is-race>>

**2) Ancestry Testing**

- a) FACT SHEET from the American Society of Human Genetics: [Direct-to-Consumer Ancestry Testing](https://www.ashg.org/wp-content/uploads/2020/04/DNA-Day-2020-Info-Handout.pdf) <<https://www.ashg.org/wp-content/uploads/2020/04/DNA-Day-2020-Info-Handout.pdf>>
- b) VIDEO from Vox: [What DNA Ancestry Tests Can – And Can't – Tell You](https://www.youtube.com/watch?v=IIWlatQt4KE) <<https://www.youtube.com/watch?v=IIWlatQt4KE>>
- c) VIDEO from TED-Ed: [What Can DNA Tests Really Tell Us About Our Ancestry? – Prosanta Chakrabarty](https://www.youtube.com/watch?v=YiydsMxOdM8) <<https://www.youtube.com/watch?v=YiydsMxOdM8>>

**3) Genetic Testing & Privacy**

- a) ARTICLE from MedlinePlus & The NIH National Library of Medicine: [What Is Informed Consent?](https://medlineplus.gov/genetics/understanding/testing/informedconsent/) <<https://medlineplus.gov/genetics/understanding/testing/informedconsent/>>
- b) ARTICLE from the American Society of Human Genetics: [Genetic Testing, Privacy, and Healthcare](https://www.ashg.org/discover-genetics/testing-privacy/) <<https://www.ashg.org/discover-genetics/testing-privacy/>>
- c) VIDEO from PBS Learning & The Gene: [Privacy Protections For Genetic Information: Meet GINA](https://cptv.pbslearningmedia.org/resource/f13694d4-061c-43c0-b679-b6bfa2a65272/privacy-protections-for-genetic-information-meet-gina-video-ken-burns-the-gene/) <<https://cptv.pbslearningmedia.org/resource/f13694d4-061c-43c0-b679-b6bfa2a65272/privacy-protections-for-genetic-information-meet-gina-video-ken-burns-the-gene>>

**4) Ancestry Testing Scenarios**

- a) VIDEO from BuzzFeedVideo: [The Try Guys Take An Ancestry DNA Test](https://www.youtube.com/watch?v=N06g2kc1Dxo) <<https://www.youtube.com/watch?v=N06g2kc1Dxo>>
- b) ARTICLE from BBC News: [These people took DNA tests. The results changed their lives.](https://www.bbc.com/future/article/20231004-these-people-took-dna-tests-the-results-changed-their-lives) <<https://www.bbc.com/future/article/20231004-these-people-took-dna-tests-the-results-changed-their-lives>>
- c) PODCAST from In Those Genes: [Up In Dem' Genes](https://player.audiostaq.com/inthosegenes/up_in_dem_genes) <[https://player.audiostaq.com/inthosegenes/up\\_in\\_dem\\_genes](https://player.audiostaq.com/inthosegenes/up_in_dem_genes)>
- d) VIDEO from The National Human Genome Research Institute: [The Human Genome: Who Do We Think We Are?](https://www.youtube.com/watch?v=lltW_13Nvps) <[https://www.youtube.com/watch?v=lltW\\_13Nvps](https://www.youtube.com/watch?v=lltW_13Nvps)>

**Table 1. Debate Research Worksheet**

Name: \_\_\_\_\_

Circle which of the two sides you are taking for this activity:

- Team A: In Favor of Sam Taking an Ancestry Test
- Team B: Against Sam Taking an Ancestry Test

Use the table to record your research findings for your sources.

| Source | Citation | Key points | Additional notes |
|--------|----------|------------|------------------|
|        |          |            |                  |
|        |          |            |                  |
|        |          |            |                  |
|        |          |            |                  |
|        |          |            |                  |
|        |          |            |                  |
|        |          |            |                  |

### Part 3. Prepare

Your research is the foundation for your debate. However, sometimes not all of the data collected will be used in your argument. It's important to consider your debate stance (for or against) and find facts that support your arguments.

First, review your research findings from **Table 1 Debate Research Worksheet**. If you are working individually, reread the information you recorded. If you are working in a group, have each person present their research to the group.

Next, construct your argument for the debate through the claim, evidence, reasoning framework: identify which points you want to make (claim), what data you have that supports this (evidence), and what statements can be made that connect the dots (reasoning). Use **Table 2 Debate Planning Table** as a worksheet to help you prepare.

The debate will follow this structure and timeline:

1. Opening statements (1 minute per side)
2. Main points/arguments (3 minutes per side)
3. Break to prepare rebuttals and summaries (10 minutes)
4. Questions and rebuttals (5 minutes per side)
5. Closing statements (1 minute per side)

Once your table is complete, take time to practice presenting each section. If you are working in a group, decide who from the team will present each of the sections for your debate.

**Table 2. Debate Planning Table**

Name: \_\_\_\_\_

Circle which of the two sides you are taking for this activity:

- Team A: In Favor of Sam Taking an Ancestry Test
- Team B: Against Sam Taking an Ancestry Test

Use the table to prepare your debate.

| Debate section            |                  | Example sentence starter  | Your response |
|---------------------------|------------------|---|---------------|
| <b>Opening statement</b>  |                  | <i>Good afternoon. Today we will be arguing in favor of (or against) Sam taking an ancestry test. This is an important topic because...</i> |               |
| <b>Point #1</b>           | <b>Claim</b>     | <i>Our first point is that...</i>   |               |
|                           | <b>Evidence</b>  | <i>According to [source]...</i>   |               |
|                           | <b>Reasoning</b> | <i>This is important because...</i>   |               |
| <b>Point #2</b>           | <b>Claim</b>     | <i>Another reason is...</i>   |               |
|                           | <b>Evidence</b>  | <i>This is supported by...</i>  |               |
|                           | <b>Reasoning</b> | <i>This supports our argument since it clearly demonstrates...</i>  |               |
| <b>Point #3</b>           | <b>Claim</b>     | <i>A third reason to support our position is...</i>   |               |
|                           | <b>Evidence</b>  | <i>One example is...</i>  |               |
|                           | <b>Reasoning</b> | <i>This matters because...</i>  |               |
| <b>Counterargument #1</b> |                  | <i>Some people might argue that...</i>  |               |
| <b>Rebuttal #1</b>        |                  | <i>However, we disagree because...</i>  |               |
| <b>Counterargument #2</b> |                  | <i>Another common opposing view is...</i>   |               |
| <b>Rebuttal #2</b>        |                  | <i>In response, we would say that...</i>  |               |
| <b>Closing statement</b>  |                  | <i>Thank you for listening. In conclusion, the evidence shows that...</i>   |               |

#### Part 4. Debate

Now it's time to debate! This is an important time where both sides will present their arguments, listen carefully to each other, and have a chance to ask questions and discuss.

The debate will follow this structure and timeline:

1. Opening statements (1 minute per side)
2. Main points/arguments (3 minutes per side)
3. Break to prepare rebuttals and summaries (10 minutes)
4. Questions and rebuttals (5 minutes per side)
5. Closing statements (1 minute per side)

While the other team is presenting their debate, use [Table 3. Debate Listening Worksheet](#) to record their statements.

During the break to prepare rebuttals and summaries, use [Table 4. Debate Rebuttal Worksheet](#) to prepare your team's rebuttal.

During the debate, your teacher may use a stopwatch or timer to ensure each group stays on time. Be sure to follow respectful discussion rules:

- Listen carefully to each speaker.
- Respond politely, using evidence rather than opinions alone.
- Avoid interrupting or personal attacks.

**Table 3. Debate Listening Notes Worksheet**

Name: \_\_\_\_\_

Circle which of the two sides you are listening to for this debate:

- Team A: In Favor of Sam Taking an Ancestry Test
- Team B: Against Sam Taking an Ancestry Test

As the debate progresses, listen carefully to the other team's arguments and record their statements and evidence presented. Include your own notes and questions about each point.

| Debate section    |           | Their statements | My notes / questions |
|-------------------|-----------|------------------|----------------------|
| Opening statement |           |                  |                      |
| Point #1          | Claim     |                  |                      |
|                   | Evidence  |                  |                      |
|                   | Reasoning |                  |                      |
| Point #2          | Claim     |                  |                      |
|                   | Evidence  |                  |                      |
|                   | Reasoning |                  |                      |
| Point #3          | Claim     |                  |                      |
|                   | Evidence  |                  |                      |
|                   | Reasoning |                  |                      |
| Closing statement |           |                  |                      |

Tips:

- Try to capture what they said, not what you think about it
- Listen for strong evidence and possible weaknesses
- Be respectful and attentive; don't interrupt while taking notes

**Table 4. Debate Rebuttal Worksheet**

Name: \_\_\_\_\_

Circle which of the two sides you are taking for this activity:

- Team A: In Favor of Sam Taking an Ancestry Test
- Team B: Against Sam Taking an Ancestry Test

Now that both sides have presented their debate, prepare your team's rebuttal. Use your own debate statements (from **Table 2**) and your notes about the other side's statements (from **Table 3**) to prepare.

| Debate section               |                              | Example sentence starter  | Your response |
|------------------------------|------------------------------|---|---------------|
| <b>Opening statement</b>     |                              | <i>Our team would like to refute some of the arguments presented by the other side...</i> |               |
| <b>Opponent's argument 1</b> | Claim                        | <i>Their claim that...</i>  |               |
|                              | Why we disagree              | <i>However, the data shows that...</i>  |               |
|                              | Supporting evidence or logic | <i>That argument doesn't consider that...</i>   |               |
| <b>Opponent's argument 2</b> | Claim                        | <i>The other group claims...</i>  |               |
|                              | Why we disagree              | <i>We disagree because...</i>   |               |
|                              | Supporting evidence or logic | <i>Supporting evidence includes...</i>  |               |
| <b>Opponent's argument 3</b> | Claim                        | <i>The statement that...</i>  |               |
|                              | Why we disagree              | <i>Yet we believe...</i>  |               |
|                              | Supporting evidence or logic | <i>According to</i>   |               |
| <b>Closing statement</b>     |                              | <i>In conclusion, we still believe the evidence supports...</i>                           |               |

## Tips

- Focus on the evidence and reasoning, not on personal opinions or emotions
- Stay calm and respectful

## Part 5. Reflection

After the debate finishes, answer the following questions.

1. What was the strongest argument you heard during the debate, whether from your side or the other?
2. What is one new point you learned about ancestry testing from the debate activity? Describe.
3. Did anything you learned make you reconsider your team's position? Why or why not?
4. Is there a "right" choice for Sam to make when deciding whether to take an ancestry test? Explain.
5. Would you take an ancestry test after this activity? Explain your reasoning.

## Part 6. Finish Sam's Story

What do you think Sam should do? Should they take the ancestry test or not? After hearing both sides of the debate, choose a path for Sam and finish their story. Using the space below, craft the ending to the story by adding the necessary dialogue between characters and, if you like, draw the scenes in the style of a comic.

Your end scene must include:

1. A title for this final chapter of “Sam’s Story”
2. Characters that include
  - a. Sam
  - b. At least 1 other character: one we’ve already seen (like Grandma, Tan, or Dr. V) or a new character of your choice
3. A description of the location for this scene
4. Dialogue that includes
  - a. Sam’s decision (take the test or not)
  - b. One benefit from that decision
  - c. One risk from that decision

Use the “Sam’s Story” scenes from the other activities in this module as inspiration when making your own.

Name \_\_\_\_\_

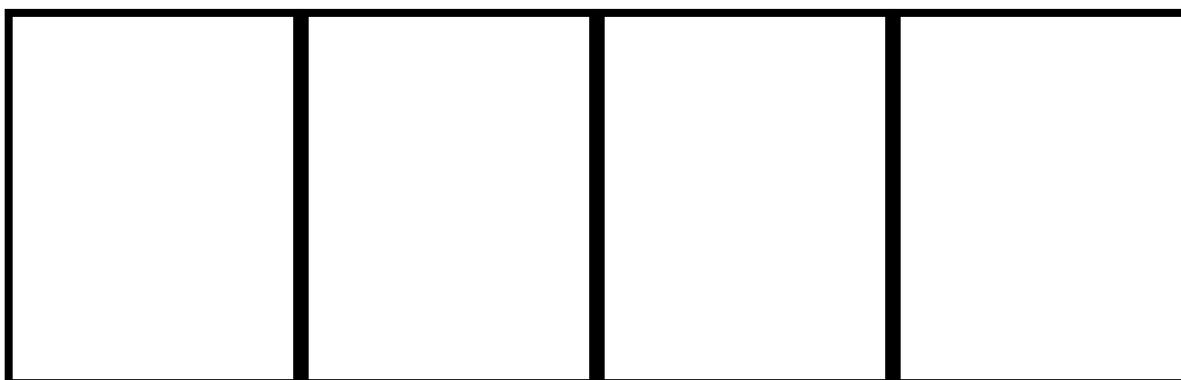
**Sam's Story:** \_\_\_\_\_

Location: \_\_\_\_\_

Characters: \_\_\_\_\_

Dialogue:

Comic (optional):



## Part 7. Ethics

In this activity, we focused on the personal decision of whether to take an ancestry test. Now, let's consider what happens *after* someone decides to take the test. When individuals choose to take an ancestry test, their genetic information becomes part of a large database owned by the testing company. Even though names and personal details may be hidden or coded, the genetic data itself remains and can be used to find biological connections.

In some cases, **law enforcement** has accessed publicly available genetic databases and used this information to help identify suspects in criminal investigations, raising important ethical questions about privacy, consent, and how genetic data should be used.

To explore these issues more deeply, let's explore real cases in which law enforcement used genetic information from public ancestry databases to solve crimes. First, read this article or the summary.

ARTICLE from Science: [We Will Find You: DNA Search Used To Nab Golden State Killer Can Home In On About 60% of White Americans](https://www.science.org/content/article/we-will-find-you-dna-search-used-nab-golden-state-killer-can-home-about-60-white) <<https://www.science.org/content/article/we-will-find-you-dna-search-used-nab-golden-state-killer-can-home-about-60-white>>

- Ancestry DNA data is being used in criminal investigations, and has benefits, risks, and ethical concerns.
- In the case of the Golden State Killer, law enforcement submitted crime scene DNA to a public database called GEDmatch. GEDmatch has genetic data from nearly 1 million individuals who took ancestry tests with different companies. Searching the database revealed relatives of the crime suspect. Eventually, one single person was identified and named as the suspect in the crime.
- Ancestry data can be used to make connections that can have positive or negative consequences, and people don't fully understand the consequences of putting their DNA into a public database.
- DNA originally shared for personal or family reasons can be later used in a very different context.

Next, choose at least two of the following questions and record your answers below.

1. What are the main benefits of law enforcement using public ancestry databases to help solve crimes?

2. What are some potential harms or ethical problems with law enforcement using these databases without users' explicit consent?
3. Should people who upload their DNA for ancestry purposes be required to give consent before their data can be used by law enforcement? Why or why not?
4. How might this issue affect people's willingness to participate in ancestry testing or have their genetic information in public databases in the future?
5. Should companies that host genetic data be legally required to protect it from law enforcement access? Why or why not?

## Part 8. Careers

Explore jobs and career paths that relate to this activity.

1. Navigate to any job search site. Some recommended ones are
  - Indeed: <https://www.indeed.com/salaries>
  - Zippia: <https://www.zippia.com/careers>
  - JobViz: <https://teach.galacticpolymath.com/jobviz>
2. Search for the jobs from this activity. You can also find more jobs using keywords from the activity or explore jobs and categories on the site.

Science Communicators explain complex scientific topics in a way that the public can understand. Similar jobs include Science Journalist and Technical Writer.

Lawyers advise people and organizations in legal matters and often use debate skills to present and defend arguments. Similar jobs include Judicial Law Clerk and Paralegal.

Therapists support individuals, families, and groups dealing with psychological or emotional issues. Similar jobs include Social Worker and Counselor.

3. Fill in the table below with 2 jobs that interest you. Record the job title, degree(s) and training needed, and the salary estimate. You can also write a description of the work and any other notes about why you found the job interesting. Continue filling the table with more jobs if you want to.

| Job title | Degree(s)/training needed | Salary estimate | Description of work | Notes |
|-----------|---------------------------|-----------------|---------------------|-------|
|           |                           |                 |                     |       |
|           |                           |                 |                     |       |
|           |                           |                 |                     |       |
|           |                           |                 |                     |       |

4. Hear from people in some of the jobs you just discovered. Choose 1 resource, then use the table below to record the resource you explored, as well as your thoughts about the people and the jobs they do. Continue filling the table with more jobs if you want to.

- [I Am A Scientist: Medical Illustrator](#)
- [LabXchange Narrative: From Athletics & Law to the Marine Corps & Biotech](#)
- [500QS: Licensed Master Social Worker](#)

| Resource you explored | Person name and job title | In your own words, describe the work they do | Which of their traits match your skills and interests? | What do you want to learn more about? |
|-----------------------|---------------------------|--|--|---------------------------------------|
|                       |                           |  |  |                                       |
|                       |                           |  |  |                                       |
|                       |                           |  |  |                                       |
|                       |                           |  |  |                                       |

## Prediction – revisited

Revisit your predictions from the beginning of this activity and update your answers to include anything you've learned during this activity.

Sam isn't sure that they should take an ancestry test. These feelings stem from the reactions of their family, all the things they learned about how the test works, and knowledge that test results will also affect their family.

Do you think Sam will choose to take the ancestry test? Provide two reasons why you chose your answer.

What is the most important factor that would help you decide whether you want to take an ancestry test?

Have you ever changed your mind after learning more information or hearing someone else's point of view?

Do you think Sam should take an ancestry test? Explain.

## Glossary

**Bias** – when someone unfairly favors one idea or side over another, often without considering all the facts.

**Claim** – a statement or opinion that someone tries to prove is true.

**Counterargument** – a point that disagrees with or challenges a claim.

**Debate** – a discussion where people share different opinions and try to support one side with facts and reasoning.

**Evidence** – facts, examples, or data that support a claim or argument.

**Informed consent** – the process of giving all the important facts, including risks and benefits to an individual before they make their decision.

**Law enforcement** – the systems and employees responsible for observing the law, maintaining public order, and managing public safety. Individuals include local police officers, county sheriffs, and federal agents.

**Logic** – the process of thinking carefully using reason to make sure ideas make sense.

**Rebuttal** – a response that explains why the counterargument is not as strong as your original claim.

**Reasoning** – thinking and explanation that connects evidence to a claim.

**Debate Rubric**

| Criteria                      | 5 points  | 4 points   | 3 points   | 2 points  | 1 point   | Total Points |
|-------------------------------|---|--|--|---|---|--------------|
| <b>Respect for Other Team</b> | All statements, body language, and responses were respectful and used appropriate language.                 | Statements and responses were respectful and used appropriate language, but once or twice body language was not. | Most statements and responses were respectful and used appropriate language, but there was one inappropriate remark. | Statements, responses and/or body language were borderline appropriate. Some inappropriate remarks. | Statements, responses and/or body language were consistently not respectful or appropriate. |              |
| <b>Information</b>            | All information presented in this debate was clear, accurate and thorough.                                  | Most information presented in this debate was clear, accurate and thorough.                                      | Most information presented in the debate was clear and accurate, but was not usually Thorough.                       | Some information was accurate, but there were some minor inaccuracies.                              | Information had some major inaccuracies or was usually not clear.                           |              |
| <b>Rebuttal</b>               | All counter-arguments were accurate, relevant and strong.   | Most counter-arguments were accurate, relevant, and strong.  | Most counter-arguments were accurate and relevant, but several were weak.  | Some counter arguments were weak and irrelevant.  | Counter-arguments were not accurate and/or relevant.  |              |
| <b>Use of Facts</b>           | Every major point was well supported with several relevant facts and/or examples.                           | Every major point was adequately supported with relevant facts and/or examples.                                  | Every major point was supported with facts and/or examples, but the relevance of some was questionable.              | Some points were supported well, others were not.   | All points were not supported.  |              |
| <b>Organization</b>           | All arguments were clearly tied to an idea and organized in a logical fashion.                              | Most arguments were clearly tied to an idea and organized in a logical fashion.                                  | Most arguments were clearly tied to an idea and organized in a logical fashion.                                      | Most arguments were clearly tied to an idea and organized in a logical fashion.                     | Most arguments were clearly tied to an idea and organized in a logical fashion.             |              |
| <b>Understanding of Topic</b> | The team clearly understood the topic in depth and presented their information forcefully and convincingly. | The team clearly understood the topic in depth and presented their information with ease.                        | The team seemed to understand the main points of the topic and presented those with ease.                            | The team seemed to understand the main points of the topic, but didn't present with ease.           | The team did not show an adequate understanding of the topic.                               |              |
| <b>Total Points:</b>          |   |  |  |   |   |              |
| <b>Comments:</b>              |   |  |  |   |   |              |

Adapted from Stanford University's Classroom Debate Rubric  
[https://web.stanford.edu/class/cs326/classroom\\_debate\\_rubric.pdf](https://web.stanford.edu/class/cs326/classroom_debate_rubric.pdf)