



SNAPSHOT

Ancestry and Identity in the Genomic Age Teacher Guide

Adapted for PBS LearningMedia in partnership with WETA for use with



Big Picture:

- How are new genetic tools providing a lens for examining human ancestry?
- What are the benefits and concerns for individuals, families and communities?

Advances in genetics have given researchers new tools for analyzing people's DNA. These technological developments are allowing scientists and doctors to better understand the connections between genes and human health with the goal of improving medical care. In addition, it is increasingly possible for individuals to learn about their genetic ancestry through low-cost DNA tests marketed to consumers. Ancestry tests are nuanced, and the results are subject to limitations. Still, these tests can yield results that are warmly welcomed or fill in missing pieces of a family story. They may also provide results that cause people to feel upset or worried, and the results may conflict with an individual's personal and cultural identities.

Activities:

Part 1: Watch clip from *The Gene: An Intimate History* (5 minutes)

We recommend starting the lesson with a short [clip](#) from *The Gene: An Intimate History* that explores how new genetic tools are providing a lens for examining human ancestry.

Part 2: Slideshow / Video (10 minutes)

The slideshow gives examples of how advances in genetics are impacting people's explorations of their ancestry. The accompanying explanatory notes for the slideshow are below ([pages 3-5](#)). In addition, we have recorded a video of this slideshow for easy use in a distance learning setting. The PowerPoint file as well as the video can be found on [our website](#) along with this lesson.

Part 3: Four Corners activity (15 – 25 minutes)

Participants will read some statements and consider their own thoughts and reactions as to where they fall on a continuum between "strongly agree", "agree", "disagree", and "strongly disagree". If this is being used in a distance learning setting, teacher may wish to use these as writing prompts or use live polling in synchronous classes.

a) Preparation: The statements presented in the PowerPoint file offer participants a chance to express their opinion and think more deeply about their own views about the use of genetics in the context of ancestry testing.

b) Introducing statements: We have provided three statements on the PowerPoint slides (slides 7-9), as well as some notes and articles for teachers below ([pages 6-7](#)). Teachers can choose which statements will work best for their classroom. Before beginning the discussion, remind students about norms for having a respectful, open discussion of ideas.

Related pgEd lesson plans

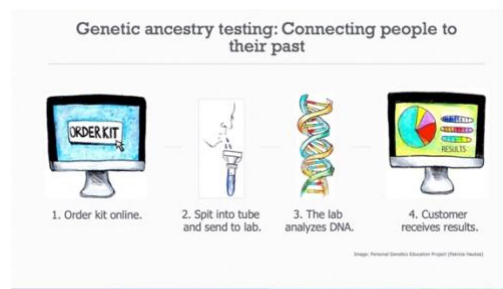
- This module was adapted from pgEd's lesson, [Introduction to Personal Genetics](#).
- pgEd has a companion lesson on the science of ancestry testing, [How Does Ancestry Testing Work?](#) that is suitable for in-class use as well as distance learning.

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SLIDESHOW NOTES

The slideshow as well as a recorded version of it are located on [our website](#) along with this lesson, and accompanying explanatory notes for the slideshow are below. The main idea of each slide is in bold along with text that summarizes the story presented in each slide. The notes provide additional context to aid in answering student questions and references for teachers interested to delve deeper into these topics. On slide 5, pause to show either one of the short videos "[Black People Get Their DNA Tested](#)" or "[Who do we think we are?](#)" (links also provided in the slide) before proceeding to the Four Corners activity.

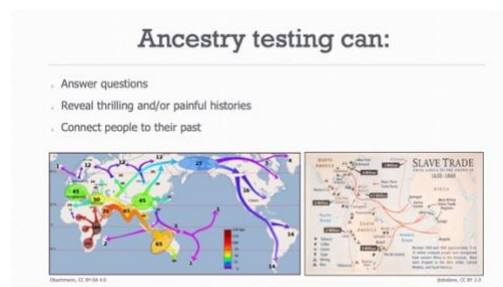
Slide 2



Ancestry testing is one important dimension of personal genetics. In 2020, DNA ancestry tests often cost \$100 US or less. For some, genetics can add a layer of information onto decades or centuries of records of family history. Others - because of adoption, migration, or other family circumstances such as donor-assisted conception - might be seeking unknown relatives

from all over the world. For example, because of the history of slavery in the US, many people of African ancestry do not know in what part of Africa their ancestors lived. DNA testing may provide some information towards filling in these gaps and may allow people to feel more connected to a past of which they were previously unaware. On the other hand, DNA testing can also complicate or even contradict a person's sense of identity if results are unexpected or unwelcome. At the same time, some ethnic groups, particularly many Indigenous American nations, place a greater emphasis on cultural belonging and familial lineage rather than genetic ancestry when considering questions of ethnic identity.

Slide 3



These maps illustrate the point that while some people's ancestry can be seen via a world map looking at human migration patterns in the ancient past, others will see the history of their families more clearly in a map of the slave trade.

Using a combination of the archaeological record and DNA analysis, scientists have been able to track human movements out of Africa, believed to have started around 60,000-70,000 years ago, to eventually most areas of the world (except for Antarctica). The top-left image illustrates current understanding of ancient human migration across the globe, showing the approximate date when a particular island or part of a continent is believed to have been first inhabited by humans. Importantly, this map doesn't show the subsequent migration of different populations to areas that were already inhabited (e.g., the expansion of peoples speaking Indo-European languages from southern Russia into Europe and India, or the migration of Bantu-speaking peoples from central Africa into southern Africa, both of which occurred within the past few thousand years).

The second map illustrates the most common transatlantic slave trade routes during the 17th-19th centuries. During this time, 10-15 million people were forcibly moved from one part of the world to another. Today, there are many more millions of descendants of this slave trade whose genealogical and cultural history have been impacted by this forced migration. Taken together, these maps illustrate some of the many historical events that have shaped the genetic ancestry of populations across the world today.

Slide 4

The many faces of Mexico



This slide illustrates the complex relationship between nationality, ethnicity, ancestry, and physical traits seen in countries formed as a result of European colonization, such as Mexico and the US.

Such countries are not ethnically-uniform, but are instead multicultural and multiethnic countries with varied percentages of ancestral origins in

their populations. National/ethnic identities such as "Mexican" can encompass dozens of languages and cultures, a mix of ancestries (including African, Indigenous American, European and/or Asian ancestry), and a wide diversity of traits. The variation in traits such as skin color is seen on this slide. In the US, many people of Mexican and other Latin American origins may identify or be identified as "Latino." The term "Latino" came into use largely as a category in the US Census; it does not easily map onto common notions of race and geography and is not broadly used across the globe.

Slide 5: VIDEO

DNA ancestry tests can provoke a wide range of emotions for people. Why?



Caveats:

1. This is not an endorsement of companies or the field of DTC genetics tests.
2. There is controversy about accuracy of results
3. Results can vary between companies

The topics covered in slides 2-4 are brought to life in two videos in which young people are learning about their genetic ancestry via direct-to-consumer genetic tests. Both videos include people who make the choice to get DNA ancestry tests, as they reflect on how their results might fill in important pieces of their personal story, give them a sense of belonging, or

differ from their family stories and concepts of ethnicity and identity. Also, both videos mention the history of colonization and slavery, and how painful that can be within families. The two videos both reinforce the idea that people are more alike than different from a genetic perspective.

The two videos differ in several ways. The video "Black People Get Their DNA Tested" from *BuzzFeed News* specifically mentions they are using a 23andMe product. (Important note: While we have included this video, pgEd does not recommend for or against DNA ancestry testing or any specific product.) We also see the interactions between family members as they process the information they've received. Lastly, this video contains some images about current political matters in the US - including immigration and the Black Lives Matter movement - through the lens of how genetic testing could remind people of our common humanity. In the NIH-produced video, "Who do we think we are?", you will see a more classroom-style approach, with more context about how DNA tests work, the history of human migration, and a discussion about the risks related to discovering unexpected information.

After watching either video, remind students that ancestry results can vary widely between companies, and rather than being definitive, are often a reflection of whose DNA is included in the database and how these "reference" samples are divided up into ethnicities or geographic regions. Many ancestry databases are over-represented with samples from people of European descent, leading to less precise results for people of non-European descent. pgEd advises teachers to watch both videos and decide which one (if not both of them) will meet your needs.

Links for Videos:

- "[Black People Get Their DNA Tested](#)" by *Buzzfeed*
- "[Who do we think we are?](#)" produced by 42o North Media for NHGRI

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FOUR CORNERS ACTIVITY: TEACHER NOTES

To set up this activity, we have provided three statements on the PowerPoint slides (slides 7-9), as well as some notes and articles for teachers below. Participants will read these statements and consider their own thoughts and reactions as to where they fall on a continuum between "strongly agree", "agree", "disagree", and "strongly disagree". In an in-person setting, participants can move to labeled corners of the room based on the degree to which they agree or disagree with each statement. If this activity is being used in a distance learning setting, teachers may wish to use these statements as writing prompts or use live polling in synchronous classes. Participants will share and discuss their opinions with the class.

I would like to take a genetic test to learn more about the history of my biological family.

This statement and those that follow bring discussion about the possibility of surprises resulting from DNA ancestry testing. Students are being asked to consider the likely benefits and risks, as well as their personal tolerance for surprises - surprises related to family connections, ethnic and cultural identity, and the (sometimes painful) histories of one's ancestors. For some, new information from an ancestry test could help fill in gaps and answer long-held questions; others may find themselves upset to learn unwelcome or uncomfortable information.

Read more:

- According to the Pew Research Center, roughly 15% of Americans have taken an at-home genetic test for ancestry, with close to 40% reporting learning something unexpected: "[Mail in DNA Test Results Bring Surprises about Family History for Many Users](#)", by Nikki Graf, August 2019, *Pew Research Center*.
- This article highlights the work of Dr. Rick Kittles to build tools that help African Americans and others rebuild family histories: "[How African Americans Use DNA Testing to Connect with Their Past](#)", by Ed Yong, June 2017, *The Atlantic*.
- This article follows the personal stories of several people who learned something different from their family stories, and describes the various ways people might respond to such information: "[They Considered Themselves White, But DNA Told a More Complex Story](#)", by Tara Bahrapour, February 2018, *Washington Post*.

People should talk to their relatives before doing a genetic ancestry test.

An important consideration when deciding whether to do a genetic ancestry test is that, as with genetic testing for medical reasons, results can have meaning for the person taking the test as well as their relatives. There are no laws that require someone doing an ancestry test to seek permission, or even consult, family members. Still, there are psychological considerations related to learning about new family relationships, particularly for people who are conceived via donor eggs or donor sperm, as explored in this article from the American Psychological Association: "[Genetic Testing and Family Secrets](#)", by Stephanie Pappas, June 2018.

Read more: This article highlights the power and limits of genetic ancestry testing, and some of the emotional dimensions this experience may bring: "[For African Americans, DNA Tests Reveal Just A Small Part of A Complicated Ancestry](#)", by Eli Chen, April 2019, *NPR*.

I would be willing to contribute my DNA to efforts to help create knowledge about human ancestry.

Research shows Americans are divided about at least one dimension of privacy concerns related to ancestry testing: the possibility that their genetic data could be shared with law enforcement.

Read more: "[About Half of Americans are Ok with DNA Testing Companies Sharing User Data with Law Enforcement](#)", by Andrew Perrin, February 2020, *Pew Research Center*.

Contributing to the genetic lens on human ancestry can mean very different things to different people. For some, this is an exciting new pathway. However, prominent Indigenous leaders and scholars have voiced concern about a growing perception that genetic testing could encourage people to claim tribal affiliation or identity. The underrepresentation of many Indigenous groups in genetic testing databases can decrease the accuracy of the analysis – but that is just one problem. Many Indigenous groups state that, regardless what a person's DNA might indicate, a person doesn't get to call themselves a member of an Indigenous nation or tribe without practicing their culture or being considered a member by the rest of the nation or tribe.

Read more: "[Genetic Testing and Tribal Identity](#)", by Rose Eveleth, January 2015, *The Atlantic*.