**Pop-Out Essential Question:** *How is genetic testing important for our health and who has access to it?*

You have examined a lot of scientific evidence around the nature vs. nurture debate and found that both genetics and environment affect the traits of organisms. Studying an organism’s environment is not difficult—we simply observe an organism’s habitat. However, to figure out how an organism’s genetic information affects how it looks or behaves, may not be as simple.

In this Pop-Out, you will learn about the rise of genetic testing, including why it is so important in modern medicine and who has access to it.

**Engage**

Perfect pitch is one of those traits that we know is hereditary, or determined by a gene variation passed on from a family member. 48% of people with perfect pitch have a close relative with perfect pitch, compared to only 14% of people without perfect pitch. Having perfect pitch means you are able to recognize, or make a tone without another reference, like hearing the tone or note on a piano.

Here’s where it gets interesting! Even if a child has the genetic variation, they need early musical training before age six in order to actually develop perfect pitch. This means, without knowing it, some of you may have the genetic variation for perfect pitch and not even know it!

With a partner, discuss:

1. Does this support the argument for nature, nurture, or nature via nurture? Why?
2. Why do you think this would make someone want to know more about their genetic makeup?
3. Genetic testing is not a simple medical test. It uses complex machines and highly trained professionals to interpret the results. This means genetic testing is very expensive!
   1. What do you think this means for who gets to find out about their genetic makeup?

**Explore**

Knowing whether you have the genetic variation for perfect pitch may not seem like the biggest priority. However, there are lots of other genetic variations that can have a big impact on your health and the health of your children. For example, some genetic variations affect the way your cells or organs function, or whether you may develop certain diseases in your lifetime. So, how can we find out more about our genetic makeup? Genetic testing is a medical test that looks for any differences in your DNA code that can cause you to develop and/or pass on certain diseases. Remember that you inherit part of your genes, or DNA code, from your mother and some from your father.

As a group, pick one of the following patients and watch a video of their story to learn more about what genetic testing can do and why it is important:

* Paige’s Story: <https://www.youtube.com/watch?v=-UHg0oEqdAg>
* Nicole’s Story: <https://www.youtube.com/watch?v=d7u3A1WMT5s>
* Jessica’s Story: <https://www.youtube.com/watch?v=uFjv5vae1J8>
* Conner’s Story: <https://www.youtube.com/watch?v=ZOJ9LpNRg3Q>
* Nicole R.’s Story: <https://www.youtube.com/watch?v=EvUmsi5gZY0>

Take notes in the box below. You will use these notes to prepare a presentation about how genetic testing helped your patient.

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**Explain**

Genetic testing is important for many different purposes. Since other groups in your class chose different patient stories, you can learn about some of these different purposes from each other.

1. As a group, create a presentation to share your patient’s story. In your presentation, make sure to include the following:

* A background of your patient
* A description of what medical issues or problems your patient was facing
* An explanation of how genetic testing helped your patient and/or your patient’s family members

1. After hearing about all the patients’ stories, discuss as a group:

* What are the different benefits of genetic testing?
* Why is genetic testing important for health outcomes?

Prepare to share out ideas as a class.

**Elaborate**

You have seen that genetic testing can play an important role in many people’s health. Since it is so important, it seems like genetic testing should be available to everyone. But is it?

1. **Individually, read and annotate the article below, “Who Has Access to Genetic Testing?”**

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| **Who Has Access to Genetic Testing?**  **Genetic testing has been on the rise, helping doctors to prevent, diagnose, and treat more diseases. However, research has shown that minority and low-income groups are much less likely to receive genetic testing.**  **Research shows that a major reason for this is cost. Genetic testing is very expensive, and private insurance companies will only pay for it if the patient meets specific conditions. For example, an insurance company may only allow someone to get testing for a specific disease if they have other family suffering from the same disease. Other data also shows that minority and low-income groups are less likely to even have that private health insurance. These are just some of the reasons why many people often cannot afford this expensive genetic testing.**  **Another challenge minority and low-income groups face is not knowing that genetic testing is available or not getting enough understandable information from their doctor. If they don’t know that genetic testing as an option, they can’t ask for it. For example, research shows that white women are more likely to request genetic counseling for breast cancer than women in minority groups.**  **Lastly, studies indicate that there is often less trust in the medical system among minority groups. Many individuals report concern about how their genetic test results will be used. For example, research has shown that African American women perceive that there are more risks and limitations to genetic testing than other groups.**  **How will this affect the health of people in these groups? Is this fair?**  **Adapted From The Following Sources:**   * <https://www.nature.com/articles/gim200997> * <https://www.healthcaredive.com/news/genetic-testing-threatens-to-widen-health-disparities/424144/> |

1. **With a partner, discuss the article and answer the questions below. Be prepared to share ideas with the class.**
   1. **Which groups of people usually have less access to genetic testing?**
      1. **What three reasons does the article give to explain their lack of access?**
   2. **Think about the stories you heard and how the patients benefited from genetic testing. Why might it be a problem if certain groups of people do not have access to genetic testing?**
   3. **How can you see this being a problem for our society?**

**Evaluate and Reflect**

Individually, take a few minutes to think about what you learned in this Pop-Out. Then reflect on the questions below:

1. How can genetic testing be used for “good”?
2. How might access to genetic testing increase health disparities, or make the world less fair?
3. What do you think could be done to make sure genetic testing is used in a fair way?