

In this Lesson Plan:

Print the Teacher Section $\rightarrow \blacksquare$



16

Print the Student Section \rightarrow



01 For Teachers	Page
Lesson Overview	1
Make Connections!	3
Pedagogical Framing	4
Slides	
Day 1	5-7
Day 2	8-9
Day 3	10-11
Day 4	12
Day 5	13-15

02 Student Resources	
Genetic Test Report Comparison	1
Group Collaboration Contract	
Part 1 Our Collaboration Agreement	2-3
Part 2 Common Group Challenges While	
Working on a Collaborative Project	4
Script Outline	
Part 1 What does our patient need to know?	5
Part 2 Health Literacy Challenges	6
Part 3 Storyboard	7-8



Cover Image Genetic research, pipetting into a test tube in front of a DNA autoradiogram

National Standards

This document is separated into two sections, For Teachers [T] and Student Resources [S], which can be printed independently.

Select the appropriate printer icon above to print either section in its entirety.

Follow the tips below in the Range field of your Print panel to print single pages or page ranges:

Single Pages (use a comma): T3, T6

Page Range (use a hyphen): T3-T6

LIVING EARTH / INVESTIGATING INHERITED DISEASES

Treatments our Our Patient's Disease

ACTIVITY DURATION

Five days

DRIVING QUESTION

How do you counsel a patient on their risk of genetic disease while considering their health literacy?

ESSENTIAL QUESTION

How do we communicate with patients who may have an inherited disease?

OVERVIEW

In this lesson, students will partner with another student who chose the same patient. Together, they will review their individual **Genetic Test Reports** and then come to a consensus on how to best deliver their findings to their patient.

OBJECTIVES

Students will be able to:

Collaborate effectively with a peer to analyze and build consensus around the most important and challenging pieces of information they need to present.

Explore what health literacy is and how to communicate effectively with their patient's health literacy skills in mind.

Investigate how to develop and strengthen writing and oral presentation skills based on purpose, audience, and delivery mode (writing versus oral).

Demonstrate understanding of translating quantitative or technical information into effective visuals and vice versa.

STUDENT TASKS

Day 1	Day 2	Day 3	Day 4	Day 5
Partner with another student to present their Genetic Test Report to their patient (be sure to review deliverables with students). Participate in a team-building activity: norm setting. Develop group contracts and agreements. Compare information in their Genetic Test Report: What are the similarities in your reports? What are the differences?	Develop a script for how they are going to communicate to their patient. Take information from their genetic test reports to create their script outline.	Research health literacy. Consider their patient's profile when deciding how to communicate each section of the Genetic Test Report to their patient.	Develop their presentation. Follow work-time guidelines. Participate in teacher/student conferences.	Participate in the Fishbowl presentation, an observation exercise. Consider how factors including a patient's age, gender, and culture impact how the student should present information.
			16	33

MAKE CONNECTIONS!

How does this connect to the larger unit storyline?

This lesson connects to the overall storyline by having students expand their their roles as genetic counselors. In this role, they will research a given genetic disorder and communicate this information to their patients. The goal of this lesson is to increase patient understanding of the genetic disorder, discuss management options, and explain the risks and benefits of testing. Counseling sessions focus on giving vital, unbiased information and nondirective assistance in the patient's decision-making process to help them manage symptoms of a genetic disorder.

A key component for students to consider throughout the project is how they will communicate technical health information to patients who have little background in the subject.

How does this connect to careers?

Science communications professionals collect and disseminate information about scientific research. Their day-to-day responsibilities look different depending on their audience: some science communicators specialize in providing information to businesses and key decision-makers, while others communicate information to the general public.

Science journalists write about scientific achievements and hold businesses and agencies accountable by reporting on their work. Science journalists strive to talk about complicated scientific concepts in a manner that is easy to understand.

Pharmaceutical marketing professionals develop materials and communication campaigns that help health care providers understand the benefits of new treatments and identify patients that might be good candidates for a company's therapeutics.

How does this connect to our world?

Health literacy is an extremely important component of all of our lives, as we all need to be able to understand and use health information. Improving health literacy is a key component in allowing patients to make informed decisions about their healthcare.

Low health literacy has been associated with poor health outcomes. Health literacy can help patients prevent health issues and decrease health disparities.

Pedagogical Framing

Instructional materials are designed to meet national education and industry standards to focus on in-demand skills needed across the full product development life cycle—from molecule to medicine—which will also expose students and educators to the breadth of education and career pathways across biotechnology.

Through this collection, educators are equipped with strategies to engage students from diverse racial, ethnic, and cultural groups, providing them with quality, equitable, and liberating educational experiences that validate and affirm student identity.

Units are designed to be problembased and focus on workforce skill development to empower students with the knowledge and tools to be the change in reducing health disparities in communities.



SOCIAL-EMOTIONAL LEARNING

Students produce a genetics testing report for a patient with a **Genetic Test** Report for a patient with a diagnosed genetic disease. This requires the use of empathy for those suffering with the disease, as well as social awareness of the perspective of the target audience. Students must also practice self-management skills like delaying gratification to pursue the goal and persevering in the face of any setbacks or frustrations while working with a partner and receiving feedback. Students create a Genetics Test Report as a genetic counselor that must relate to people of various ethnicities and socioeconomic backgrounds.

CULTURALLY AND LINGUISTICALLY RESPONSIVE INSTRUCTION

This lesson applies culturally and linguistically responsive instruction to the creation and presentation of Genetic Test Reports that a genetic counselor would provide for patients. When exploring treatment options, these professionals often face health literacy challenges with patients and must find strategies to use in order to make their reporting as clear as possible. The lesson also offers opportunities for students to provide specific and helpful feedback to their peers while rehearsing the presentations of the reports. This supports CLD students' use of standard English, while bridging the content from scholastic research to the reality of delivering complex information to a varied population.

ADVANCING INCLUSIVE RESEARCH

It is important for students to understand that not every individual has equitable access to medical education. According to an article in the USA Today, in 2019 only 2.6 percent of doctors in the United States and 7.3 percent of medical students identify as Black. This is compared to 13 percent of the U.S. overall population. There are generally limited efforts to recruit Black and Latino students into medical education programs (Alltucker 2020). Some programs have made progress by enhancing diversity requirements in the admission process and improving recruitment incentives.

COMPUTATIONAL THINKING PRACTICES

In this lesson, students use the computational thinking strategies of abstraction and decomposition to work successfully with a partner. By identifying similarities and differences between their work and their partner's work, students are able to concentrate on the commonalities between the two Genetic Test Reports and make the process of combining them easier. Students use the computational thinking strategy of decomposition to consider how patients will receive the information when presented with their Genetic Test Report. By breaking down the experience of reading the report into subcomponents, students can think about tangible ways to improve.

CONNECTION TO THE PRODUCT LIFE CYCLE

In this lesson, students are getting hands-on experience with developing and refining a health communications product. As such, they gain an understanding of the Commercialization phase of the product life cycle.



Slides 1-9

Launch

Students partner with someone who chose the same patient. (5 minutes)

- 1 **Prepare in Advance:** As the teacher, decide how to best pair students together. Options include:
 - **a.** Student choose partners who have developed a **Genetic Test Report** for the same patient.
 - **b.** Form student groups yourself based on your knowledge of your students, but ensure that partners have developed a **Genetic Test Report** for the same patient.
- Open class by letting students know the culminating project focuses on communicating the **Genetic Test Report**.
 - **a.** Tell students that for Lessons 5 and 6 students will work in pairs to develop their patient communication Flipgrid video.
 - **b.** Assign pairs or let them choose (see prep notes above).

Slides 1-9

Review the deliverables students will develop with their partner in Lesson 5 and Lesson 6. (15 minutes)

- 1 Remind students that by the end of Lesson 6 they will have recorded their Flipgrid video communicating the **Genetic Test Report** information to their patients.
- Ask students to review the N2K questions to identify the content and process questions related to doing this work in Lessons 5 and 6.
- 3 Ask students to identify what they need to do next in order to create a video communicating the test information to their patient.
- 4 Facilitate a class conversation around the following prompts using a random, yet targeted method like color of shirts or birthday month. (For example, students in red shirts answer the question initially, and then January birthdays add on, or use a targeted criteria of your choice.)
 - What are the advantages of working with a partner who has developed a **Genetic Test Report** for the same patient?
 - If you have two different reports, but have to communicate together, how will you decide what to communicate?

Continues next page >

COMPUTATIONAL THINKING IN ACTION

By breaking down the steps of what they need to do to create their video, students are using the computational thinking strategy of decomposition.

Continued

INDUSTRY AND CAREER CONNECTION

As students work through the "Characteristics of a Successful Group" activity, they are gaining experience in a type of thinking exercise that is common for pharmaceutical marketing professionals. These creative kickoffs are an important part of developing successful marketing and communications plans.



COMPUTATIONAL THINKING IN ACTION

As student brainstorm a list of words, they are using the computational thinking strategy of abstraction to summarize effective group work.

Slides 10-11

Tell students they will get an opportunity to review each of their **Genetic Test Reports** together so they can compare and contrast the information, but first it is important that they set up their new partnership for success.

Slides 10-11

Students will participate in a team-building activity, setting norms for themselves. (15 minutes)

Prepare in Advance: Create an anchor chart titled: "Characteristics of a Successful Group."

- 1 Students participate in a quick team-building activity.
 - a. Have each partner gather two sheets of paper, a pencil, and a clipboard. Tell each pair to designate one partner as Partner 1 and one partner as Partner 2. Then tell partners to sit back to back.
 - **b.** Tell partners they have 30 seconds to draw a picture that uses at least three different shapes.
 - **c.** Partner 1 then describes his or her picture, and Partner 2 must try and draw it on their remaining blank sheet of paper.
 - **d.** Have partners look at the first image and debrief. Did your drawings match? Why or why not? How might you improve communication for the next round?
 - e. Partner 1 then draws on their remaining blank sheet of paper.

Debrief: Communication is key to collaborating effectively. Pausing and checking in with one another is important to understand what works and what is needed to be successful.

When complete, have students brainstorm a list of words that describe what it takes to collaborate successfully in a group. Use the following prompt:

Use the following prompt: Now that you have completed that activity, let's use that experience to think about what it takes to successfully collaborate in a group. Write down one or two words that come to mind that help a group successfully collaborate on a project.

3 As students share their words, add them to the anchor chart.

Continues next page >

Day 1 Continued

Slide 12

Slide 12

Have groups develop their collaboration agreements. (10 minutes)

- Pass out the *Group Collaboration Contract* to students. Ask students what they notice in the capture sheet. Use these observations to review the different sections.
- Tell students: With your partner, use the *Group Collaboration*Contract to identify what is specifically important for your group when collaborating together.
- 3 Have pairs identify three words on the Successful Collaboration anchor chart that are important for them as they work together.
- 4 Once students identify their words and complete Section 1 together, move around the room and check-in with pairs asking them to explain why they selected their particular words.
- When all students have signed their collaboration agreement in Part 1 of the chart, review the scenarios in Part 2.
- 6 Have pairs work through the collaboration scenarios in Part 2, identifying what to do and what not to do for each scenario.
- When complete, discuss each scenario with the class by having one pair volunteer their response for each scenario.

Slides 13-15

Slide 13-14

Provide the script template, which students will use to develop ways to communicate with patients. (10 minutes)

- When pairs have completed their contract, let them know they are ready to start developing their Flipgrid video.
- 2 Pass out one *Script Outline* to each pair.
- 3 Have students share things they notice in the template with each other.
- 4 Use the observations you hear while walking around to discuss what they will need to do to write their scripts and create their images.
- Ask a few students how they plan to collaborate in order to develop one script while using two **Genetic Test Reports**. Remind students that the script will be used to develop their Flipgrid video, which in turn will be used to communicate results and options to patients.
- Ask why they think images are important when they communicate the results of the **Genetic Test Report** to their patients.

Slide 15

Compare information in their **Genetic Test Report**. (20 minutes)

- 1 Have students take out their **Genetic Test Reports**.
- 2 Tell partners they will compare one another's report.
- 3 Pass out the *Genetic Test Report Comparison* capture sheet.
- 4 Review the capture sheet with students and explain how to complete the Venn diagram to compare and contrast their reports.
- 5 Ask students what elements might contribute to their reports being different or similar.

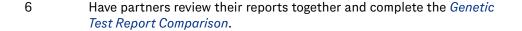
Continues next page >

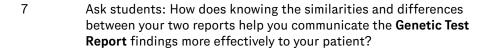
COMPUTATIONAL THINKING IN ACTION

Here, students are using the computational thinking strategy of abstraction to hone in on the similarities between their work and the work of their partner.

Day 2 Continued

Slides 15-17







Slides 16-17

Students begin to develop the outline of their scripts. (15 minutes)

- 1 Give students the **Patient Response and Reflection** capture sheet listed in Lesson 6.
- 2 Tell students that this capture sheet will let them know how effective they were at communicating the report findings to their patients. Point out that they will use this capture sheet to provide feedback on each other's Flipgrid video.
- Ask students to review the capture sheet and share what they notice with each other. Use some of the observations you hear to discuss the expectations for the final Flipgrid video.
- Now, have students complete Section 1 of their script template to identify the four or five most important things they need to communicate to their patients from the **Genetic Test Report**.
- After students are finished with Section 1, pause their work in the template. Students need to consider health literacy challenges before moving onto Section 2 in the template.

Slides 18-24

Slides 18-24

Read and Reflect on Health Literacy article. (20 minutes)

- Students will work in pairs as they use the instructional strategy Tabletop Texting while they view the video: Culture, Language, and Health Literacy.
 - **a.** Have students volunteer to share their partner takeaways.
 - **b.** Ask students how the video and its contents connected to them and their community.
 - **c.** What are some health literacy challenges that they see in their own community today?
 - **d.** How does health literacy impact the health of the people in their community?
- 2 As students share aloud, make a list on the board.
- Now share the articles and webpage below for students to read:
 - a. Understanding Health Literacy CDC page
 - **b.** The *Health Literacy* article
 - **c.** Health Literacy in African-American Communities: Barriers and Strategies article
 - **d.** The Importance of Diversity in Healthcare & How to Promote it article
 - e. Health Literacy articles and video

Teachers note > *Articles are provided at different reading levels and one asset has articles with accompanying video, in order to allow for differentiation.*

4 Students will use the instructional strategy *Twenty-Five Things You Didn't Know* in order to learn and share information. Divide students into five groups. Assign each group an article to read together. As a group, they must determine five facts that they learned while reading the article.

Continues next page >

COMPUTATIONAL THINKING IN ACTION

As students identify health literacy challenges in their communities, they use the computational thinking strategy of decomposition to break problems down into components.

Day 3 Continued

Slides 25-26



- After, have students share aloud five things they learned during their research. Record the facts on the board, as students share. Collectively, they will have learned 25 new facts around health literacy.
- Ask students why it is important as a healthcare worker to take into account a patient's health literacy.
- This research will help to further refine their work as they prepare their patient communication.

Slides 25-26

Review patient profile cards to consider the specific health literacy challenges the patients face. (25 minutes)

- 1 Now, have students review their patient profile cards.
- Tell students: You have already identified the most important information your patient needs to know when you communicate your findings from the **Genetic Test Report**. Using what you learned about health literacy, review your patient profile and consider what you think will be the greatest health literacy challenges you will encounter when communicating your findings. For each challenge, identify specific strategies that you can use in your video to help you communicate the findings more clearly.
- Point out Section 2 of the script template, where students will identify strategies.
- 4 As students share, make sure they know that:
 - Section 1 should contain information about whether the genetic condition is hereditary throughout generations or confined to the patient, and whether the condition affects survival and likelihood of future reproduction.
 - they determine the best order to present the key information, from Section 1 to their patients.
 - for each piece of key information, they need to identify an image to help communicate to their patients.
 - for each piece of key information, they need to identify health literacy strategies from Section 2 to use in the Flipgrid video.
- As an exit ticket, have students respond with a quick *Whip Around*: "How does health literacy help decrease health disparities?"

COMPUTATIONAL THINKING IN ACTION

Scripts and templates are helpful ways to use the computational thinking strategy of developing algorithms to organize student work.



Slides 27-30

Slides 27-30

Students develop their script and visuals (45 minutes)

- As students begin developing their script and visuals, remind them to include:
 - **a.** the statistics or probability of their patient having an inherited disease and passing the gene to their children.
 - **b.** the likelihood of survival and reproduction for future generations.
 - **c.** what test(s) or treatment(s) the patient could consider.
 - **d.** an explanation of results and next steps for the patient to consider.
- Before you begin, tell students you will conference with them while they work. Display the questions you might ask on an anchor chart or on the board.
- 4 Conference with students as they work. Use the prompts below.
- 5 Possible conference prompts:
 - **a.** What are the key pieces of information you decided to communicate to your patient?
 - **b.** What images are you going to use in order to assist you in communicating?
 - **c.** How will you create the images so they are large enough to be seen in your video?
 - **d.** What health literacy challenges do you anticipate with your patient?
 - e. What strategies will you use to overcome those challenges?
 - **f.** How are you and your partner collaborating to problem solve?
 - g. What questions do you have before recording your Flipgrid video?
- 6 **Prep needed for Day 5**: Ask one of your pairs ahead of time if they are willing to participate in the *Fishbowl* on Day 5 by doing a practice presentation for the class. Assure them the focus of the activity will not be on their project but on modeling for the class how to give and receive feedback.

Tips when selecting a group for *Fishbowl*—Choose a group whose project is "done enough" to be provided feedback. Consider who will be most comfortable and open to feedback (especially if this is new for your students.) Pick a group with a solid understanding of the work, but also has room for improvements. Students should be able to find both positives and opportunities for improvement as feedback is shared.



Slides 31-32

Slides 31-32

Setting up the Fishbowl and Tuning Protocol. (10 minutes)

- 1 Arrange classroom chairs in a circle. In the center of the circle make a smaller circle with six chairs.
- 2 Ask students to bring a pencil or pen and their project rubrics to the circle.
- Have your two pre-selected students come to the center of the circle and have four more volunteers sit in the center of the circle with them. Remind them to bring their rubrics with them to the center.
- Explain to students that today they will be practicing giving and receiving feedback—depending on where they are sitting in the circle, they will serve a different role.
 - **a.** The two pre-selected students will serve as presenters.
 - **b.** Four other students inside the fishbowl area will serve as audience members providing feedback.
 - **c.** Students sitting in an outside circle—observers who are actively listening.
- Reiterate that today the focus is on thinking about how to give and receive feedback in service of our peers and their hard work. We need to make sure that feedback is:
 - a. kind
 - b. specific
 - c. helpful
- Tell students to keep the project expectations in mind to guide the feedback—which is why the project rubric is helpful.
- Ask students to look at the rubric and consider how the project components were addressed in this communication exercise Allow students to annotate (health literacy components, supporting evidence, etc.) on their rubric.
- 8 Understanding who the patient is—particularly gender, age, culture, socio-economic status, etc.—is important in considering the presentation and the feedback to be given.

Day 5 Continued

Slide 33

Slide 33

Model peer feedback of the project by using a *Fishbowl* activity with a *Tuning* protocol. Students practice listening skills and how to give meaningful and effective feedback. (25 minutes)

- Presentation (5 minutes)—Presenting group first shares their patient profile card with the audience, then presents their script. Audience takes notes.
- 2 **Clarifying Questions** (1 minute)—Audience asks clarifying questions. Presenters can respond.
- 3 **Individually Assess** (1 minute)—Audience reviews rubric and prepares feedback.
- 4 **Praise** (2 minutes)
 - "I like..."
 - "When you said... it stood out because..."
- 5 **Question** (2 minutes)
 - "I wonder..."
 - "One question I have is..."
- 6 Suggest (2 minutes)
 - "One change I would make is..."
 - "I suggest..., because...
- 7 **Reflect** (2 minutes)—Presenters reflect on the feedback given.

Continues next page >

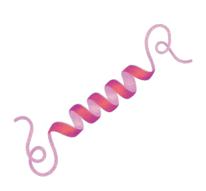
Day 5 Continued

Slide 34

Slide 34

Debrief the process and major takeaways. (10 minutes)

- Ask students who were in the *Fishbowl* what they liked about the process. Be sure to take insights from both the presenters and the four students who gave feedback.
- 2 Ask students to identify the most challenging part of the process.
- 3 Ask students how this process allows them to evaluate, reflect, and then refine their project.
- 4 Invite those who were in the outside circle to share any takeaways.
- 5 Provide time for students to individually reflect on the presentation and feedback given today. What are the implications for their own products? What opportunities do they have for improvement in their own work?
- Advise students that during the next lesson they will all get a chance to give and receive feedback using the same protocol.



National Standards

Next Generation Science Standards

Science and Engineering Practices (SEP)

Practice 6

Analyzing and Interpreting Data

Design a solution to a complex real-world problem, based on scientific knowledge, student-generated sources of evidence, prioritized criteria, and trade off considerations.

Disciplinary Core Ideas (DCI)

ETS1.C

Optimizing the Design Solution

Criteria may need to be broken down into simpler ones that can be approached systematically, and decisions about the priority of certain criteria over others (tradeoffs) may be needed.

Crosscutting Concepts (CC)

Connections to Engineering, Technology, and Applications of Science

Influence of Science, Engineering, and Technology on Society and the Natural World

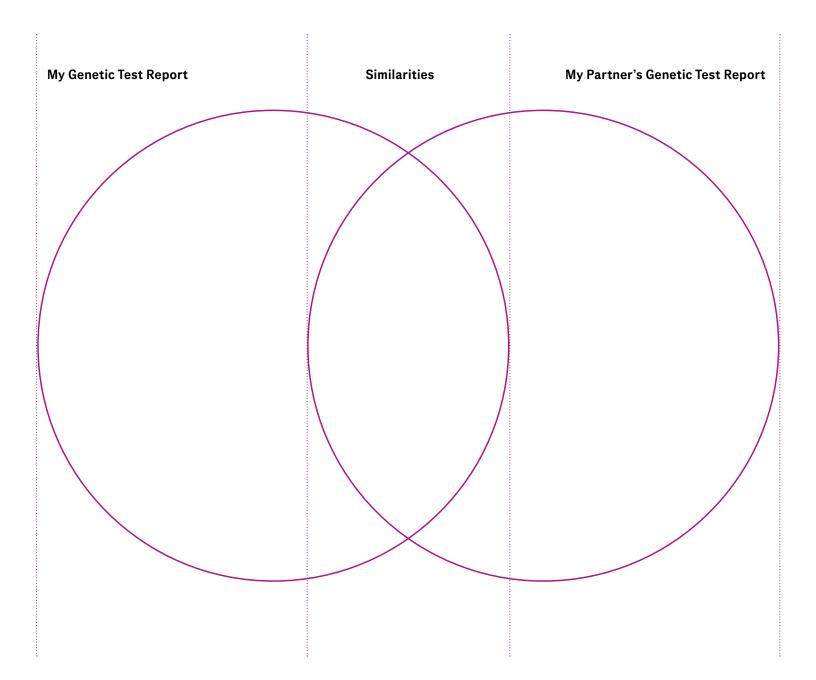
New technologies can have deep impacts on society and the environment, including some that were not anticipated. Analysis of costs and benefits is a critical aspect of decisions about technology.



Genetic Test Report Comparison

Directions

With your partner, review each other's Genetic Test Report. Identify how your report is similar and different from your partner's. With your partner, list the similarities and differences between your reports in the Venn Diagram.



Group Collaboration Contract, Part 1

Our Collaboration Agreement

Directions

Identify three words from the list we brainstormed as a class that are the most important to you and your partner. Respond to the reflective questions. Remember, these three words you select represent what you and your partner believe you will need to do together in order to successfully collaborate.

Group Signatures
We agree to do our best to achieve these three
collaboration goals as a group. Signed:
What We Need To Do To Work Successfully Together
1.
2
2.
3.
Continues next page >
, ,

Group Collaboration Contract, Part 1

Our Collaboration Agreement

Continued

1	Write the first collaboration word your group identified.	Why is this important to your group?	What specific actions can help you achieve this when working together?

2	Write the second collaboration word your group identified.	Why is this important to your group?	What specific actions can help you achieve this when working together?

3	Write the third collaboration word your group identified.	Why is this important to your group?	What specific actions can help you achieve this when working together?

Group Collaboration Contract, Part 2

Common Group Challenges While Working on a Collaborative Project

Directions

Work with your partner to think about what to do and what not to do when these common collaboration challenges occur.

Scenario 1 Someone is absent multiple days.	
What should you do?	What should you not do?

Scenario 3 You disagree about an important decision.		
What should you do?	What should you not do?	

Scenario 2 Someone does no	ot do their work on time.
What should you do?	What should you not do?

Scenario 4 Someone tries to	take over or do the work alone.
What should you do?	What should you not do?

Script Outline, Part 1

What does our patient need to know?

Directions

What are the four or five most important things you need to communicate to your patient based on your findings in your Genetic Test Report?

Key Information for Patient	Why is it important for your patient to understand this in order to make an educated decision on how to move forward with your findings?

Script Outline, Part 2

Health Literacy Challenges

Directions

Use the articles you read to identify the health literacy challenges you expect to face communicating your findings in the **Genetic Test Report** to your patient.

Health Literacy Challenges	What are the health literacy strategies that will help your patient more easily understand the information you are going to present?

Script Outline, Part 3

Storyboard

Directions

- 1. With your partner, decide which order is best to present the key information you identified to your patient.
- 2. Then, for each piece of key information you listed:
 - a. identify the image you want to use in your video to help communicate with your patient
 - b. identify other health literacy strategies you plan to use when recording your Flipgrid video.

1	The first key piece of information you need to share with your patient from the Genetic Test Report:	What image will you use to help communicate this information to your patient?	What other health literacy strategies will you use?

2	The second key piece of information you need to share with your patient from the Genetic Test Report:	What image will you use to help communicate this information to your patient?	What other health literacy strategies will you use?

Continues next page >

What other health literacy strategies

will you use?

FUTURELAB+

The third key piece of information you

need to share with your patient from

Scrip	t O	utlin	e, P	art	3
-------	-----	-------	------	-----	---

Storyboard

Continued

	the Genetic Test Report:	patient?	,
	;		;
4	The fourth key piece of information you need to share with your patient from the Genetic Test Report:	What image will you use to help communicate this information to your patient?	What other health literacy strategies will you use?
5	The fifth key piece of information you need to share with your patient from the Genetic Test Report:	What image will you use to help communicate this information to your patient?	What other health literacy strategies will you use?

What image will you use to help

communicate this information to your