FUTURELAB+

LIVING EARTH

Genetic Detectives: Investigating Inherited Diseases

Inherited Diseases

Developed in partnership with:
Discovery Education

In this Lesson Plan:

Print the **Teacher Section** →

Print the **Student Section** →

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

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

LIVING EARTH / INVESTIGATING INHERITED DISEASES

Inherited Diseases

DRIVING QUESTION

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

OVERVIEW

In this lesson, students examine a selection of inherited diseases. They hear stories from patients living with these diseases, research a disease that interests them, and present the data they collect in the form of a poster.

Students also explore the following key concepts:

The difference between genetic and inherited diseases: A genetic disease is any disease that occurs as the result of a DNA mutation. Inherited diseases are genetic diseases that can be passed down to offspring. Inherited diseases include conditions such as Sickle Cell Anemia, Cystic Fibrosis, and certain types of cancers. Some conditions, such as Alzheimer's Disease, may be the result of an inherited gene or may develop in someone who does not have a family history of the disease.

Health literacy: A person's ability to obtain, process, and act on information about his or her health[1] is known as that person's health literacy. Patients who speak English as a second language, come from Native communities, have cultural aversions to medical institutions, and/or are over the age of 65 are less likely to be health literate.[2]

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ACTIVITY DURATION

Five days

ESSENTIAL QUESTIONS

What is the role of a genetic counselor?

What is an inherited disease?

Whose lives are impacted by inherited diseases?

OBJECTIVES

Students will be able to:

Discover who is impacted by inherited diseases.

Investigate different types of genetic and inherited diseases.

Explore the role of a genetic counselor.

UNIT LAUNCH VIDEO

Community Empowerment: Eradicating Disease

[1] *Health Literacy | Healthy People 2020*
[2] Ibid.

OVERVIEW *Continued*

Patient pathways: Also known as clinical pathways, patient pathways are the steps patients take from the moment they walk into a health care institution to the moment they end their treatment.

Health, disparities: A health disparity is an injury, disease or lack of optimal health conditions experienced more by one group than another.

Personalized medicine: Also called precision medicine, personalized medicine is a medical model that treats patients as individuals with unique needs, rather than as a group. Personalized medicine often involves looking at a patient's genetic makeup in order to determine the best course of treatment.

Throughout the unit, students explore the career of genetic counseling. Genetic counselors are health care professionals who help patients understand

how to navigate the information contained in their genetic code.[3] Students act as genetic counselors by developing a test report for a selected patient profile. As they develop and present their report, students must display many of the skills that genetic counselors use in their work. These include displaying empathy to patients, communicating complex information to individuals with low health literacy, analyzing genetic data, and identifying a patient's best pathway for care.

[3] *Cincinnati Children's*

STUDENT TASKS

Day 1	*Day 2*	*Day 3*	*Day 4*	*Day 5*
Examine a variety of genetic diseases by visiting digital stations.	Develop their Need to Know Questions. Form groups based on interest in genetic disease. Begin researching their selected disease.	Finalize research and present findings to their group. Groups develop a poster using their research.	Finalize posters. Groups present their genetic diseases in a *Jigsaw* exercise.	Conduct a *Gallery Walk* of the posters to identify similarities and differences between diseases. Reflect on the Need to Know Questions and identify the content they need to learn in the next phase of the project.

MAKE CONNECTIONS!

How does this connect to the larger unit storyline?

Genetic diseases are caused by mutations in DNA. These mutations are the result of errors that occur during the transcription process. DNA mutations can be passed down to offspring, who may or may not display traits related to the mutation. These traits are known as inherited diseases. This lesson focuses on people who are born with heritable diseases and explores how the diseases impact their daily lives.

How does this connect to careers?

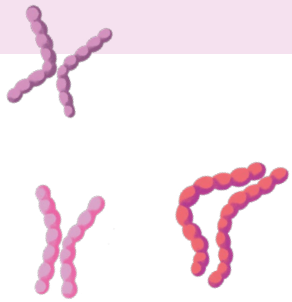
Genetic counselors work with patients to help them and their families understand the potential risks of inherited disease. They assist in family planning and help patients make decisions regarding treatment options by working alongside obstetricians, oncologists, research scientists, and geneticists.

Alzheimer's caregivers are specialists who support patients with memory loss and dementia. They help patients accomplish daily tasks and may also assist them with legal matters, financial management and long-term care planning.

Computational genomics specialists develop computer programs that look at the structure and function of genes. Many new biological discoveries come from the field of computational genomics.

How does this connect to our world?

Genetic diseases have plagued humankind for millennia. What we have learned about the human genome, combined with scientific advances in medicine and research, has extended humans' life expectancy, prevented unnecessary suffering, and enabled patients to make informed decisions about genetic diseases.

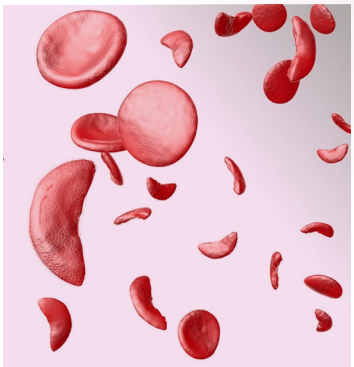


Pedagogical Framing

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 problem-based 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 practice self-management skills, such as persevering in the face of setbacks and frustrations, while researching diseases. They practice social awareness and management skills to successfully understand what others are feeling as they interact with diverse groups. They cooperate, negotiate solutions to conflict, and seek help when needed. Because some students will have had personal experience with a genetic disease, students must demonstrate empathy and practice social awareness in group discussions.

CULTURALLY AND LINGUISTICALLY RESPONSIVE INSTRUCTION

This lesson applies culturally and linguistically responsive instruction to the study of certain genetic diseases that affect various segments of the population, including BIPOC, who represent cultures, backgrounds, and languages of historically marginalized groups. The lesson offers opportunities for the growth of critical consciousness of self and community, while encouraging students to bridge the learning to their real-world experiences. Cultivating a growth mindset about themselves will have a powerful effect on the ability of students to reflect on their own natural abilities and qualities.

ADVANCING INCLUSIVE RESEARCH

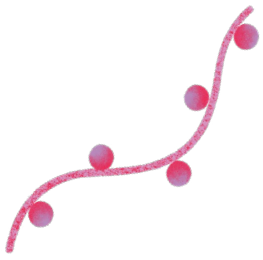
A significant issue facing the future of genetic research is the fact that the majority of the data collected reflects those with Caucasian and northern European ancestry. In order to collect genetic data that matches the diversity of the human population, scientists must first build trust with communities that have been historically mistreated by established medicine. Genetic counselors are on the front lines of this work, as they communicate complex genetic concepts to patients in ways that are easy to understand.

COMPUTATIONAL THINKING PRACTICES

The computational thinking strategy of collecting data involves knowing what you need to know and knowing how to find it. In this lesson, students collect data on a number of genetic diseases and select one to research further. This allows students to develop ownership over the data collection process and analyze the data they collect by developing a poster.

CONNECTION TO THE PRODUCT LIFE CYCLE

Until recently, there were few treatment options for those with inherited conditions such as Sickle Cell Anemia. Now, many therapies are being developed to help people with these diseases live longer and more fulfilling lives. These therapies, and the careers associated with bringing them to market, are located in the Development phase of the product life cycle.



Day 1

Slides 1–6

Slides 2–4

As an entry event, students build empathy with people impacted by genetic diseases. They also learn about genetic diseases by doing a mini-station activity. (55 minutes—more time will be given to revisit stations on Day 2)

1	**Prepare Ahead of Time:** *Post Anchor Phenomena Images* around the room.
2	In small groups, have students conduct a *Gallery Walk* around the classroom. As they approach each station, instruct students to ask the question "What is this?"
3	Return to a whole group and have students share their observations using a *turn and talk* with a neighbor. Explain to students that these observations will guide their learning in this unit.
4	The genetic diseases that students will focus on for this unit are Sickle Cell Anemia, Cystic Fibrosis, Hemophilia, Hereditary Breast and Ovarian Cancer Syndrome, and Alzheimer's Disease.
5	Use the materials in the Inherited Disease Mini-Stations to set up the five stations. If possible, have a device at each station for students to watch the following videos: • *Sickle Cell*—Anne Alfa's Story • *Cystic Fibrosis*—Molly Pam's Story • *Hemophilia*—The Bradys' Story • *Hereditary Breast and Ovarian Cancer Syndrome*—Jackie's Story • *Alzheimer's Disease*—Don's Story
6	Have students return to their earlier student groups and move through each station as directed. While at the station, have them watch the video first and then read the other artifacts. Students will fill out the *Inherited Disease Mini-Station Observations* capture sheet that utilizes the *See, Think, Wonder* thinking routine. Explain that by visiting the mini-stations and completing the capture sheet, students are utilizing the computational thinking strategy of collecting data. This strategy involves knowing what you need to know in order to solve a problem, and also knowing where to go to find it. Ask students: What sources could be used to research what they are wondering about?

COMPUTATIONAL THINKING IN ACTION

By participating in this mini-station activity, students are putting the computational thinking strategy of collecting data into practice. At the end of the activity, students will have created a dataset on genetic diseases.

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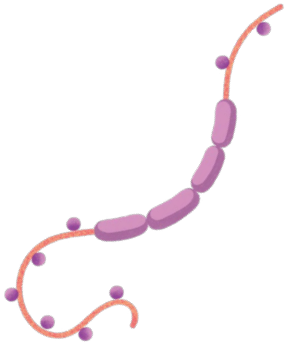
Day 1

Continued

Slides 7–9



Slides 7–9	
Debrief Day 1 by considering who genetic diseases impact and why using anchor chart activity below. (10 minutes)	
1	**Prepare Ahead of Time:** Create an anchor chart titled “The Perspectives of Inherited Diseases.”
2	Divide the anchor chart into three columns. Leave a space for a title for each column, but leave each title blank for now. Later the three columns will be: Directly Impacted (patient), Indirectly Impacted (family, friends), Medical Professionals. As students share, add the different people suggested into the three untitled columns.
3	When ready, have students respond to the prompt: “Who are the different people you saw that are impacted by or connected to inherited diseases?”
4	As they share, add the names of the people from the videos and articles they read in each column as they align to the three categories.
5	When finished, ask students to look at how you organized the names in the three columns. Ask students to come up with the titles for the three columns.
6	When students have made the connection, label the three columns in the anchor chart.
7	Close class with the Exit Ticket prompt, “How do you personally connect with the images and videos you saw today about inherited diseases?” Have students turn and talk with a neighbor to answer.

Day 2

Slides 10–15

INDUSTRY AND CAREER CONNECTION

As students develop their N2K Questions, they are practicing skills that are utilized in a variety of genomics careers: computational researchers, science reporters, and genetic counselors all use these strategies to gather information and solve problems.

Slides 11–12

Complete the Digital Mini-Stations activity with students. (15 minutes)

When the student groups have completed each station, give time for students to complete the *Inherited Disease Mini-Station Reflection*.

Slides 13–15

Guide a class conversation around the inherite disease mini-station activity from the previous day. Have students engage in a *Give One, Get One, Move On* discussion protocol. Then begin to develop students' Need to Know (NTK) Questions using the Think-Pair-Share prompt below. (10 minutes)

1	**Prepare Ahead of Time:** In the front of the room hang two pieces of chart paper next to each other. Label one "N2K: Inherited Diseases" and label the other "N2K: Our Project."
2	Using *Think-Pair-Share*, have students respond to the following prompt: "Think about what you saw in the mini-station activity yesterday and today where you explored various genetic diseases. With your partner, identify three things you learned about inherited diseases, two things you want to learn more about, and one question you have."
3	When pairs have discussed the prompt, ask a few students to share something that they heard or said to facilitate a class discussion around the prompt.
4	Add students' N2K Questions and what they want to learn more about to the "N2K: Inherited Diseases" anchor chart.
5	Have students review their *Inherited Disease Observations* capture sheet to identify any additional questions that need to be added to the N2K list.

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Day 2

Continued

Slides 16–21

Slides 16–18

Share project information documents and add to students' N2K Questions. (10 minutes)

1. Pass out and review the project information sheet, the Driving Question, and the rubric.
2. Have students share their questions about the project and add them to the "N2K: Our Project" anchor chart.
3. In five locations around the room, have signs posted with the name of each of the genetic diseases to be researched.
4. Have students move to the sign of the genetic disease they would like to examine further. Let them know they will be making a poster to present by the end of this lesson. Be sure all diseases are represented and have students pick a second choice, if needed.
5. Have students in each corner break into smaller groups of three to four for each disease.

Slides 19–21

Guide students through a *Jigsaw* process to collect information about their genetic disease. (10 minutes to introduce and students finish for homework)

1. In their groups, have students create a Profile Poster of their genetic disease.

   The poster needs to identify:

   a. Genetic Disease Name

   b. Who

   - Who is directly affected (the patient)?
   - Who is indirectly affected?

   c. What

   - What are the symptoms?

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Day 2

Continued

Slides 19–21

d. How

- How does someone get the genetic disease?
- How does a genetic counselor test someone to see if he or she has the disease?

e. Statistics

- List important statistics associated with the disease.

2 Have students use the *Inherited Diseases Online Resources* and the *Inherited Disease Exploration* capture sheet.

3 Have students *Jigsaw* their research in their groups.

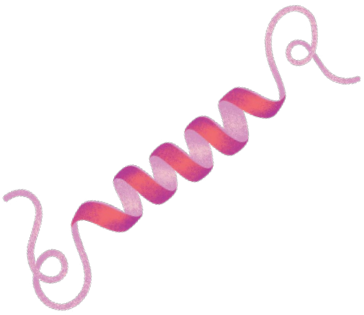
4 First, have students select which part of their disease profile they want to research: Who, What, How, or Statistics.

5 Next, have students will begin collecting data once they are all aware of their research focus.

6 Tell students that anything they do not finish in class, they will need to complete as homework. Remind students they will be sharing their portion of the research to the other people in their group, and vice-versa, on Day 3 in order to develop a profile of their disease.

COMPUTATIONAL THINKING IN ACTION

Jigsaw activities are excellent ways for students to practice the computational thinking strategies of decomposition (breaking a process down into manageable pieces) and collecting data.



Day 3

Slides 23–28

Slides 23–28	
Students present their *Jigsaw* information. (25 minutes)	
1	Give students 5 minutes to prepare their notes and research to teach or present to the other people in the group.
2	Show students where on the *Inherited Disease Exploration* capture sheet they need to take notes when they listen to their group members talk about what they discovered.
3	When ready, have students in each group present to one another. Optional: Use slides 22–25 as a guide during group share-out to ensure that all topics are covered. These slides outline the requirements for the poster project that students will begin working on next
4	With a quick *stand and share* discussion protocol, facilitate a class debrief around the prompt: • Based on what you learned about the genetic disease you just researched, what stands out to you? • How do you think the other genetic diseases are similar and different?
5	When participants have an answer or comment, they stand. When all have stood, the facilitator asks each for his or her input. Once a student has given input, that student can sit down.
6	Tell students they are going to learn about the other genetic diseases to better understand the similarities and differences. To do this, they will make a poster to present to other groups.

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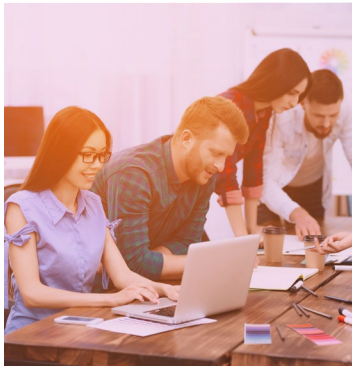
Day 3

Slides 29

COMPUTATIONAL THINKING PRACTICES

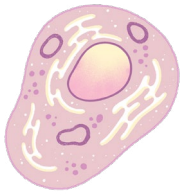
As students synthesize the data they collected into a poster, they are employing the computational thinking strategies of abstraction and analyzing data.



Slide 29	
Students begin to develop their posters. (20 minutes)	
1	Have the groups begin to make their posters.
2	Inform them that their posters need to include the four areas of research they did on their genetic disease: Who, What, How, and Statistics. Let students know they decide how to organize their poster to include that information. Remind them to focus on content before decoration.
3	Remind students they are to add their researched information and images to the poster in order to help the other groups analyze data about their specific disease. The posters will be viewed during the *Gallery Walk* on Day 5. Groups will need to think carefully about what information to include on the limited space of the poster and how to convey their information clearly.

Day 4

Slides 30–35



Slides 30–35	
Move students through a *Jigsaw* Presentation protocol where they begin to learn about the other genetic diseases. (45 minutes)	
1	Give groups 10 minutes to finalize their posters.
2	When ready, pair up groups to present their findings about their poster.
3	Show students how to take notes in the *Inherited Disease Presentations* capture sheet while listening to a presentation.
4	As an Exit Ticket, have students respond to the following prompt with a *Snowball Fight*: "What is one similarity and one difference between the genetic disease you researched and the others you learned about?"

Day 5

Slides 36–41

Slides 37–38

Students compare and contrast genetic diseases through a *Gallery Walk* style presentation. (25 minutes)

1	Have students hang their posters around the room for a *Gallery Walk* presentation of their work.
2	Tell them they need to visit five posters total, one for each of the five genetic diseases.
3	While they study the posters, have them record their observations about each disease in the *Inherited Disease Presentations* capture sheet.

Slides 39–41

When students finish the *Gallery Walk*, facilitate a class debrief. (20 minutes)

1	Using the following prompts to facilitate a class debrief, have students first discuss in their groups, and then have groups share aloud one item from their group discussion: Take a look at our N2K questions. Which questions can we answer now based on the work we've done so far. What new Questions do you have that we need to add to our N2K questions? Other questions to consider or discuss: • Based on what you learned about the genetic disease you just researched, what personal characteristics do you think a genetic counselors will need to possess to do their work? • How are the diseases similar to each other? • How are the diseases different from one another? • How do the people the disease impacts differ among the diseases we have explored?
2	At the end of the class debrief, give students the following Exit Ticket prompt and have them write out their response: "In the next phase of our project, you will need to explain a patient's probability of having or transmitting an inherited disease. What do you think you will need to learn about first, in order to do that work?"
3	Save the Exit Ticket responses to use for Lesson 2.

COMPUTATIONAL THINKING PRACTICES

Here, students are using the computational thinking strategies of collecting and analyzing data in order to assess the information they have and identify the information they still need.

National Standards

Next Generation Science Standards

Science and Engineering Practices (SEP)

Practice 6
Constructing Explanations and Designing Solutions

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

Disciplinary Core Ideas (DCI)

ETS1.A
Defining and Delimiting Engineering Problems

Criteria and constraints also include satisfying any requirements set by society, such as taking issues of risk mitigation into account, and they should be quantified to the extent possible and stated in such a way that one can tell if a given design meets them.

Crosscutting Concepts (CC)

Connections to Engineering, Technology, and Applications of Science

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.

Educator Resources

Anchor Phenomena Images

Educator Resources

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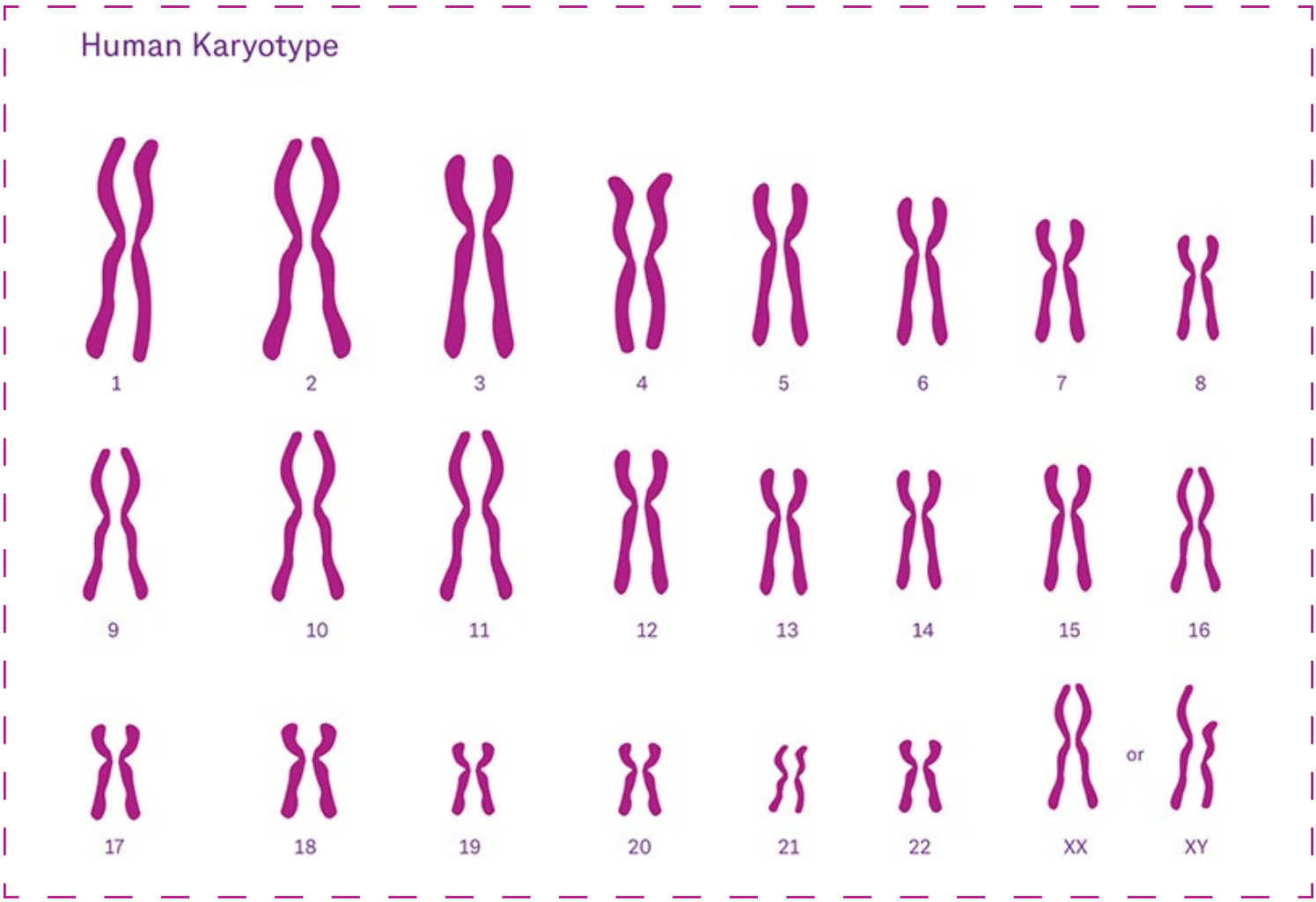
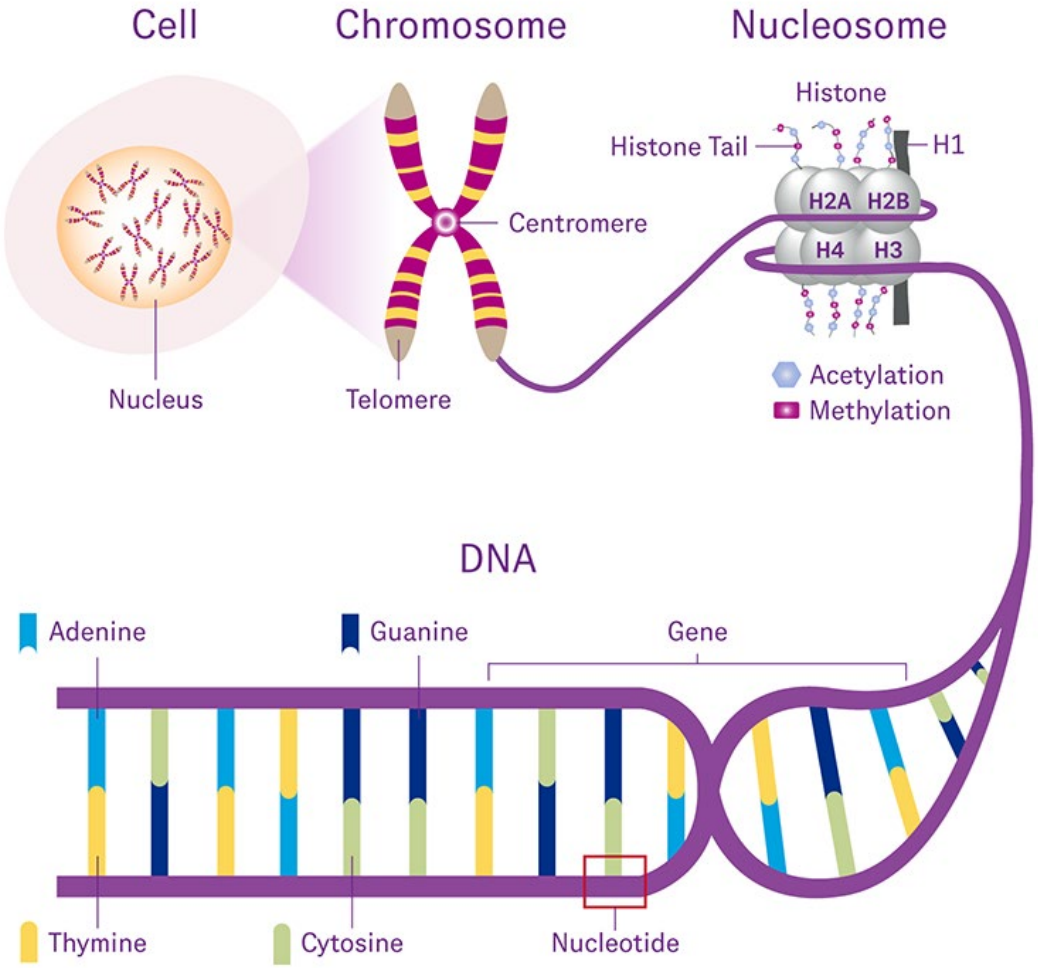


Educator Resources

Anchor Phenomena Images



Educator Resources

Anchor Phenomena Images

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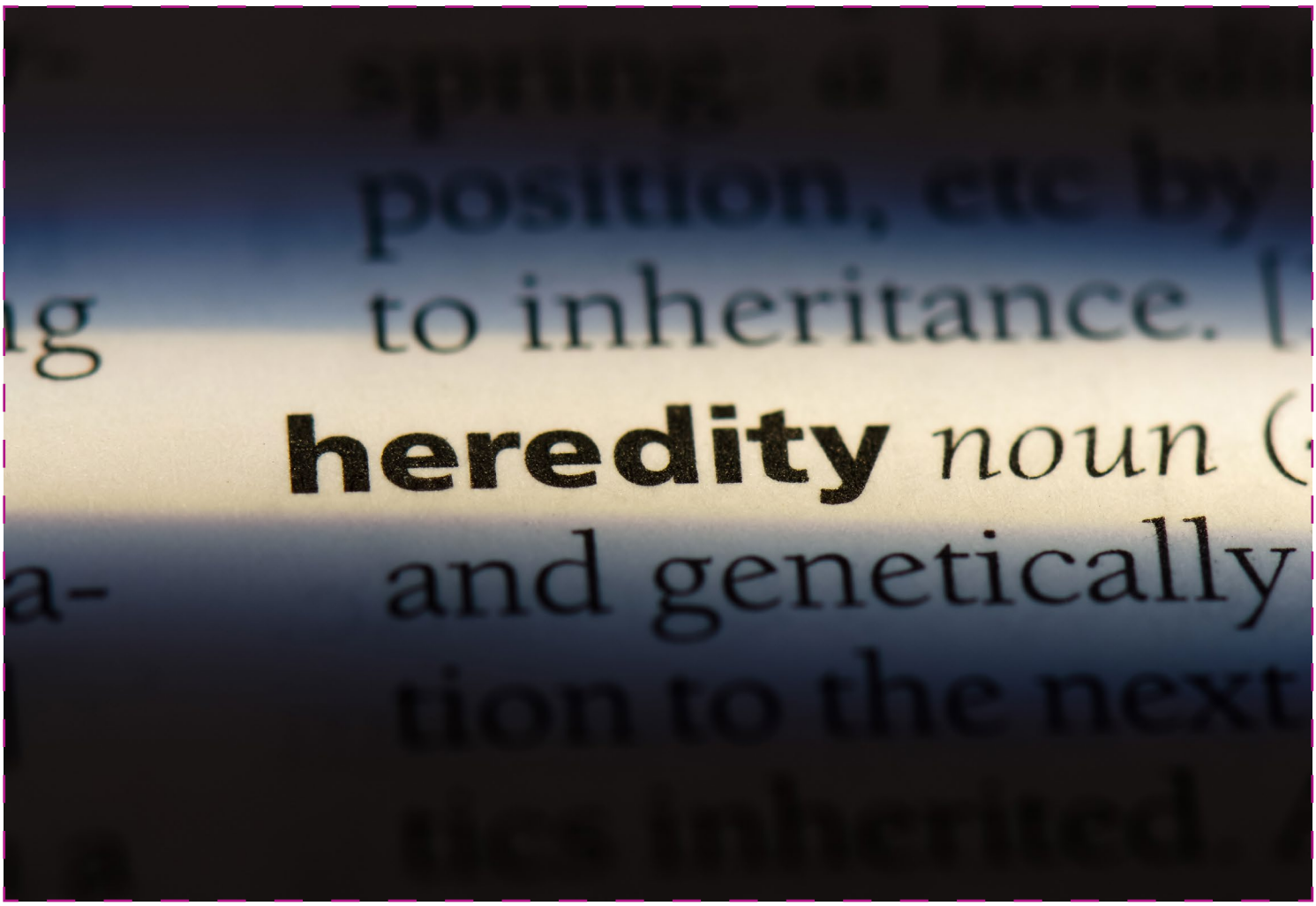
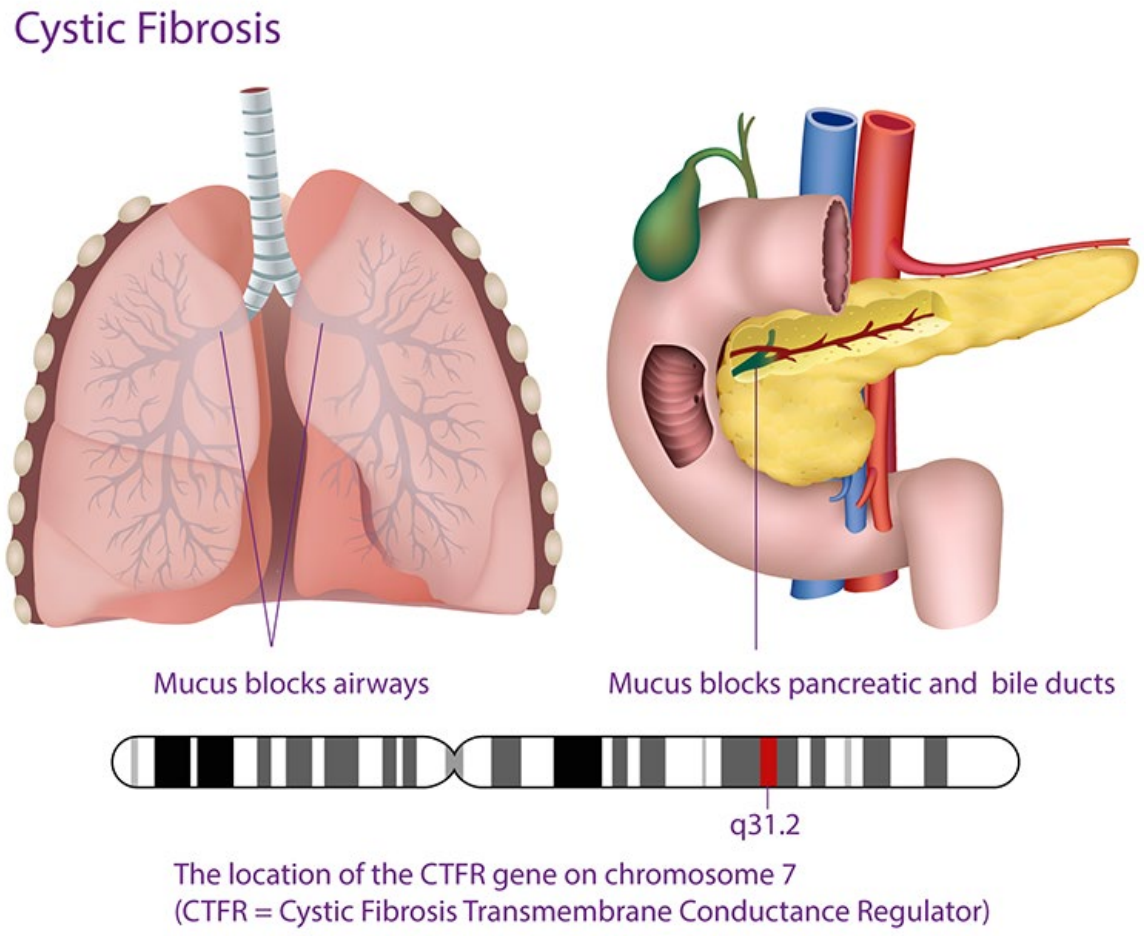


Station 1: Cystic Fibrosis

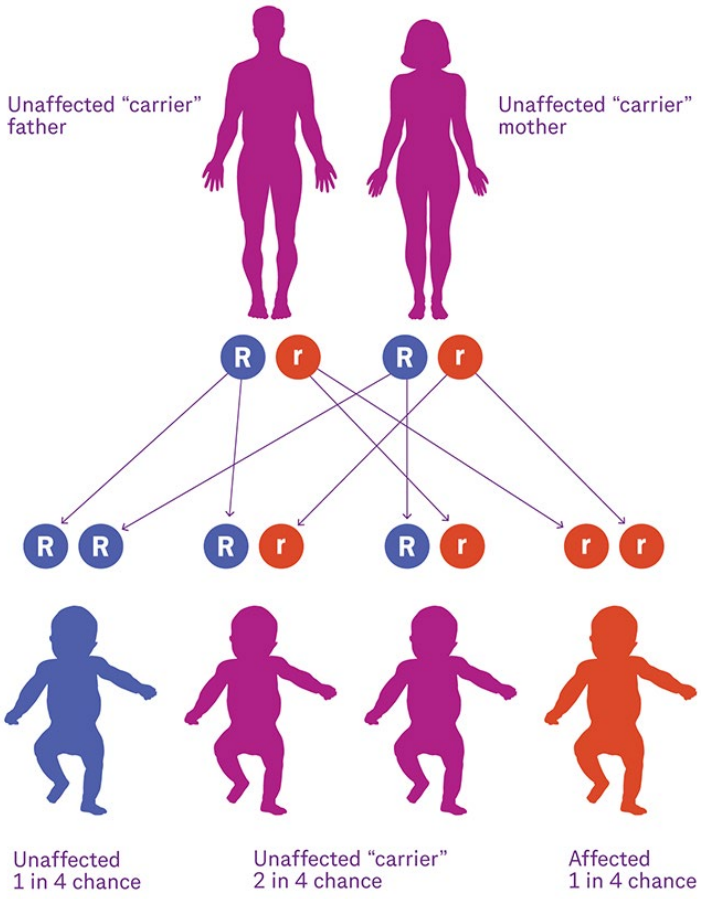
Inherited Disease Mini-Stations



The location of the CTFR gene on chromosome 7
(CTFR = Cystic Fibrosis Transmembrane Conductance Regulator)

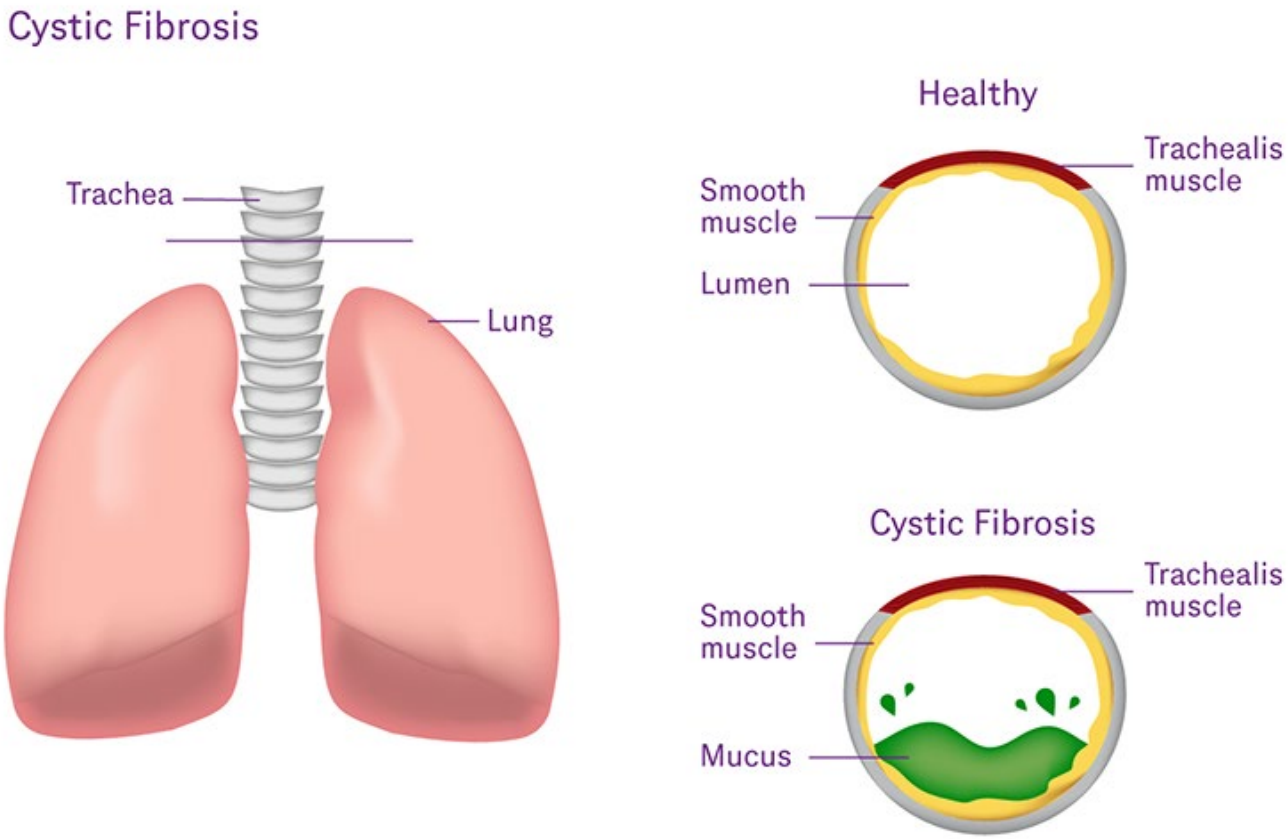
Station 1: Cystic Fibrosis

Inherited Disease Mini-Stations



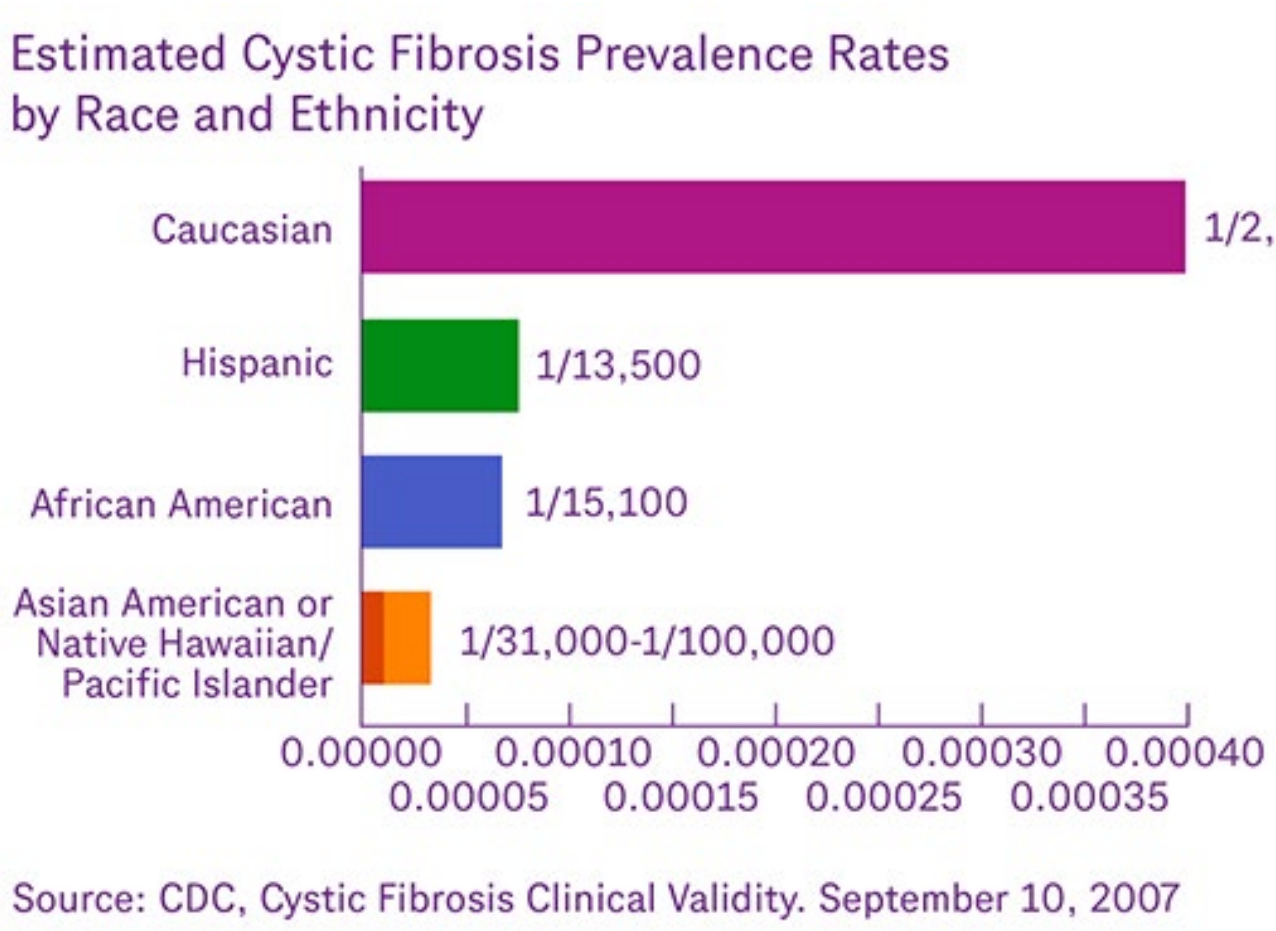
Station 1: Cystic Fibrosis

Inherited Disease Mini-Stations



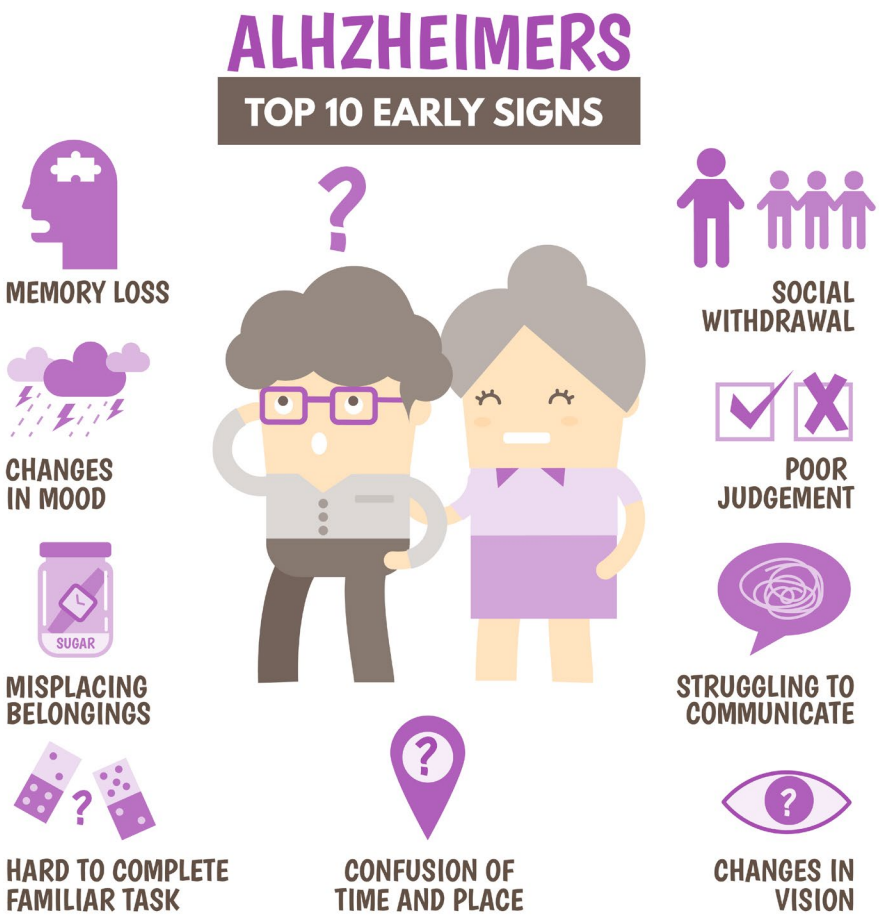
Station 1: Cystic Fibrosis

Inherited Disease Mini-Stations



Station 2: Alzheimer's Disease

Inherited Disease Mini-Stations



Station 2: Alzheimer's Disease

Inherited Disease Mini-Stations

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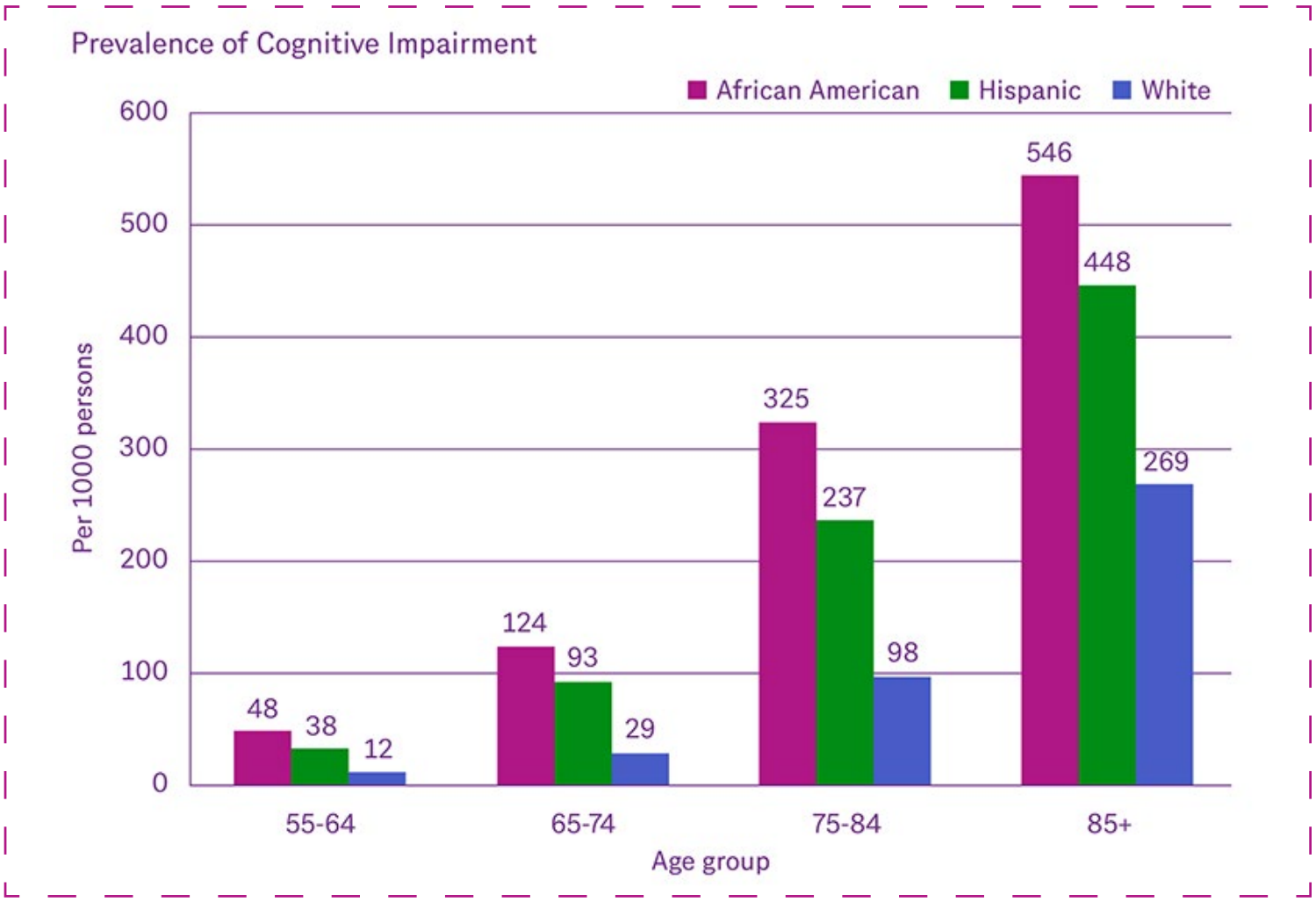
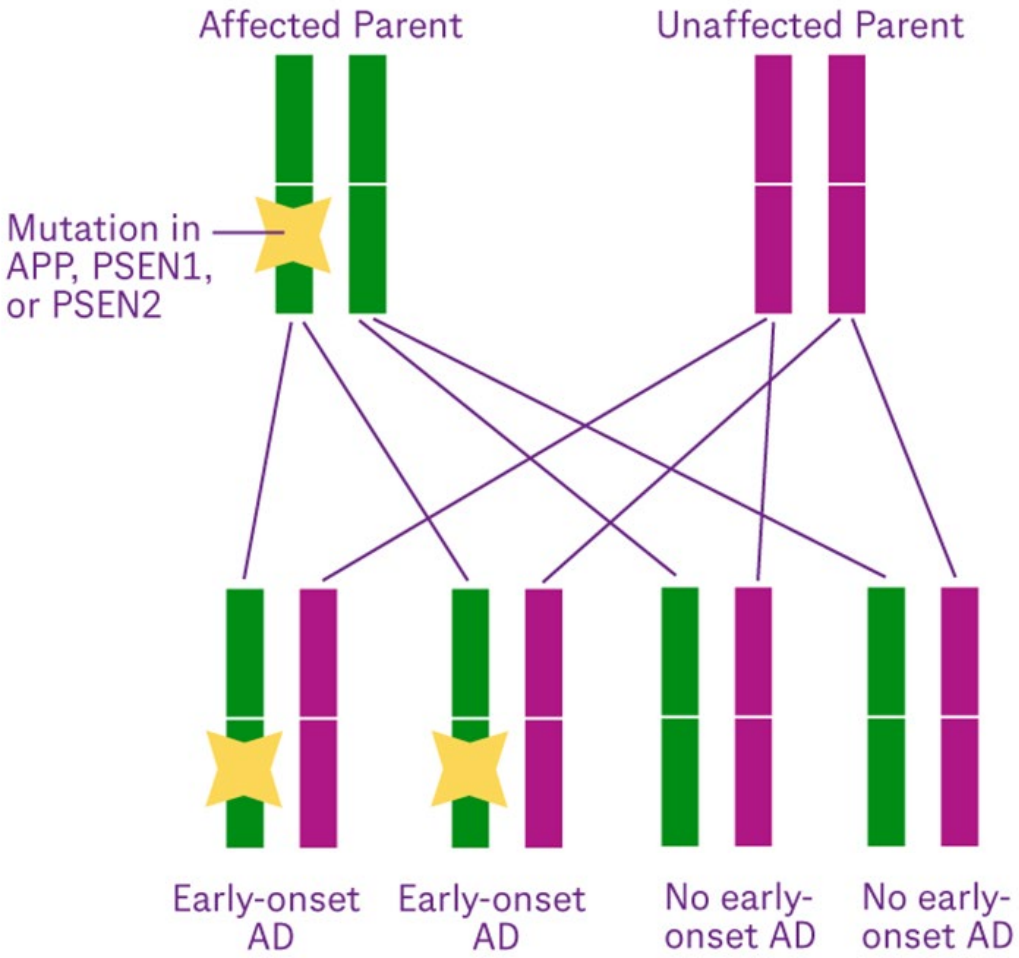
Inherited Disease Mini-Stations



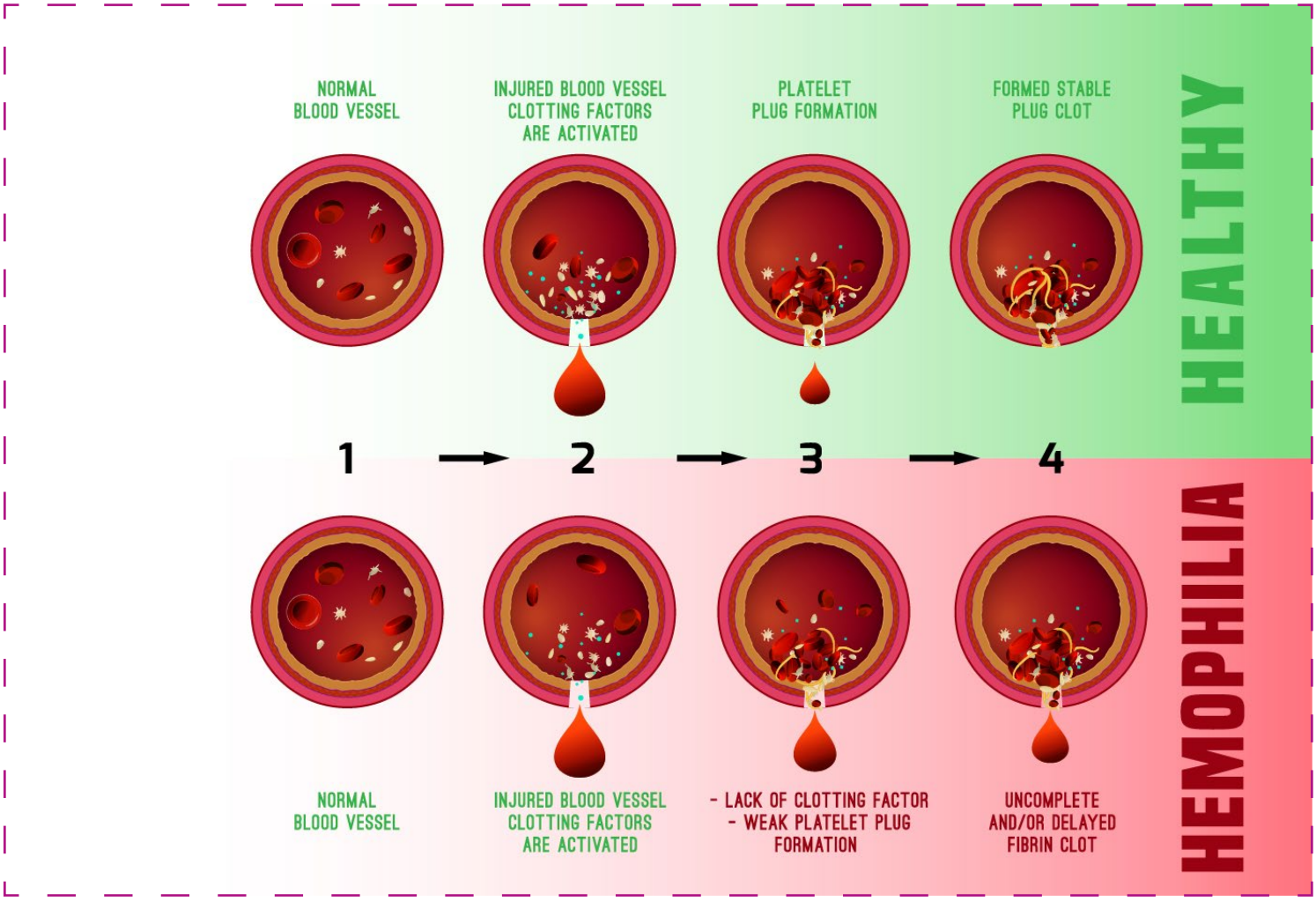
Station 2: Alzheimer's Disease

Inherited Disease Mini-Stations



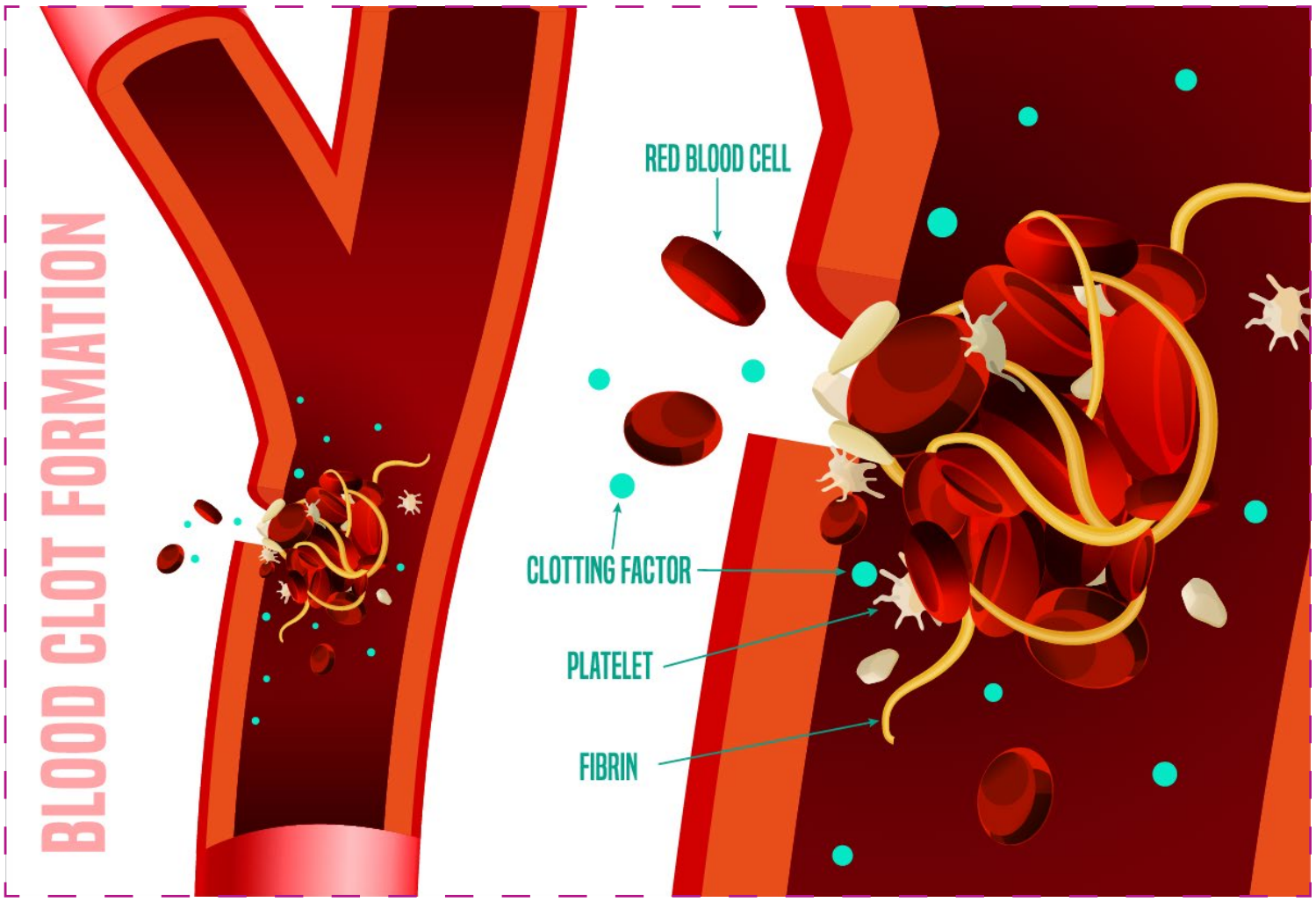
Station 3: Hemophilia

Inherited Disease Mini-Stations



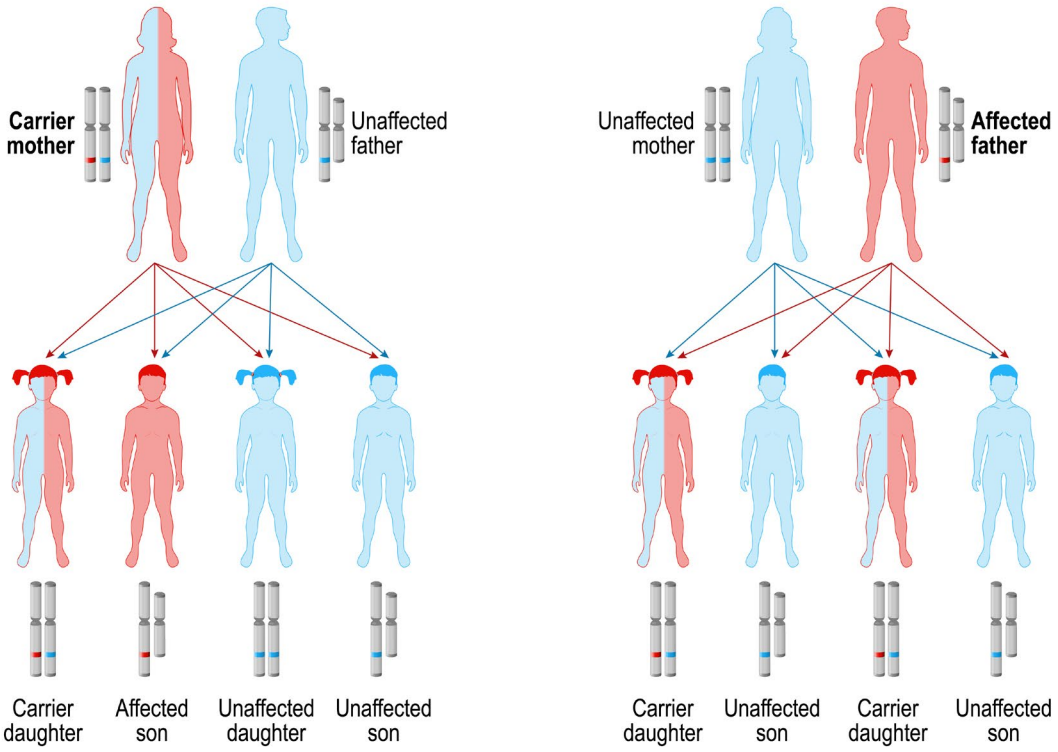
Station 3: Hemophilia

Inherited Disease Mini-Stations



Station 3: Hemophilia

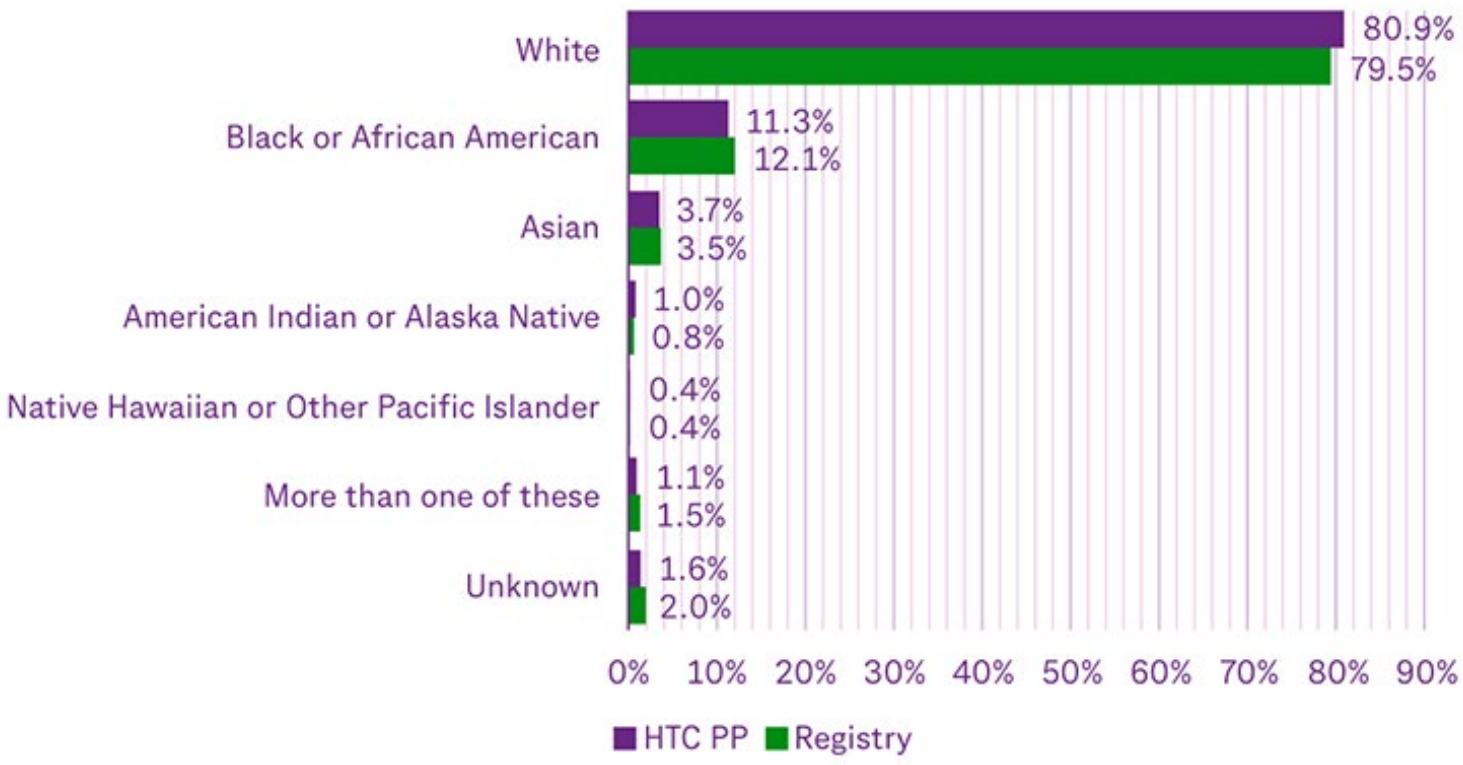
Inherited Disease Mini-Stations



Station 3: Hemophilia

Inherited Disease Mini-Stations

Racial distribution of male Registry and HTC PP participants



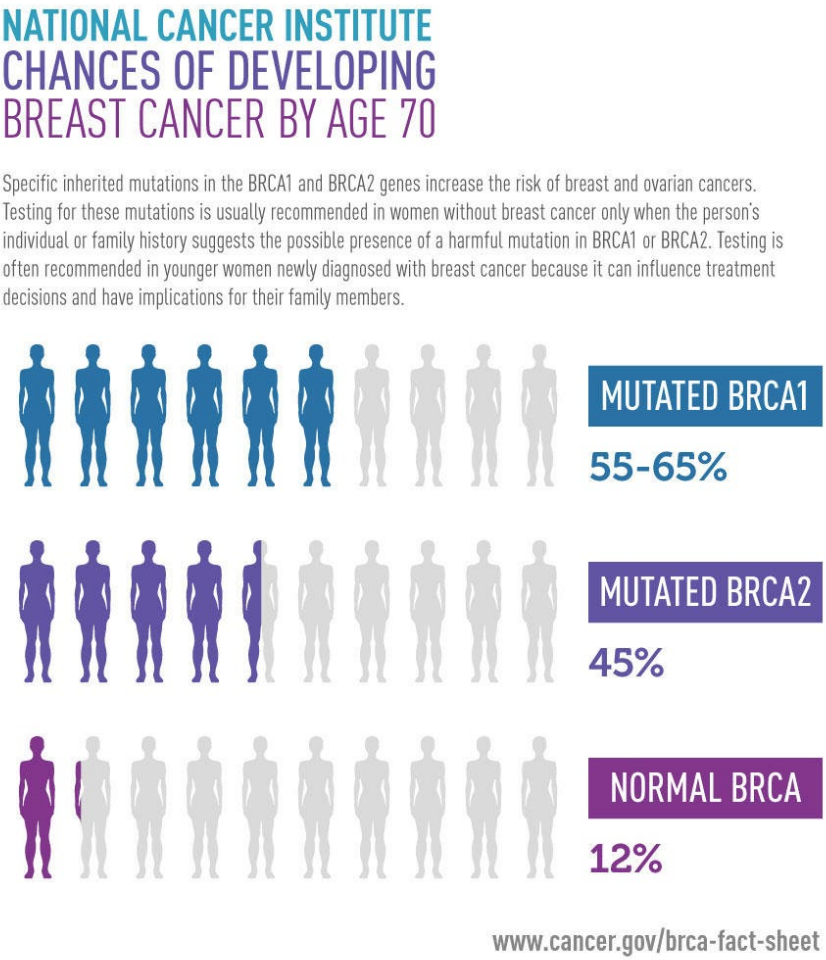
Source: National Center on Birth Defects and Developmental Disabilities,Centers for Disease Control and Prevention

Station 4: Hereditary Breast and Ovarian Cancer Syndrome

Inherited Disease Mini-Stations

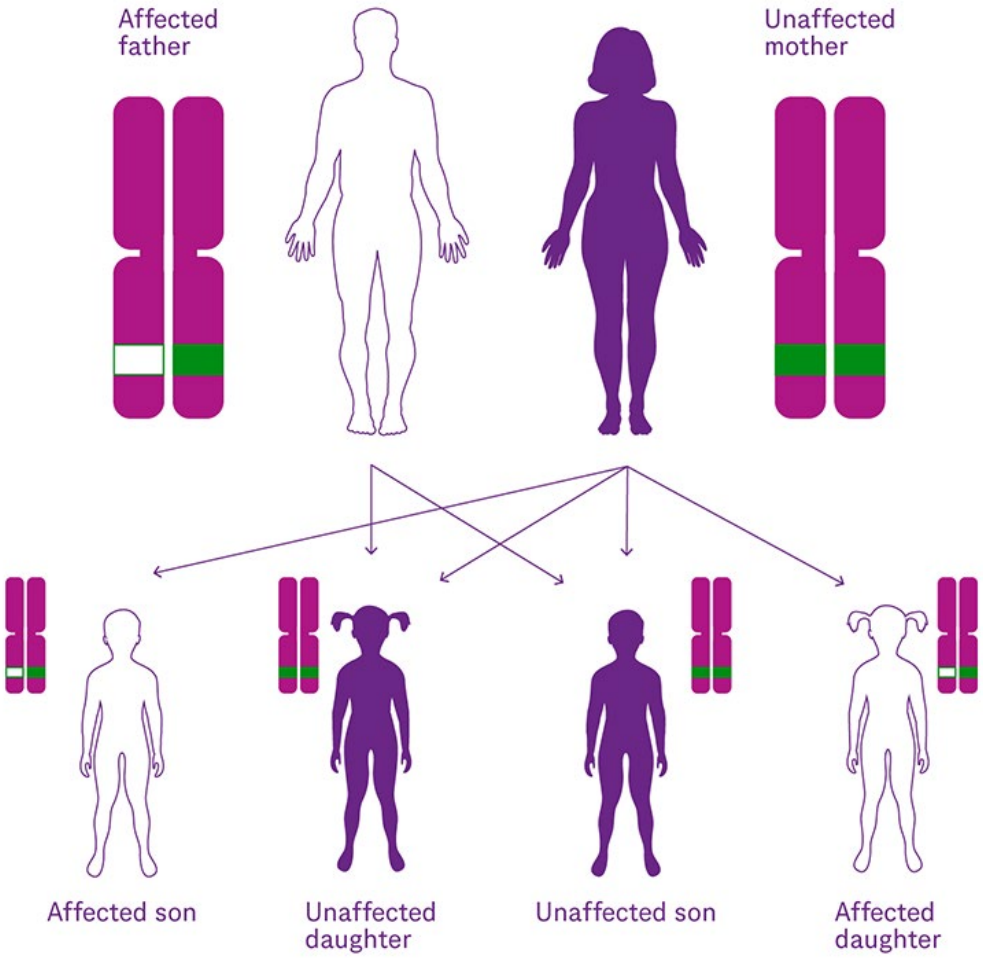
Station 4: Hereditary Breast and Ovarian Cancer Syndrome

Inherited Disease Mini-Stations



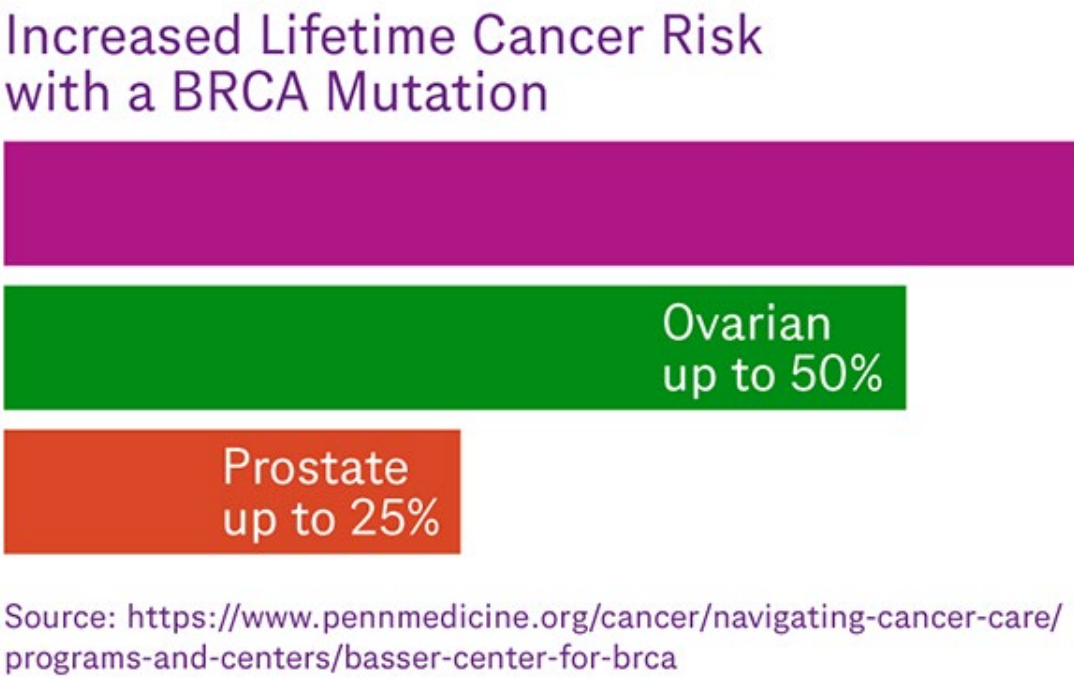
Station 4: Hereditary Breast and Ovarian Cancer Syndrome

Inherited Disease Mini-Stations



Station 4: Hereditary Breast and Ovarian Cancer Syndrome

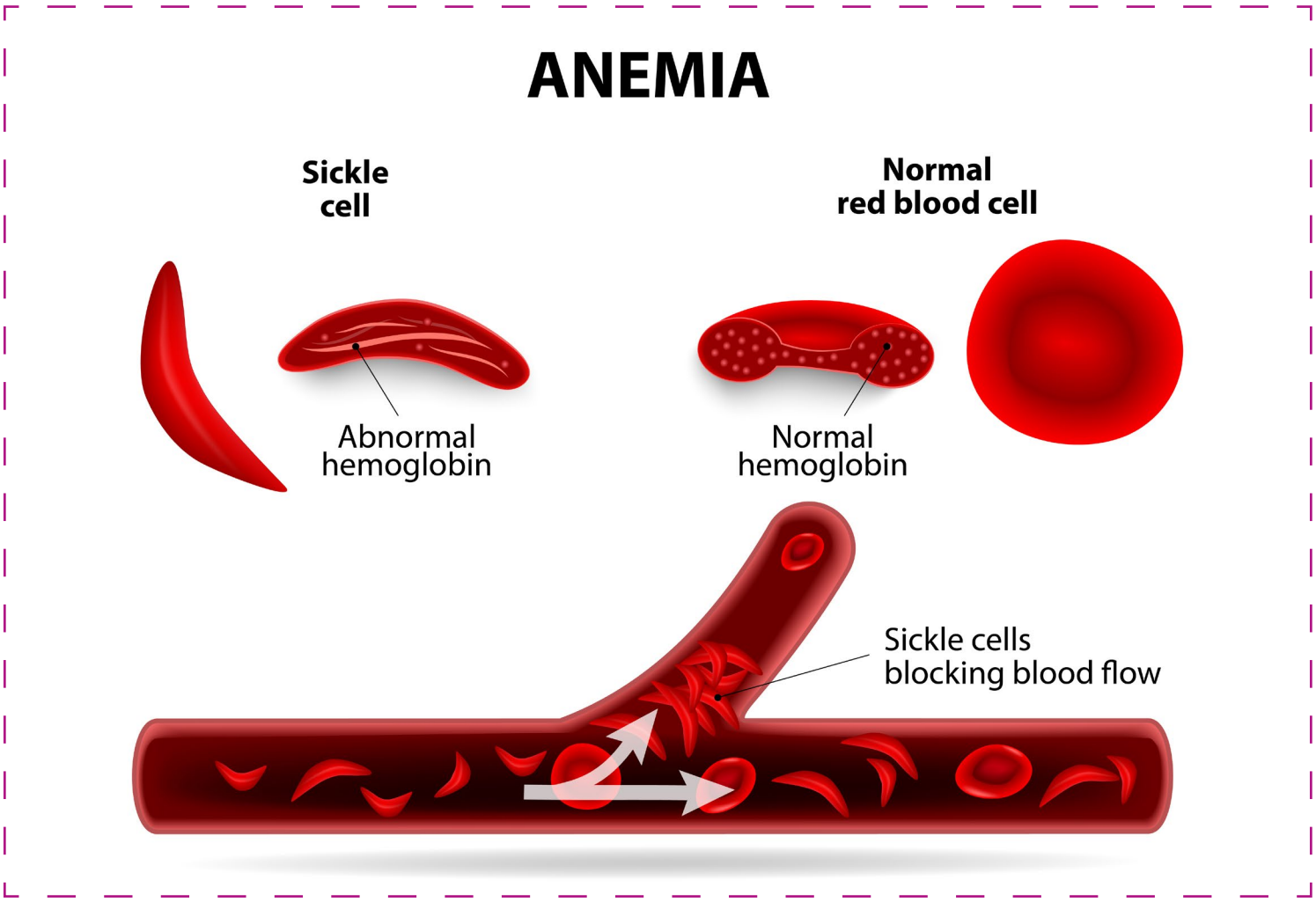
Inherited Disease Mini-Stations



Source: https://www.pennmedicine.org/cancer/navigating-cancer-care/programs-and-centers/basser-center-for-brca

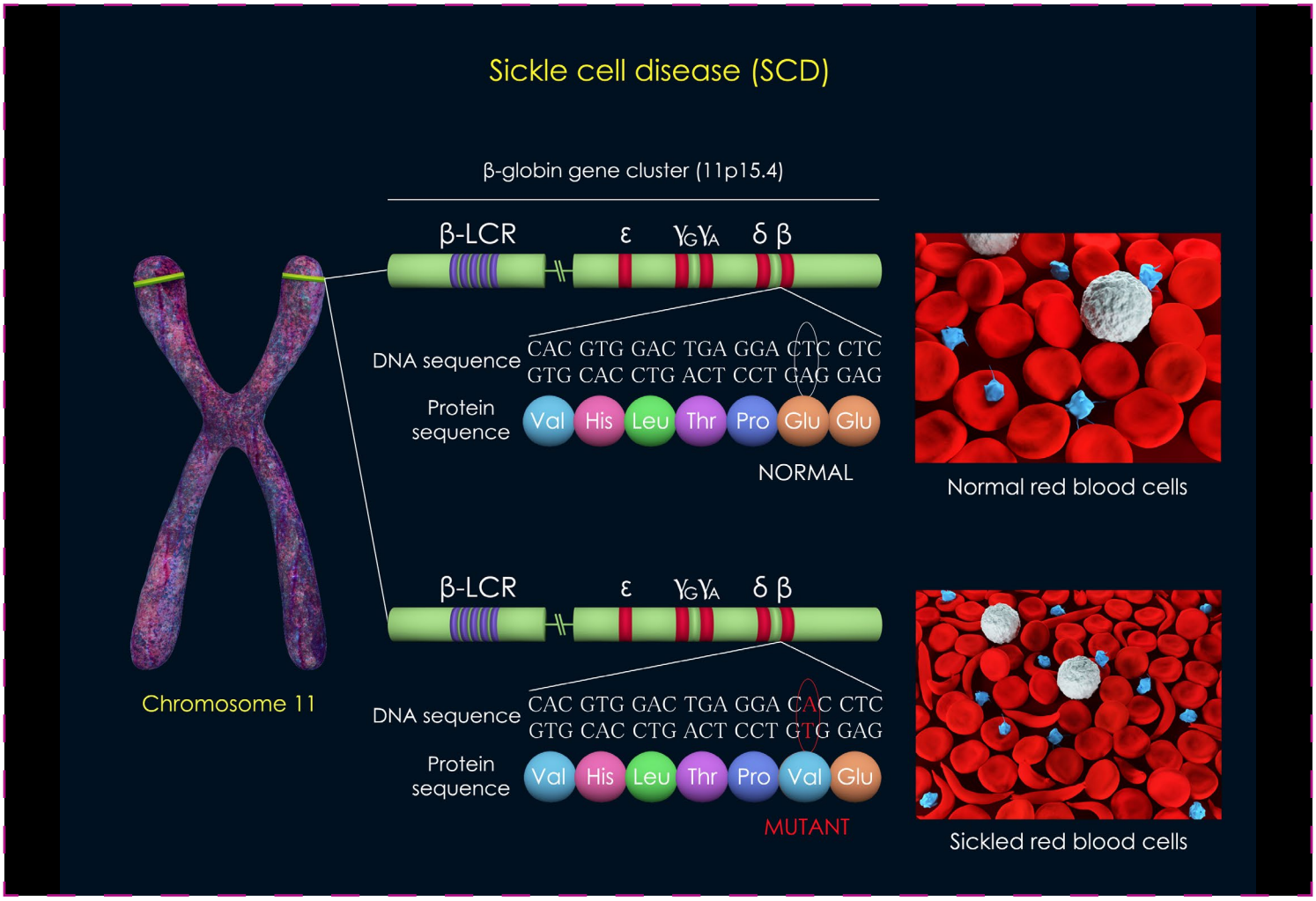
Station 5: Sickle Cell Anemia

Inherited Disease Mini-Stations



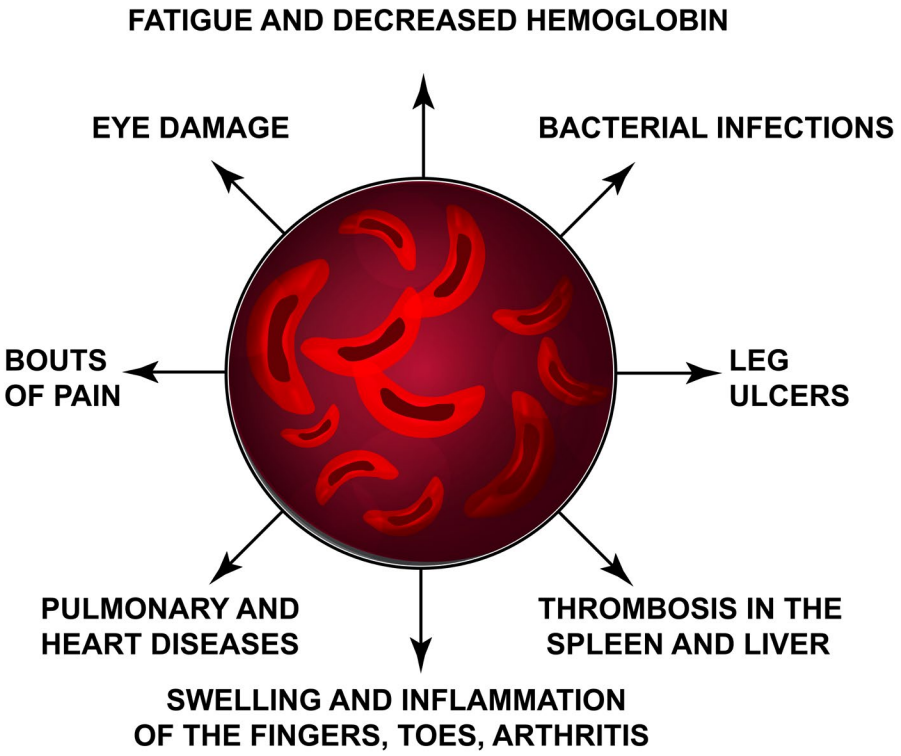
Station 5: Sickle Cell Anemia

Inherited Disease Mini-Stations



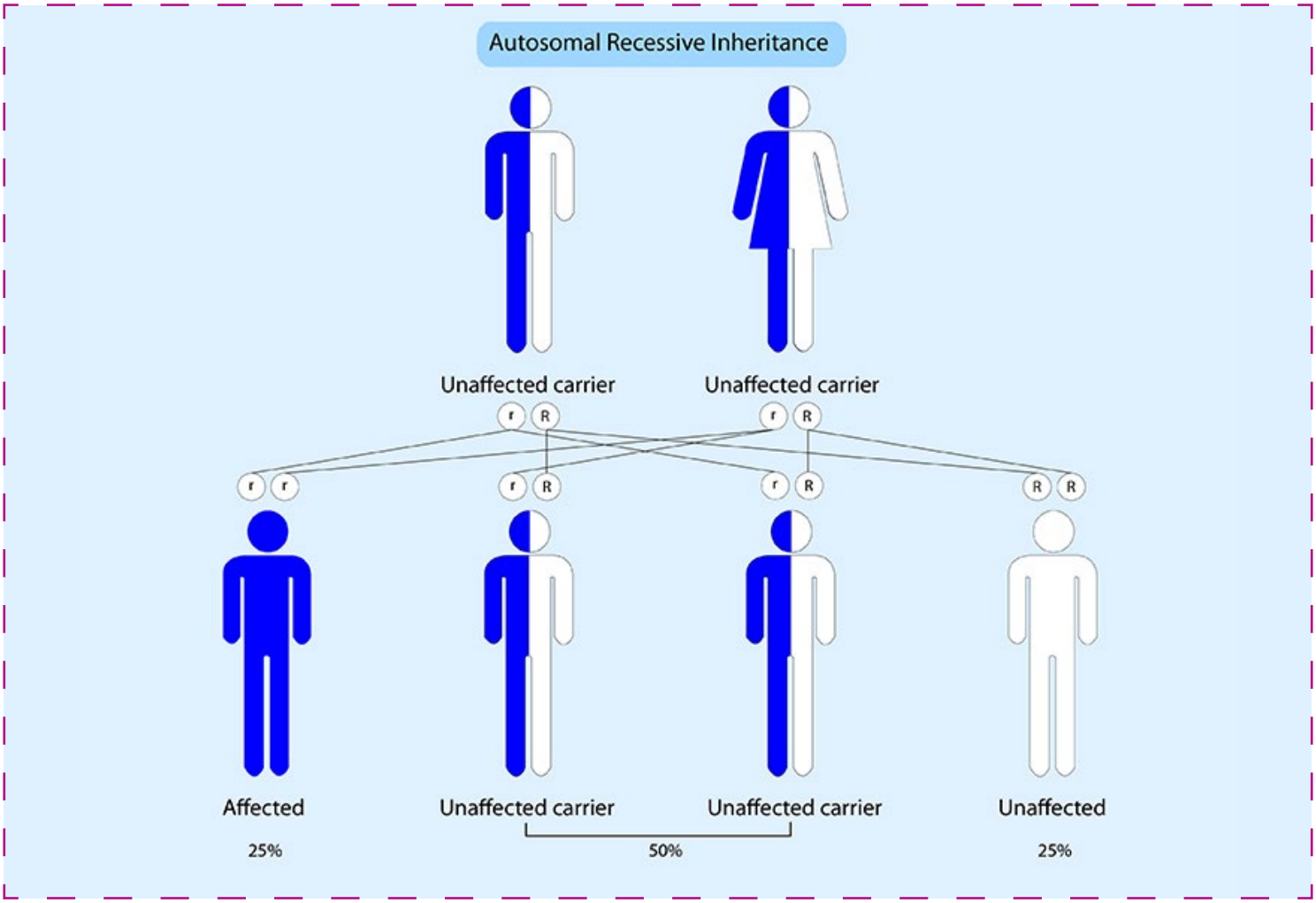
Station 5: Sickle Cell Anemia

Inherited Disease Mini-Stations



Station 5: Sickle Cell Anemia

Inherited Disease Mini-Stations



Station 5: Sickle Cell Anemia

Inherited Disease Mini-Stations

TABLE 3. Incidence of sickle cell trait (SCT), by race — 13 U.S. states, 2010

State	Asian, Native Hawaiian, or Other Pacific Islander			Black or African American			White		
	No. of infants screened	No. of infants with a positive SCT screen result	Incidence per 1,000 infants screened	No. of infants screened	No. of infants with a positive SCT screen result	Incidence per 1,000 infants screened	No. of infants screened	No. of infants with a positive SCT screen result	Incidence per 1,000 infants screened
Alabama	567	0	0.0	17,616	1,728	98.1	34,670	145	4.2
California	52,018	54	1.0	30,575	2,103	58.8	384,092	1,551	4.0
Kansas	1,206	2	1.7	3,026	221	73.0	33,979	105	3.1
Louisiana	0	—	—	24,307	1,204	49.5	35,632	124	3.5
Michigan	2,384	74	31.0	20,315	2,048	100.8	71,295	263	3.7
Minnesota	4,167	15	3.6	5,356	331	61.8	48,484	71	1.5
Mississippi	274	3	10.9	17,675	1,255	71.0	19,500	64	3.3
Missouri	940	2	2.1	11,059	805	72.8	56,254	79	1.4
Montana	138	0	0.0	74	3	40.5	10,331	5	0.5
New Hampshire	421	1	2.4	182	8	44.0	11,623	27	2.3
Ohio	2,565	10	3.9	21,401	1,541	72.0	100,116	226	2.3
Washington	8,433	2	0.2	4,221	175	41.5	67,391	56	0.8
West Virginia	137	1	7.3	925	39	42.2	26,319	13	0.5
Total (13 states)	**73,250**	**164**	**2.2**	**156,732**	**11,461**	**73.1**	**899,686**	**2,729**	**3.0**

Video QR Codes

Inherited Disease Mini-Stations

Molly's Story (Cystic Fibrosis)

The Bradys' Story (Hemophilia)

Anne's Story (Sickle Cell)

Don's Story (Alzheimer's Disease)

Jackie's Story (Hereditary Breast and Ovarian Cancer Syndrome)

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Inherited Disease Mini-Station Observations

Directions
Visit each station and review all materials. Write down what you see, what it makes you think, and any questions you have.

	See What do you see in the video and images?	**Think** What does it make you think?	**Wonder** What questions do you have?
Station 1: Cystic Fibrosis			
Station 2: Alzheimer's Disease			
Station 3: Hemophilia			

Continues next page >

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Inherited Disease Mini-Station Observations

Continued

	See What do you see in the video and images?	**Think** What does it make you think?	**Wonder** What questions do you have?
Station 4: Hereditary Breast and Ovarian Cancer Syndrome			
Station 5: Sickle Cell Anemia			

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Inherited Disease Mini-Station Reflection

Directions
Based on the information you saw at the different stations, answer the reflection questions below.

1. What did you already know about genetic diseases?

2. Who do you think are the different people impacted by genetic diseases?

3. What more do you want to know regarding genetic diseases?

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Inherited Disease Exploration

Directions
Select which part of the disease profile each group member will research: Who, What, How, and Statistics. Use the Inherited Diseases Online Resources to respond to the questions. Make note of where you found the information in the Sources column.

The genetic disease I'm learning more about is _____

		What you discovered	Sources Where did you find the information?
WHO is impacted by the disease?	What did you learn about the people who get the genetic disease?		
	What did you learn about the people who are indirectly affected by the genetic disease?		
WHAT are the effects of the disease?	What did you learn about the symptoms of the people who have the genetic disease?		

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Inherited Disease Exploration

Continued

		What you discovered	Sources Where did you find the information?
HOW you get the disease and get tested	What did you learn about how someone gets the genetic disease?		
	How does a genetic counselor test someone to see if they have the genetic disease?		
The Statistics of the disease	What are important statistics associated with the disease you found?		

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Inherited Disease Presentations, Part 1

Jigsaw

Directions

As you listen to the other groups present their genetic diseases, record your notes and thoughts about what you hear on the lines below.

Name of Disease

Notes

Name of Disease

Notes

Continues next page >

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Inherited Disease Presentations, Part 1

Jigsaw

Continued

Name of Disease

Notes

Name of Disease

Notes

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Inherited Disease Presentations, Part 2

Gallery Walk

Directions

As you walk around and view each poster during the Gallery Walk, record your observations about the similarities and differences among the diseases. If the poster is the same disease that you researched, look for information you did not know before. Use the sentence starters to help you record your thoughts.

Sentence Starters

This disease is similar to my genetic disease because...

This disease is different from my genetic disease because...

Something new I learned about my genetic disease is...

Cystic Fibrosis

Alzheimer's Disease

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Inherited Disease Presentations, Part 2

Gallery Walk

Continued

Hemophilia

Hereditary Breast and Ovarian Cancer Syndrome

Sickle Cell Anemia

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Project Information Sheet

Summary

You will take on the role of a genetic counselor tasked with preparing a genetic test report and a communication resource that you will use to present to clients who may carry genes for a heritable disease.

Driving Question

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

Major Products:

— Individual Genetic Test Report

— Partner Flipgrid presentations

— Resource with visuals

Key Deliverables and Deadlines

Lesson 1

- ☐ Inherited Disease Posters—Group
- ☐ Inherited Disease Research—Individual

Lesson 2

- ☐ Patient Pedigree Chart—Individual
- ☐ Begin to develop Patient Genetic Test Report—Individual

Lesson 3

- ☐ Continue Patient Genetic Test Report—Individual

Lesson 4

- ☐ Continue Patient Genetic Test Report—Individual

Lesson 5

- ☐ Partner Group Contracts—Partners
- ☐ Presentation Script Outlines—Partners
- ☐ Begin Flipgrid Videos and Visuals—Partners

Lesson 6

- ☐ Flipgrid Video and Visuals Due—Partners

Evaluation Criteria

- ☐ Unit 1 Rubric

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Unit 1: Inherited Diseases Project Rubric

Directions
Use the center columns to evaluate whether the product meets the standard or is still developing. Provide specific suggestions for improvement in the left column. Note elements that exhibit deeper understanding in the right column.

Emerging How can this product be improved?	**Developing** This product includes some, but not all required elements	**Proficient** This product meets all performance expectations	**Advanced** How does this product exceed expectations?
	I can make a claim that inheritable genetic variations may result from: (1) new genetic combinations through meiosis, (2) viable errors occurring during replication, and/or (3) mutations caused by environmental factors.	I can make and defend a claim based on evidence that inheritable genetic variations may result from: (1) new genetic combinations through meiosis, (2) viable errors occurring during replication, and/or (3) mutations caused by environmental factors. **NGSS-HS-LS3-2**	
	I can apply concepts of statistics and probability to organize data on the variation and distribution of expressed traits in a population.	I can apply concepts of statistics and probability to explain the variation and distribution of expressed traits in a population. **NGSS-HS-LS3-3**	
	I can translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) or translate information expressed visually or mathematically (e.g., in an equation) into words.	I can translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words. **Reading in Science and Technical Subjects**	

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Unit 1: Inherited Diseases Project Rubric

Continued

Emerging How can this product be improved?	**Developing** This product includes some, but not all required elements	**Proficient** This product meets all performance expectations	**Advanced** How does this product exceed expectations?
	I can analyze how genetics, family history, or the relationship between access to health care and health status can impact personal health.	I can analyze how genetics, family history, and the relationship between access to health care and health status can impact personal health. I can propose ways to reduce or prevent health problems based on these factors. **Health Literacy** **NHES Standard 1**	
	I can somewhat adapt health messages and communication techniques to a specific target audience.	I can adapt health messages and communication techniques to a specific target audience. **Health Literacy** **NHES Standard 8**	
	I can develop ideas for a purpose and task, to communicate appropriate findings, arguments and supporting evidence. My audience can follow the line of reasoning.	I can clearly develop ideas appropriate to the purpose and task, to communicate appropriate findings, arguments and supporting evidence clearly, concisely and logically. My audience can easily follow the line of reasoning. **Presentation—Explanation of Ideas and Information**	