UNIT 3

THE SCIENCE OF WHO WE ARE

Sample Material © Pearson 2023

THINK ABOUT THIS

Look at the picture and read the title of the unit. How much do you know about the following topics? Rank your answers.

1 = I know a lot 2 = I know some things 3 = I know a little 4 = I don't know anything

____ 1. DNA

____ 2. the discoveries of Gregor Mendel

____ 3. genetic engineering and gene therapy

____ 4. genetic testing

____ 5. genetic diseases

CHAPTER 7

The Science of Genetics

Gregor Mendel

LEARNING OUTCOME

› Learn basic information about the science of genetics

GETTING READY TO READ

Complete the chart with the names of family members who are similar to you in appearance or personality. Then share your answers in a small group.

HOW I AM SIMILAR TO PEOPLE IN MY FAMILY	
Characteristic	**Family member's name and relationship to me**
Face (for example, eyes, nose, mouth, shape)	
Body size and shape (for example, height and weight)	
Character (for example, shy, funny)	
Other?	

Sample Material © Pearson 2023

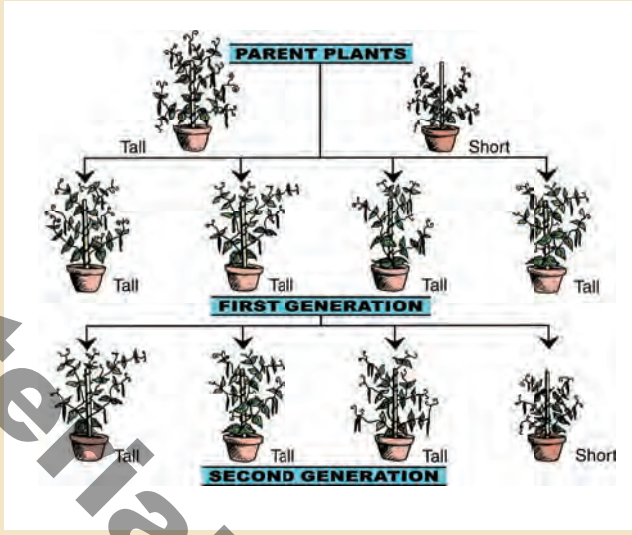
READING

Read to Find Out: What is the scientific explanation of how we inherit characteristics from our parents?

Read the definitions beside the reading. Then read "The Science of Genetics." If you see a new word, circle it, but don't stop reading. You can learn the new word later.

The Science of Genetics

1 Who are we? Where did we come from? How are we related to each other and to other living things? The written record of the search for the answers to these questions goes back at least 2,500 years. At that time, Pythagoras, the famous Greek mathematician,[1] believed that children got all of their physical **traits** from their fathers. Later, Aristotle, the Greek philosopher,[2] **realized** that children **inherit** characteristics from both of their parents. However, he incorrectly believed that a child was the direct product of the mixing of the mother's and father's blood.



Gregor Mendel's pea plant experiment

2 Modern genetics (the science that helps us to understand how and why we get traits from our parents) was not born until the nineteenth century. The father of modern genetics was Gregor Mendel, an Austrian scientist. Through eight years of experiments on pea[3] plants, Mendel proved that characteristics from the "mother" plant and characteristics from the "father" plant are not mixed together when the two plants cross-pollinate[4] and produce the next **generation** of plants. Rather, the characteristics that are dominant (stronger) will **come out** in the first generation. The characteristics that are recessive (weaker) will only appear in the second generation.

3 For example, if you take a very short pea plant and cross-pollinate it with a very tall pea plant, you might expect the new pea plant to be of average height. But in fact, the first generation of plants will all be very tall, because that characteristic is dominant. Short plants will not appear until the second generation, because that characteristic is recessive.

4 The theories that Mendel developed using plants were later applied to all living things, including human beings. Future research that would explain how parents pass traits on[5] to their children through their **genes** grew out of Mendel's work.

[1] *a mathematician* = someone who studies or teaches mathematics

[2] *a philosopher* = someone who teaches about life and what it means, and how we should live

[3] *a pea* = a small round green seed that is cooked and eaten as a vegetable

[4] *cross-pollinate* = transfer pollen (a powder produced by plants) from one plant to another

[5] *pass traits on* = give someone or something a particular trait

Sample Material © Pearson 2023

5 What is a gene? Explained very simply, a gene is a set of **instructions** that you get from your parents before you are born. Your genes are similar to an instruction book for a computer. When you open the book, you see a list of all of the parts of the computer. Then, you see instructions telling you how to make the computer work. Your genes, like the instruction book, contain a complete list of all of the parts that make a human being. They also contain instructions on how to put the parts together to make one special **individual**—you.

6 Today, scientists are learning more and more about genes and their effect on what we look like, how we behave, and what kinds of sicknesses we have or are likely to get in the future. They are using this information in two areas: *genetic engineering* and *genetic testing*.

7 Through genetic engineering, scientists change how genes work. They sometimes **replace** one gene in a **cell** with another gene that works better in some way. Because all living things (not only humans) have genes, scientists use genetic engineering to produce plants and animals that are healthy, grow rapidly, or are useful to us in some other way. Gene therapy is a type of genetic engineering that is sometimes used in humans who have very serious health problems. It involves using genes to try to **cure** an **illness** in someone who is already sick, or to **prevent** someone with the genes for a genetic **disease** from getting sick. At this time, gene therapy is experimental. It is only used on patients who have diseases that cannot be treated or cured in any other way.

8 When doctors do genetic testing, they take DNA[6] from a person (or other living thing) and examine it carefully. One important use of genetic testing in humans is to discover if someone has or might get a genetic illness. Then the doctors might put him or her in a scientific study and use gene therapy to treat or prevent the disease. Genetic testing can also be used to **determine** the **gender** of a fetus,[7] although doctors often use other, simpler techniques to get this information.

9 If experimental gene therapy is successful, some day genetic testing and engineering might be used to allow parents to choose **desirable** traits or **get rid of** undesirable ones before their child is even born.

[6] *DNA* = deoxyribonucleic acid, an acid that carries genetic information in a cell

[7] *fetus* = a young human or animal before birth

Quick Comprehension Check

A. Read these sentences **about the reading**. Circle T (true), F (false), or ? (can't determine the answer from the reading). If you circle T or F, write the number of the paragraph with the answer on the line.

1. Around 2,500 years ago, most people already knew that we get characteristics from both our mother and father. T F ? _____
2. The study of how and why certain characteristics are passed from one generation to the next is called genetics. T F ? _____
3. People look different from one another because they have different genes. T F ? _____
4. Genes do not have an effect on behavior. T F ? _____

Reading Tip: The way that you read depends on your purpose. When you are reading for a class, highlight new information or anything that is difficult to remember. That will make it easier to find when you need to review it.

Sample Material © Pearson 2023

5. Genetic engineering is used on plants and animals. T F ? ____
6. In some cases, doctors use genetic engineering to find out if someone is sick. T F ? ____
7. Today, parents can use genetic engineering to change a child's sex before the child is born. T F ? ____
8. Some people do not think that genetic engineering should be used on humans. T F ? ____

B. Work with your class. Share your answers from part A. Go back to the reading to find the reason why a sentence is true or false. Correct the false sentences.

EXPLORING VOCABULARY

Thinking about the Target Vocabulary

Guessing Strategy: In-text Definitions

When writers use technical terms or introduce people important in a particular field, you might not need to guess the term's meaning or find out who the person is. Often, the terms are defined in the text itself, and the people are identified by the information that follows their names. The definitions and information are either in parentheses or between commas directly after the terms or names. Look at the examples.

*Rather, the characteristics that are **dominant** (**stronger**) will come out in the first generation. The characteristics that are **recessive** (**weaker**) will only appear in the second generation.*

*At that time, **Pythagoras, the famous Greek mathematician**, believed that children got all of their physical traits from their fathers.*

Pay attention to words or phrases in parentheses and between commas. They often contain definitions or important information.

A. Read the sentences and answer the questions. Use the in-text definitions to help you.

1. Later Aristotle, the Greek philosopher, realized that children inherit characteristics from both of their parents.

   Who was **Aristotle**? _____

2. Modern genetics, the science that helps us to understand how and why we get traits from our parents, was not born until the nineteenth century.

   What is **modern genetics**? _____

   _____

3. Many scientists are doing research in gene therapy (using the genes of a human cell to treat serious disease).

   What is **gene therapy**? _____

   _____

Sample Material © Pearson 2023

B. Look at the target words. Which ones are new to you? Circle them here and in the reading. The numbers in parentheses help you find the words in the paragraphs.

Target Words

traits (1)	genes (4)	cure (7)	gender (8)
realized (1)	instructions (5)	illness (7)	desirable (9)
inherit (1)	individual (5)	prevent (7)	get rid of (9)
generation (2)	replace (7)	disease (7)	
come out (2)	cell (7)	determine (8)	

C. Read "The Science of Genetics" again. Look at the context of the new words. Can you guess their meanings?

D. Complete the word form chart. Fill in the shaded areas of the chart with the target words from the reading. Write the base form of the verbs and the singular form of the nouns.

NOUNS	VERBS	ADJECTIVES
trait		

Understanding the Target Vocabulary

A. These sentences are **about the reading**. Complete them with the words in the box. Circle the words in the sentences that help you understand the meanings of the target words.

cell	determine	illnesses	replace
come out	gender	individual	traits
cure	generation	realize	
desirable	genes		

1. A long time ago, people didn't know why children tended to look like their parents. They didn't _____ that characteristics are passed from one _____ to the next.

Sample Material © Pearson 2023

2. Today, we know that our _____ contain all of the information that is necessary to make a human being. They contain a list of details on how to "build" a human being.
3. One _____ is different from another because each person has his or her own genes.
4. The science of genetics (the study of how characteristics are passed from one generation to another) has shown that some _____ will appear in the first generation. Other weaker ones will not _____ until the following generation.
5. Through gene therapy, doctors are trying to help people with genetic _____ get better. They are trying to _____ them.
6. In one experimental technique, scientists remove a gene that is not working correctly from a _____ (the smallest part of a person or other living thing). Then, they _____ it with a healthy gene.
7. It is possible for scientists to use genetic testing before birth to find out a child's _____, that is, whether the child is male or female.
8. Genetic testing can also be used to _____ whether a child is likely to develop a genetic illness.
9. In the future, parents might be able to make sure that their children are born with _____ traits, such as intelligence or beauty.

B. Read the sentences and circle the words that help you understand the meanings of the bold face target words. Then circle the correct answers.

1. We get many **traits** from our parents. Eye color and height are two examples. *Traits* are
   a. gifts. b. characteristics. c. interests.
2. If a boy has a genetic **disease**, it means that his genes are not working correctly, so he has health problems. *Disease* means
   a. sickness. b. trouble. c. fever.

Sample Material © Pearson 2023

3. In the future, doctors hope they can **prevent** some types of sicknesses through gene therapy. If they are successful, people won't get these sicknesses. *Prevent* means

   a. begin doing something. b. stop something before it happens. c. fix completely.

4. In the future, scientists will try to **get rid of** genes that cause sickness. This would be the best solution because people would never worry about these sicknesses again. *Get rid of* means to cause something to

   a. become smaller. b. get better. c. disappear.

5. Children look like their parents because they **inherit** genes from them. *Inherit* means

   a. receive. b. require. c. get money.

DEVELOPING READING SKILLS

Scanning

Find the information about these topics in "The Science of Genetics." Scan the reading, and write the paragraph number (1–9).

____ a. The birth of modern genetics
____ b. The definition of a gene
____ c. Possible future uses of genetic testing and engineering
1 d. Some past ideas about how humans get their traits
____ e. What genetic engineering is used for
____ f. What scientists are learning about genes
____ g. What happens when you cross a small pea plant with a tall one
____ h. How later scientists used Mendel's research
____ i. What genetic testing is used for

Summarizing

Writing a Summary

When you **summarize** a text, you should include the main idea and the major points about the main idea. Your summary should include details only if they are necessary to clarify the major points. Always write a summary in your own words.

Write a sentence about each of the nine paragraph topics from the Scanning exercise above. Use information from the reading, but do not copy. Include only the most important information. Together, the nine sentences should summarize the reading.

Paragraph 1: In the past, there were many different theories about why children look and act like their parents.

Sample Material © Pearson 2023

Paragraph 2: _____

_____

Paragraph 3: _____

_____

Paragraph 4: _____

_____

Paragraph 5: _____

_____

Paragraph 6: _____

_____

Paragraph 7: _____

_____

Paragraph 8: _____

_____

Paragraph 9: _____

_____

BUILDING ON THE VOCABULARY

Using the Target Vocabulary in New Contexts

Complete the sentences with the target words in the box. Be careful. There are two extra words.

came out	determines	get rid of	instructions
cells	genders	illness	prevents
cured	generations	individual	realize
desirable	genes	inherits	trait

1. I don't know how to play that game. Please read the _____ to me.
2. Great news! He isn't going to die. The doctors _____ him!
3. That house is expensive because it is in a _____ location, in the best part of town.

Sample Material © Pearson 2023

4. Sometimes, parents and children don't understand each other because they come from different _____. The age difference can make it difficult for them to communicate.
5. The men in his family have been tennis champions for generations. The talent must be in their _____ and passed on from great-grandfather to grandfather, grandfather to father, and father to son.
6. Doctors now realize that anxiety is an _____, with real physical causes.
7. I'm sorry. I didn't _____ that I hurt you.
8. Each _____ in the class must participate in at least one experiment.
9. Everyone has two types of blood _____: red and white.
10. The mechanic will call you when he _____ the cause of the problem.
11. Everyone was surprised when the news of his marriage _____. They had kept it a secret. Nobody even knew he had a girlfriend.
12. Most schools in my country are co-educational. That is, they accept students of both _____.
13. Loyalty is the _____ that I value most in a friend.
14. Those shoes are so old. They look terrible! You need to _____ them and buy new ones.

Expanding Vocabulary

Word Families: Adjectives ending in *-able*

Some adjectives are formed by adding the suffix *-able* to the end of the verb. The meaning of the adjective is "capable of doing" or "able to do," the action of the verb. For example, *desirable* means "capable of being desired." Notice that if the verb ends in *-e*, the *-e* is dropped before adding the suffix.

A. Complete the word form chart. Write the correct form of the missing words. Check your answers in your dictionary.

NOUNS	VERBS	ADJECTIVES
		desirable
	prevent	
	cure	

Vocabulary Tip: Some suffixes change the form of the word but not the meaning. For example, the adjective *creative*, with the suffix *-ive*, is very similar in meaning to the verb *create*. Other suffixes, however, change the meaning of the word, often by adding information. *-able* is a suffix that adds meaning.

Sample Material © Pearson 2023

B. Complete the sentences with words from the chart. Be careful. You will not use all the words.

1. Sicknesses caused by insects are _____. If you protect yourself from insect bites, you won't get these sicknesses.
2. Don't worry. She's sick now, but she's not going to die from that disease. It is _____.
3. His _____ to become a scientist is so strong that he spends every minute studying and conducting experiments.
4. Scientists are working hard to find a _____ for that disease.
5. The _____ of forest fires is the responsibility of the Department of Fire Safety.
6. They own a _____ piece of land. Many people would like to buy it, but they won't sell.

C. Working with a partner, answer the questions. Make sure you use the correct form of the **boldfaced** words.

1. Sometimes your **desires** for the future do not match the **desires** of your family or other people that you love. Has this ever happened to you? If so, what did you do? If not, what do you think you would do?
2. Make a list of diseases that are **preventable**. Talk about how you can **prevent** them.
3. Which diseases are currently **incurable**? Which of those diseases do you think scientists will find a **cure** for in your lifetime?

Word Grammar: Collocations with Verb + Direct Object + Preposition

Some verbs are followed by a prepositional phrase. With some of these verbs, you need to include a direct object before the preposition. The correct preposition depends on the verb. Most dictionaries will give you the correct preposition and show you whether a direct object is necessary. Look at the examples.

- *He **prevented** us **from** finding out the truth.*
- *The doctor **cured** her **of** her illness.*
- *She **inherited** a lot of money **from** her grandmother.*
- *I damaged her computer, but I **replaced** it **with** a new one.*

Sample Material © Pearson 2023

Write answers to these questions. Use the **boldfaced** words in your answers.

1. If you have children, what will you try to **prevent** them **from** doing?

_____

_____

2. What would you do if you unexpectedly **inherited** $1,000,000 **from** a relative you had never met?

_____

_____

3. Write about a time when you broke or lost something that belonged to someone else and you had to replace it. What did you **replace** it **with**?

_____

_____

4. If you had the power to **cure** people **of** one disease, which disease would you choose? Explain why you chose that disease.

_____

_____

CRITICAL THINKING

A. Discussion

Share your ideas in a small group. As you talk, try to use the vocabulary below. Each time someone uses a target word, put a check (✓) next to it.

☐ come out	☐ get rid of
☐ desire/desirable/undesirable	☐ illness
☐ determine	☐ individual
☐ disease	☐ inherit
☐ gene/genetic	☐ prevent/preventable
☐ generation	☐ trait

1. Based on what you learned in the reading, as well as your own prior knowledge, decide which of the following news stories could be true. Be ready to explain your answers to the class. Refer to specific information from the reading wherever appropriate.
   - Most farmers in the United States use special seeds to grow food. The genes of these seeds have been changed. The plants that grow from them grow faster and

Sample Material © Pearson 2023

are larger than the plants grown from regular seeds. The plants also get fewer diseases.

- Scientists are now able to take a few cells from a human heart and grow a new heart from them. This new heart can replace the heart of someone with heart disease.
- Scientists are now experimenting with growing organs inside of pigs. These organs are genetically similar to human organs. In the future, doctors hope to be able to replace the diseased organs of humans with the organs grown inside pigs.
- Scientists have discovered the gene for intelligence. Parents can now use genetic testing before their baby is born to find out whether their child is going to be intelligent or not.
- Genetically engineered skin can be grown in a lab. It is commonly used to treat burn victims.

2. Choose one of the true news stories above and talk about it in your group. Make a list of the pros and cons of this use of genetic engineering. Think carefully about the various reasons that people might be in favor of or opposed to it. Consider religious beliefs, ideas about morality, safety and health concerns, or another standard that you and your group come up with. After considering the pros and cons, give your opinion, if you feel you have enough information to do so. Explain the reasons for your opinion.

Critical Thinking Tip: You might be asked for your opinion on something that you know very little about. It is acceptable to say that you have no opinion because you don't know much about the topic.

B. Writing

Complete one or both of these writing topics. When you write, use at least five of the target words from the chapter. Underline the target words in your paper.

1. Genetic testing now makes it possible for people to find out if they have a higher than average chance of getting certain genetic diseases. Write a short essay discussing the advantages and disadvantages of knowing this information, but do not take a position. Rather, just present the two sides. You can start with the following sentence: *There are both advantages and disadvantages to knowing if you have a high risk for getting a genetic disease.*
2. Write a letter to the editor giving your opinion about one of the topics raised in this unit.

Writing Tip: Writing about something is often a good way to teach yourself about a topic and discover how you feel about it. Writing about the pros and cons of a topic without taking a position is a good way to deepen your understanding.

Sample Material © Pearson 2023

CHAPTER 8

Designing the Future

LEARNING OUTCOME

› Learn about a new technique used in genetic engineering

GETTING READY TO READ

Answer the questions. Then compare your answers with a partner.

1. Look at the list of adjectives. If you had a **son** and could choose only three characteristics, which would you choose and why? Put a check (✓) next to three or add your own.

   ☐ strong ☐ thin ☐ handsome ☐ honest
   ☐ intelligent ☐ funny ☐ kind ☐ successful
   ☐ other _____

2. Now check the three adjectives that you would choose if you had a **daughter**.

   ☐ strong ☐ thin ☐ beautiful ☐ honest
   ☐ intelligent ☐ funny ☐ kind ☐ successful
   ☐ other _____

Sample Material © Pearson 2023

READING

Read to Find Out: What is CRISPR and how is it changing the field of genetics?

Read the definitions beside the reading. Then read "Designing the Future." If you see a new word, circle it, but don't stop reading. You can learn the new word later.

Designing the Future

1 A young couple has decided that it is time to have a baby. So, what is the first thing they do? They go shopping! But not for clothes or furniture. That will come later. Before anything else, they must decide whether they want a girl or a boy. Next, it is time to consider their future child's intelligence. Do they want a gifted child, or would a child with an average level of intelligence be **acceptable**? And what about personality? Do they care if their child is shy? Is kindness important to them? Finally, it is time to consider physical traits. What eye color would they prefer? What about height and weight? Do they want an **athletic** child, so that he or she can play tennis with Mom? There are so many **features** to choose from!

2 **Actually**, the situation described above does not happen today. But a recently developed technique in genetic engineering has **led** many scientists **to** believe that changing a human embryo's[1] DNA, and thus its traits, is scientifically possible. If this sounds more like science fiction[2] than science, think again. The technique is called CRISPR.[3] According to experts, using CRISPR to cut out and replace a piece of human DNA would be remarkably easy. Jennifer Doudna, a respected **biologist** and the co-developer of the technique, recently said "Any scientist with molecular biology skills and knowledge of how to work with [embryos] is going to be able to do this."

3 Already, genetic testing can be used to **identify** gender very early in the embryo's development. The genes that mark for[4] a number of genetic diseases can also be identified. Some scientists are **convinced** that they will soon find the genes for a wide variety of traits—physical **appearance**, artistic talent, a tendency toward depression—just about anything you can imagine. And if scientists know the gene or genes that control a specific trait, it is at least theoretically possible that CRISPR could be used to replace an undesirable trait with a more desirable one.

4 But just because scientists *can* do it, does it mean they *will* do it? Guoping Feng, a biologist at the Massachusetts Institute of Technology (MIT), thinks so. In the future, he hopes to use CRISPR to replace human genes that cause disease with healthy ones. He believes it will take about 10 to 20 years for the technology to be safe enough to use in humans. "It's hard to predict the future," Feng said, "but correcting disease **risks** is definitely a possibility and should be supported. I think it will be a reality."

5 Not everyone shares Feng's positive attitude, however. Doudna, the scientist who co-developed CRISPR, organized a meeting to **restrict** the use of the technique on human embryos. At the end of the meeting, Doudna and a group

[1] *an embryo* = an animal or human that has not yet been born, and has just begun to develop

[2] *science fiction* = a type of writing that describes imaginary future developments in science and their effect on life, for example traveling in time

[3] *CRISPR* = an acronym, or abbreviation, for "clustered regularly interspaced palindromic repeats"

[4] *mark for* = signal or show the presence of (something)

Sample Material © Pearson 2023

of experts in genetics, ethics,[5] and law called for scientists to agree not to use CRISPR to produce children with genetic changes. However, the group supports basic research using CRISPR, including experiments on embryos.

6 What do non-experts think about all of this? It is difficult to know, but a recent survey conducted in the United States found that 46% of adults approved of using genetic engineering to reduce the risk of serious diseases. However, 83% said that changes to make a baby more intelligent would not be acceptable. Of course, this is only one survey from one country. Perhaps it is more instructive to remember that **historically**, whenever the once unimaginable has become possible—cars, airplanes, and the Internet, for example—it soon becomes common. If the technology exists, how can we prevent "trait shopping" by parents who want a "perfect" baby?

7 Scientists do not agree on the morality of producing children with genetic changes, or the exact day when it will happen. But most do agree that day is **approaching**. This **brings up** very difficult social and moral questions. What are the long-term[6] health risks of introducing genetic changes that will be passed on to future generations? Will too many parents choose to have children of the same gender, leading to a **shortage** of boys or girls? What will happen to children whose parents cannot afford to give them the **advantages** enjoyed by their genetically "designed" peers? How will society treat "imperfect" children? **In short**, will changing human genes change **humanity** itself?

[5] *ethics* = moral rules or principles of behavior for deciding what is right and wrong

[6] *long-term* = continuing for a long period of time into the future

Quick Comprehension Check

A. Read these sentences **about the reading**. Circle T (true), F (false), or ? (can't determine the answer from the reading). If you circle T or F, write the number of the paragraph with the answer on the line.

1. Parents can now choose what their future children will look like. T F ? ____
2. CRISPR is a technique used to create DNA. T F ? ____
3. CRISPR is not difficult for scientists to use. T F ? ____
4. Scientists have found the genes for many inherited traits, and in the future expect to find even more. T F ? ____
5. One of the developers of CRISPR wants to limit how it is used on humans. T F ? ____
6. Even if genetic engineering makes it possible for parents to "design" their children, most parents won't use the technology. T F ? ____
7. Scientists think it is immoral to change human genes. T F ? ____
8. The use of genetic engineering to produce children with changed genes is likely to happen in the future. T F ? ____

Reading Tip: When you read something about the future, pay attention to what is true now, and what may be possible in the future. Look for words such as *possible, probably,* and the auxiliary verbs *will, be going to, may, might, could,* and *would.*

B. Work with your class. Share your answers from part A. Go back to the reading to find the reason why a sentence is true or false. Correct the false sentences.

Sample Material © Pearson 2023

EXPLORING VOCABULARY

Thinking about the Target Vocabulary

Guessing Strategy: Dashes

Understanding punctuation can help you understand the meaning of unfamiliar words. The **dash** (—) is a type of punctuation. Writers use dashes to focus the reader's attention on important information. Often, writers put examples between two dashes. Look at the example.

> *Some scientists are convinced that they will soon find the genes for a wide variety of traits— physical **appearance**, artistic talent, a tendency toward depression—just about anything you can imagine.*

In this case, the word before the dash is *traits*. The words after the dash are specific examples. Although you may not understand the exact meaning of all the words in the examples, you can guess the general meaning from the context. For example, you can guess from the context that the target word *appearance* is an example of a trait.

A. Read the sentences with the dashes. Then complete the following sentence(s) about the **boldfaced** target word.

1. Changing human genes brings up serious social issues—health risks in future generations, a possible **shortage** of boys or girls, the negative effects on "imperfect" children—so many people worry about using it.

   A possible **shortage** of boys or girls is an example of _____. The definition of **shortage** might be _____.

2. In the future, a child's **appearance**—height, weight, eye and hair color—might be determined before birth.

   Some examples of **appearance** are _____. The definition of **appearance** might be _____.

3. **Advantages** that rich parents might be able give their children—above-average intelligence, physical beauty, no danger of genetic diseases—will not be available to those who cannot afford them.

   Some examples of **advantages** are _____. The definition of **advantage** might be _____.

4. Some scientists believe that the **risks** of using CRISPR on human beings—possible damage to the genes, health problems, genetic changes in future generations—make it immoral to use the technique.

   Some examples of **risks** are _____. The definition of **risk** might be _____.

B. Look up the definitions of the target words in exercise A in your dictionary. Are they similar to your definitions?

Sample Material © Pearson 2023

C. Look at the target words. Which ones are new to you? Circle them here and in the reading. The numbers in parentheses help you find the words in the paragraphs.

Target Words

acceptable (1)	led to (2)	restrict (5)	shortage (7)
athletic (1)	identify (3)	historically (6)	advantages (7)
features (1)	convinced (3)	approaching (7)	in short (7)
actually (2)	appearance (3)	brings up (7)	humanity (7)
biologist (2)	risks (4)		

D. Complete the word form chart. Fill in the shaded areas of the chart with the target words from the reading. Write the base form of the verbs and the singular form of the nouns.

NOUNS	VERBS	ADJECTIVES	OTHER
		acceptable	

Understanding the Target Vocabulary

These sentences are **about the reading**. Complete them with the words in the box. Circle the words in the sentences that help you understand the meanings of the target words.

acceptable	biologist	historically	lead to
actually	brings up	humanity	restrict
approaching	convinced	identified	
athletic	features		

1. _____, people with genetic diseases often chose not to have children. They did not want to pass their genes on to the next generation. In the future, that could change.
2. Scientists have already _____ the genes for a number of genetic diseases.

Sample Material © Pearson 2023

3. According to _____ Guoping Feng, the day is _____ when it will be possible to get rid of genetic diseases. Other scientists, however, think it will never happen.
4. It might seem incredible, but in the future, parents might _____ be able to "design" their children before they are born. This would make it possible for parents to choose the traits they want, similar to the way they choose the _____ of a new car.
5. For some parents, physical traits are important. They like to play sports, so they would like to determine their children's _____ ability.
6. People are starting to ask some very difficult questions about genetic engineering. Genetic engineering _____ some complex questions.
7. Some people worry that genetic engineering could have a negative effect on all of _____. In fact, they think it might change what it means to be human.
8. Other people think that there is nothing wrong with using genetic engineering on humans. They think that this use of technology is _____.
9. The biologist Guoping Feng is _____ that using CRISPR on human embryos is a good thing. Other scientists are not so sure. They want to _____ the use of CRISPR to curing disease.
10. A serious concern is that genetic engineering will _____ social problems. For example, what will happen if only the rich can afford to design their children?

DEVELOPING READING SKILLS

Making Inferences

Read these sentences from "Designing the Future." Then, read the two sentences that follow. Put a check (✓) next to the sentence that is a reasonable inference. The numbers in parentheses are the paragraphs where you can find the sentences.

1. Do they want an athletic child, so that he or she can play tennis with Mom? (1)
   - ☐ a. Mom is a tennis player.
   - ☐ b. Mom doesn't have anyone to play tennis with.

Reading Tip: Remember: When you make an inference, your inference must be based on actual information in the text; it cannot go beyond what is written in the text.

Sample Material © Pearson 2023

2. If this sounds more like science fiction than science, think again. (2)
   - ☐ a. The article is based on real scientific information.
   - ☐ b. You should not read science fiction.

3. Doudna, the scientist who co-developed CRISPR, organized a meeting to restrict the use of the technique on human embryos. (5)
   - ☐ a. Doudna is concerned about how the technique will be used.
   - ☐ b. Doudna wants other people to stop using the technique.

4. Of course this is only one survey from one country. (6)
   - ☐ a. Only one country has done a survey on this issue.
   - ☐ b. We need more data on this issue.

Summarizing

Complete this summary of "Designing the Future." Write as much as you can without looking back at the reading. Then, compare your summary with a classmate's. If there are any differences, decide whose summary is more accurate. Finally, go back to the reading to check your summary and to add any missing information.

Writing Tip: Writing a summary from memory is a good way to check your understanding of a reading. It also prevents copying from the reading.

Because of a _____ engineering _____ called CRISPR, many scientists believe that in the future, parents will be able to _____. Already, scientists use genetic testing to _____. They have also identified _____.

Some scientists are in favor of _____. Other scientists are worried about _____.

In one survey, 46% of non-experts said that _____, while 83% said that _____.

Despite the opinions of many scientists and non-experts, in the future it will probably be possible _____.

The use of genetic engineering to "design" children leads to some difficult moral questions. The most important question is, will using genetic engineering on human beings _____?

Sample Material © Pearson 2023

BUILDING ON THE VOCABULARY

Using the Target Vocabulary in New Contexts

Complete the sentences with the target words in the box. Be careful. There are two extra words.

acceptable	athletic	historically	lead to
advantages	biologist	humanity	restricted
appearance	bring up	identify	risks
approach	convinced	in short	shortage

1. He can't throw a ball or run fast. He isn't very _____.
2. I had a lot of homework to do, but my sister _____ me to go to the movies with her.
3. The work of Austrian scientist Gregor Mendel, the father of genetics, is important for all of _____. Even today, Mendel's discoveries continue to help people.
4. You look different. Your new haircut really changes your _____.
5. Travel to that region is _____. You can only go there if you get permission from the government.
6. Bad eating habits can _____ illness and other physical problems.
7. I'm sorry, but this paper is not _____. It is very messy and has many errors. You are going to have to write it again.
8. The police published the criminal's picture in the newspaper and posted it on websites. They hope that someone will be able to _____ him.
9. There are many _____ to having a good education. For example, people who are well-educated usually earn more money than people with less education.
10. He is attractive, intelligent, and successful. _____, he's the perfect man for you!
11. It hasn't rained in almost a year. There is a water _____.

Sample Material © Pearson 2023

12. Slow down as we _____ the traffic light. My house is on the corner, just after the light.

13. I don't like to ski or ride horses because I don't like to take _____. I prefer safer sports such as tennis.

14. You should _____ your concerns in class. Your teacher will help you.

Expanding Vocabulary

Word Families: Adjectives ending in *-ous*

The adjective ending *-ous* means "full of." Therefore, the adjective *advantageous* means "full of advantages." The addition of certain suffixes, including *-ous*, can change the syllable stress on a word. You can look in your dictionary to find out which syllable is stressed. In most dictionaries, the symbol **'** is placed at the beginning of the stressed syllable.

A. Look at the pronunciation guides for the following words. Answer the questions.

ad·van·tage /əd'væɪdʒ/ *n* **1** [C,U] something that helps you to be better or more successful than others [**≠ disadvantage**]: *Her computer skills gave her an* ***advantage over*** *the other applicants.* | *He turns every situation* ***to*** *his* ***advantage***. **2 take advantage of sth** to use a situation or thing to help you do or get something you want: *He* ***took advantage of the opportunity*** *given to him.* **3** [C] a good or useful quality that something has: *Good restaurants are one of the many* ***advantages of*** *living in a big city* **4 take advantage of sb** to treat someone unfairly or to control a particular situation in order to get what you want

ad·van·ta·geous /ˌædvænˈteɪdʒəs, -vən-/ *adj* helpful and likely to make you more successful [**≠ disadvantageous**]

Vocabulary Tip: An English/English dictionary is very helpful when you learn new words. In addition to definitions, there is usually information about grammar, usage, and pronunciation.

1. a. How many syllables are in the noun **advantage**? _____
   Which syllable is stressed? _____
   b. How many syllables are in the adjective **advantageous**? _____
   Which syllable is stressed? _____

anx·i·e·ty /æŋˈzaɪəti/ *n* [U] a strong feeling of worry about something: *a lifestyle that creates stress and anxiety* | *workers'* ***anxiety about*** *being fired*

anx·ious /ˈæŋkʃəs, ˈæŋʃəs/ *adj* **1** very worried about something or showing that you are worried: *June is* ***anxious about*** *the results of her blood test* | *an anxious look*

2. a. How many syllables are in the noun **anxiety**? _____
   Which syllable is stressed? _____
   b. How many syllables are in the adjective **anxious**? _____
   Which syllable is stressed? _____

Sample Material © Pearson 2023

mys·te·ri·ous /mɪˈstɪriəs/ *adj.* **1** strange and difficult to explain or understand: *the mysterious disappearance of our neighbor* **2** not saying much about something because you want it to be a secret: *Oliver is being very* ***mysterious about*** *his plans.*
mys·ter·y /ˈmɪstəri/ n (plural **mysteries**) **1** [C] something that is difficult to explain or understand: *The location of the stolen money* ***remains a mystery****.* | *It won't be easy to* ***solve the mystery****.* **2** [C] a story, especially about a murder, in which events are not explained until the end: *the Sherlock Holmes mystery stories* **3** [U] a quality that makes someone or something seem strange, interesting, and difficult to explain or understand: *There's an* ***air of mystery*** *about him that intrigues people.*

3. a. How many syllables are in the noun **mystery**? ____

   Which syllable is stressed? ____

   b. How many syllables are in the adjective **mysterious**? ____

   Which syllable is stressed? ____

B. Talk with a partner. Answer the questions. Use the **boldfaced** words in your answers. Make sure you stress the correct syllable.

1. When you feel **anxious**, what do you do to relax?
2. In life, which is more **advantageous**—physical beauty or intelligence? Why?
3. Which field of science is the most **mysterious** to you? Why do you feel it is a **mystery**?

Word Grammar: Adverbs

Adverbs modify verbs, adjectives, other adverbs, or entire sentences. Many adverbs are formed by adding *-ly* to the end of the adjective form of the word. Adverbs are placed close to the words they modify. Look at the examples.

Examples	Explanations
They waited anxiously for the doctor's call.	The adverb *anxiously* modifies the verb *waited.*
She is a remarkably good cook.	The adverb *remarkably* modifies the adjective *good.*
She spoke very convincingly about the issue.	The adverb *very* modifies the adverb *convincingly.*
Actually, she's not a biologist. She didn't even graduate from college.	The adverb *actually* modifies the whole sentence that follows it.

Sample Material © Pearson 2023

A. Fill in the shaded areas of the chart with the adverb forms of the target words from this chapter and previous ones. Check a dictionary for the correct spelling of the adverb forms.

NOUNS	ADJECTIVES	ADVERBS
actuality	actual	
anxiety	anxious	
athlete	athletic	
conviction	convincing	
history	historic	
humanity	humane	
remark	remarkable	

B. Complete the sentences with the *adverbs* from the chart. Use the adverb that *best* fits the context of the sentence. Do not use a word more than one time.

1. _____, women stayed at home and took care of the children. Today, however, many women work outside of the home.
2. It is not acceptable to hurt an animal on purpose. Animals should be treated _____.
3. He sings _____ well. He is a great performer.
4. What an athlete! She can play almost any sport well. She is _____ gifted.
5. Most people think he's been playing the piano for years. _____, he just began playing three months ago.
6. The parents watched _____ as the doctor examined their sick son.
7. He spoke so _____ that everyone believed him, but in fact, he was lying.

Sample Material © Pearson 2023

CRITICAL THINKING

A. Discussion

Share your ideas in a small group. As you talk, try to use the vocabulary below. Each time someone uses a target word, put a check (✓) next to it.

- ☐ acceptable
- ☐ advantage, advantageous
- ☐ appearance
- ☐ athletic, athletically
- ☐ convince, convincingly
- ☐ feature
- ☐ humanity, humane, humanely
- ☐ identify
- ☐ lead to
- ☐ restrict
- ☐ shortage

1. When you read the first paragraph of the reading, what effect did it have on you? For example, were you surprised? Interested in what would come next? Why do you think the writer started the reading in that way?
2. In paragraph 4, what do you think the question "But just because scientists *can* do it, does it mean they *will* do it?" means? According to the reading, is there an answer to this question? If so, what is the answer?
3. Does it surprise you that Jennifer Doudna wants to restrict the use of a technique that she co-developed? Do you think her reaction is common in science—that is, a scientist who developed something tries to restrict its use? Explain your answers. Do you know of another example from the past when something similar happened? Tell your group about it.
4. Are the writer's conclusions about what might happen in the future positive or negative? How do you know? Use information from the text to support your answer.
5. Discuss the writer's concerns in paragraph seven. Discuss each question. Do you share these concerns? Explain your answers.

Critical Thinking Tip: When a writer asks a question, try to answer it in your head. This will keep you engaged and help you see how well you understand the reading. If you can't answer the question(s), maybe you missed something important.

B. Writing

Complete one or both of these writing topics. When you write, use at least five of the target words from the chapter. Underline the target words in your paper.

1. Imagine that in the future you will be able to design your own child. What traits do you want your son or daughter to have? Write a letter to your future child explaining why you wanted him or her to have these traits.
2. Write an essay supporting one of the following positions. Support your position with information from the readings in chapters 7 and 8, as well as your own ideas.

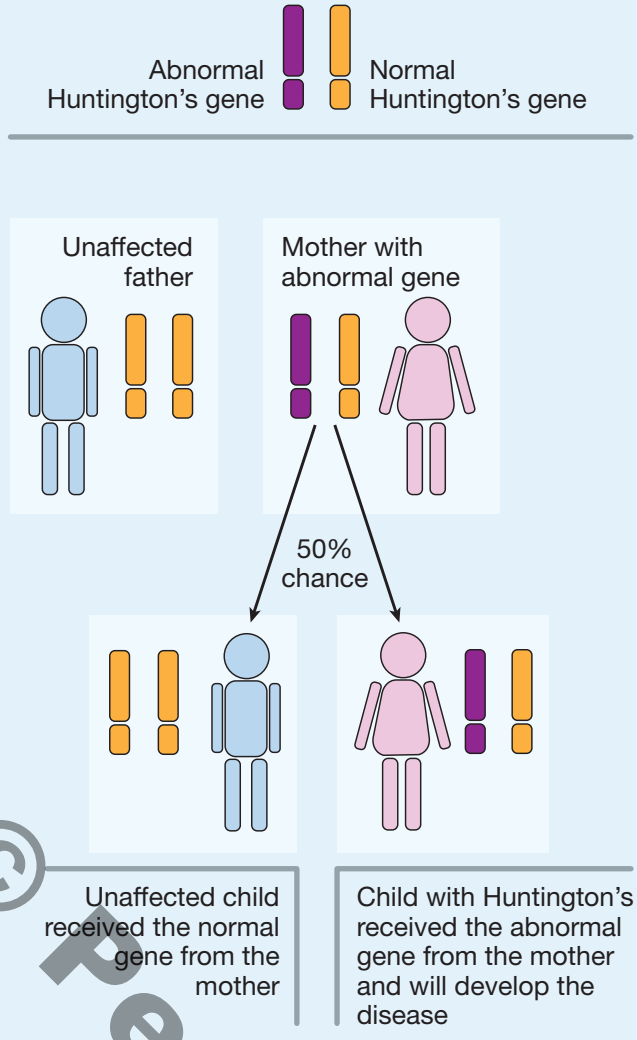
   Genetic engineering will do more harm than good to humanity.

   Genetic engineering will do more good than harm to humanity.

Sample Material © Pearson 2023

CHAPTER 9

A Terrible Inheritance, A Difficult Decision



Genetic Inheritance of Huntington's Disease: The Basics

LEARNING OUTCOME

› Learn about a genetic disease and its effects

GETTING READY TO READ

Talk with a partner. Look at the diagram and the title of the chapter. Then answer the questions.

1. What do you think "a terrible inheritance" refers to?
2. What could the "difficult decision" be?
3. What do you think the reading will be about?

Sample Material © Pearson 2023

READING

Read to Find Out: What do Katharine Moser and Nancy Wexler have in common?

Read the definitions beside the reading. Then read "A Terrible Inheritance, A Difficult Decision." If you see a new word, circle it, but don't stop reading. You can learn the new word later.

A Terrible Inheritance, A Difficult Decision

1 If you had a risk of developing a genetic disease, would you want to be tested for it? What **factors** would affect your decision? If there were no way to prevent, treat, or cure the disease, would you still want to be tested? As gene research **progresses**, these are questions that a growing number of people are facing. As many are discovering, there are no easy answers.

2 Meet Katharine Moser. Moser is an occupational therapist[1] at Terence Cardinal Cooke Health Care Center, a nursing home on the Upper East Side of Manhattan. In 2002, Moser's maternal[2] grandfather died at Cooke. He had Huntington's Disease, a **severe** genetic illness that attacks the brain. Victims of the disease usually begin to show symptoms[3] when they are 40 to 50 years old. Early symptoms can include emotional changes such as depression, and behavioral changes such as aggression. As the disease progresses, victims **suffer** from a loss of control over their movements, difficulty in thinking and talking, and severe emotional **complications**. After ten to twenty years of suffering, victims lose all ability to move and finally die.

3 There is no special **diet** that you can follow to prevent Huntington's. There is no medicine that doctors can **prescribe** to treat it, and there is no **operation** they can perform to fix it. If one parent suffers from Huntington's, his or her children have a 50 percent chance of inheriting the gene that causes the disease. And if you have the gene, you will definitely develop the illness. There is no **effective** treatment. All of its victims get worse, and then die. No one has ever **recovered** from it.

4 At the age of 23, Moser made the decision to be tested for Huntington's. Her decision was unusual. Since there is no treatment or cure, most people at risk for Huntington's do not see any **benefit** to being tested. And knowing that you will one day get the disease can be harmful to your mental health and your relationships. In fact, Moser's own mother did not agree with her daughter's decision. If her daughter had the harmful gene it would mean that she had it, too. And Moser's mother did not want to know because, as she said, "You don't want to know stuff like that. You want to enjoy life."

5 Nancy Wexler, like Katharine Moser, comes from a family with a history of Huntington's. Her mother, grandfather, and three of her uncles died of the disease. And like Moser, Wexler works closely with victims of the disease. She is a neuropsychologist[4] at Columbia University and is **in charge of** the Hereditary Disease Foundation. She is an expert in Huntington's. In fact,

[1] *an occupational therapist* = someone who helps people with physical or emotional problems do different activities

[2] *maternal* = on the mother's side of the family

[3] *a symptom* = a physical or psychological condition which shows that you have a particular illness

[4] *a neuro-psychologist* = a doctor who has special training in the nervous system and how it affects someone's psychological health

Sample Material © Pearson 2023

she was involved in the discovery of the gene for the disease in 1993. That discovery led to the development of a genetic test for the disease. It is the same test that Moser decided to take years later.

6 Wexler, like Moser, had always **intended** to have the test when it became available. But when she was actually faced with the decision of whether or not to be tested, she realized that she did not want to know. If the test were positive for the gene, she felt that her life would be **poisoned** by the knowledge. "If you take the test, you have to be prepared to be really depressed," said Nancy. "I've been depressed. I don't like it."

7 Moser had the test in 2005. It was positive for the deadly gene. However, she says that she is not sorry that she was tested. "I'm the same person I've always been. It's been in me from the beginning." At first, it was difficult for her to be around the Huntington's patients at work. However, she now finds strength and purpose in working with them. She is also involved in raising money for research on Huntington's Disease. Mostly, she is busy living her life. "I have a lot to do. And I don't have a lot of time."

8 Sadly, Moser's mother has not spoken to her daughter since she found out the results of the test. In an interview, her mother said, "It's a horrible illness. . . . Now he [my husband] has a wife who has it. Did she think of him? Did she think of me? Who is going to marry her?"

9 Wexler has never been tested, but it seems that she has been more **fortunate** than Moser. She is now in her 60s, past the age when symptoms of the disease usually appear. As Wexler continues her research, Moser goes on with her life. She is working, playing tennis, going to church, learning to ride a unicycle,[5] spending time with her best friend, traveling . . . and hoping that the work of Wexler and others will lead to a cure soon—before it is too late for her and thousands of others.

[5] *a unicycle* = a vehicle that is like a bicycle but has only one wheel

Quick Comprehension Check

A. Read these sentences **about the reading**. Circle T (true), F (false), or ? (can't determine the answer from the reading). If you circle T or F, write the number of the paragraph with the answer on the line.

1. Fifty percent of people with Huntington's can be cured of the disease. T F ? ____
2. Most people at risk for Huntington's get tested for the gene. T F ? ____
3. Huntington's Disease is a genetic illness that only affects women. T F ? ____
4. Nancy Wexler decided not to be tested for Huntington's. T F ? ____
5. Nancy Wexler will never get Huntington's. T F ? ____
6. Katharine Moser wishes that she had never been tested for Huntington's. T F ? ____

Sample Material © Pearson 2023

7. Katharine Moser's mother has Huntington's. T F ? ____

8. Katharine Moser's life today is very different from the way it was before she had the test. T F ? ____

B. Work with your class. Share your answers from part A. Go back to the reading to find the reason why a sentence is true or false. Correct the false sentences.

EXPLORING VOCABULARY

Thinking about the Target Vocabulary

Guessing Strategy: Antonyms

Antonyms are words that have opposite meanings. Look at the example.

There is no effective treatment, and all of its victims get worse and then die. No one has ever recovered from it.

The words *get worse* and *recover* are antonyms. You already know the meaning of *get worse*, so you should be able to guess from the context that *recover* has the opposite meaning, *to get better.*

A. Read the sentences and circle the antonym of each **boldfaced** target word. Then write a definition of the **boldfaced** word.

1. Some diseases **progress** for a while and then stop. Others just keep progressing.

   Definition: _____

2. It seems that Wexler is **fortunate**; she is 60 years old and has not developed the disease. Moser, on the other hand, is unlucky. She has the disease.

   Definition: _____

3. For Moser, there are **benefits** to knowing that she has the disease, but Wexler can only see the disadvantages.

   Definition: _____

Vocabulary Tip: Wait until you know a word well before learning its antonym. Otherwise, you may confuse the two words.

B. Look at the target words. Which ones are new to you? Circle them here and in the reading. The numbers in parentheses help you find the words in the paragraphs.

Target Words

factors (1)	complications (2)	effective (3)	intended (6)
progresses (1)	diet (3)	recovered (3)	poisoned (6)
severe (2)	prescribe (3)	benefit (4)	fortunate (9)
suffer (2)	operation (3)	in charge of (5)	

Sample Material © Pearson 2023

C. Read "A Terrible Inheritance, A Difficult Decision" again. Look at the context of the new words. Can you guess their meanings?

D. Complete the word form chart. Fill in the shaded areas of the chart with the target words from the reading. Write the base form of the verbs and the singular form of the nouns.

NOUNS	VERBS	ADJECTIVES	OTHER
factor			

Understanding the Target Vocabulary

A. These sentences are **about the reading**. Complete them with the words in the box. Circle the words in the sentences that help you understand the meanings of the target words.

diet	intends	progresses	suffered
effective	operation	recovered	
fortunate	prescribe	severe	

1. Huntington's Disease _____ over a period of ten to twenty years until the person with the disease finally dies.
2. No one has ever _____ from Huntington's. There is no cure or treatment.
3. The effects of the disease are _____. They make it impossible to live a normal life. For example, most people lose control of their arms or legs.
4. Because Huntington's is caused by a gene, doctors cannot perform an _____ to cut it out of your body.
5. Doctors cannot _____ a drug to prevent it.
6. You can't slow down the disease by eating a special _____.

Sample Material © Pearson 2023

7. Katharine Moser's grandfather and Nancy Wexler's mother _____ and eventually died from Huntington's.

8. Wexler was involved in developing a very _____ test for Huntington's disease. In fact, the test is 100 percent reliable.

9. Wexler is now past the age when most people begin to show symptoms, so she probably will not get Huntington's. She is more _____ than Moser, who tested positive for the disease.

10. Despite the bad news, Moser has a positive attitude. She _____ to use the time that she has left to enjoy life, and to help others with the disease.

B. Read the paragraph and match the **boldfaced** words with their definitions.

Imagine that you have a 50 percent chance of getting a terrible genetic illness twenty years from today. Will you be tested for the disease? What **factors** will affect your decision? If there is no way to prevent, treat, or cure the disease, will you still want to be tested for the gene? Is there any **benefit** in knowing that you will get the disease? Will that knowledge **poison** your life? Or will it help you to plan for and feel more **in charge of** your own future?

Word	**Definition**
_____ 1. factor	a. influence someone's thoughts or emotions in a bad way, or make them feel very unhappy
_____ 2. benefit	b. something that gives you advantages or improves your life in some way
_____ 3. poison	c. controlling or responsible for a group of people or an activity
_____ 4. in charge of	d. one of several things that influence or cause a situation

DEVELOPING READING SKILLS

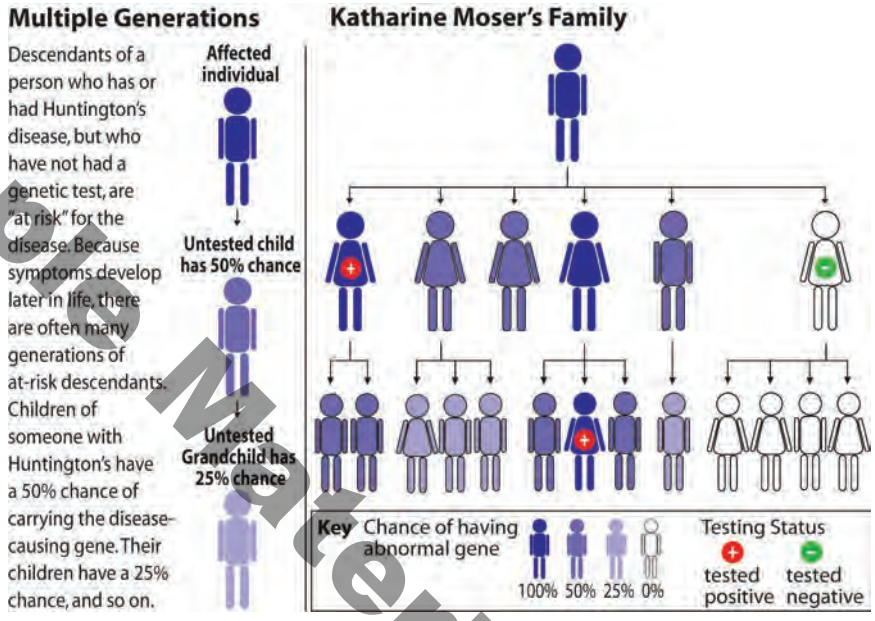
Interpreting a Diagram

Understanding Diagrams

Readings about scientific or technical topics often include both text and **diagrams**. The diagrams usually illustrate a specific part of the text to make it easier to understand. Understanding the connection between a written text and a diagram is an important reading skill.

Sample Material © Pearson 2023

Read "A Terrible Inheritance, a Difficult Decision" again. Then look at the diagram of Katharine Moser's family tree. Based on the reading and what you see in the diagram, circle and label the figures that represent the people from Katharine's family who are mentioned in the reading. Write K (Katharine), KG (Katharine's grandfather), and KM (Katharine's mother).



BUILDING ON THE VOCABULARY

Using the Target Vocabulary in New Contexts

Complete the sentences with the target words in the box. Be careful. There are two extra words.

complications	factor	poison	recovered
diet	in charge of	prescribed	severe
effective	operation	progressed	

1. You are eating too much. It isn't healthy. You need to change your _____.
2. Even when you have just a simple operation, something can go wrong. There is always the danger of _____.
3. He has _____ very quickly in his career. He has been at the company for only one year, but he's already in charge of three departments and 100 employees.

Sample Material © Pearson 2023

4. She saw mice in her apartment, so she is going to get something to _____ them or get rid of them in some other way.

5. There is going to be a _____ snowstorm tonight. I think we should stay home.

6. He's a very _____ teacher. His students learn a lot from him.

7. Her job is very important. She is _____ 1,000 workers.

8. He hurt his leg very badly skiing. He needs to have an _____ to fix it.

9. One _____ to consider when buying a car is the cost.

Expanding Vocabulary

Word Families

A. Read these sentences, and write the target words that are in the same word families as the **boldfaced** words.

1. The patient's **recovery** was faster than his doctors had expected.

   Target word: recover

2. She had a bad cough, so her doctor wrote her a **prescription** for cough medicine.

   Target word: _____

3. I'm sorry. It was never my **intention** to hurt you.

   Target word: _____

4. In this book, there is a **progression** of activities from easy to difficult.

   Target word: _____

5. Eating the right kinds of food is **beneficial** to your health.

   Target word: _____

B. Match the **boldfaced** words from part A to their definitions.

____ 1. recovery	a. a change or development from one situation or state to another
____ 2. prescription	b. the act of getting better after an illness
____ 3. intention	c. something that you plan to do
____ 4. progression	d. good for you
____ 5. beneficial	e. a piece of paper from your doctor that allows you to get the medicine you need

Sample Material © Pearson 2023

Word Grammar: Collocations—Specialized Vocabulary

Medicine, like any other professional field, has specialized vocabulary that includes many collocations. Look at the **boldfaced** collocations in the examples.

- *She **suffers from** high blood pressure.*
- *She is in the hospital, **recovering from** a serious illness.*
- *He has very high cholesterol, so he has to **follow a strict diet**.*
- *The doctor who **performed the operation** made a serious mistake.*

A. Rewrite the following sentences with the correct collocations. Write one word in each space.

1. My father has skin cancer.

   My father _____ _____ skin cancer.

2. After his illness, he got better in a week.

   He _____ his illness in a week.

3. Dr. Smith will be in charge of the operation.

   Dr. Smith will _____ _____ _____.

4. His doctor told him to be very careful about what he eats.

   His doctor advised him to _____ _____

   _____ _____.

Writing Tip: Using the correct collocations when you write will make your writing sound much more fluent and natural.

B. Write answers to these questions. Use the **boldfaced** collocations in your answers.

1. If you were **suffering from an incurable illness**, would you want your doctor to tell you, or would you rather not know?

   _____

   _____

2. Why do children usually **recover from an illness** more quickly than elderly people?

   _____

   _____

3. Have you ever watched a doctor **perform an operation on television**? If so, describe it. If not, would you like to? Why or why not?

   _____

   _____

Sample Material © Pearson 2023

4. People who suffer from certain diseases have to **follow a strict diet**. Name a couple of these diseases. Make a list of the foods that are restricted for each one.

_____

_____

CRITICAL THINKING

A. Discussion

Share your ideas in a small group. As you talk, try to use the vocabulary below. Each time someone uses a target word, put a check (✓) next to it.

☐ beneficial	☐ effective	☐ fortunate	☐ progress	☐ severe
☐ complication	☐ factor	☐ prescribe	☐ recover	☐ suffer from

1. In paragraphs 4 and 8, you learn about Moser's difficult decision and her mother's reaction to it. What was the decision she made? How did her mother react? Using information in the reading and your own experience, explain why you think Katharine told her mother about the results of the test. Why do you think her mother reacted the way she did?
2. What can you infer about the differences between Moser's and Wexler's characters and personalities? What are the similarities? Refer to specific parts of the reading to support your answers. Then discuss whose character is more similar to your own.
3. Paragraph 4 in the text says, "Since there is no treatment or cure, most people at risk for Huntington's do not see any benefit to being tested." Can you think of any benefits to being tested? What would the benefits be? Use information from the reading and your own ideas to support your answer.
4. Imagine a day when doctors and scientists will be able to prevent or cure all diseases. Will this be a completely positive thing? Can you imagine any problems that this might lead to?

Critical Thinking Tip: When you read about other people, try to imagine yourself in a similar situation. This will help you get more involved in the reading, and understand and remember the information.

Reading Tip: If you are reading a text that compares and contrasts two different ideas or people, you can annotate the text by writing an *S* next to similarities and a *D* next to differences.

B. Writing

Choose Discussion question 3 or 4 and write an opinion essay based on the question. When you write, use at least five of the target words from the chapter. Underline the target words in your paper. Use information from the readings in the unit, as well as your own ideas, to support your opinion.

Sample Material © Pearson 2023

UNIT 3

Checkpoint

LEARNING OUTCOME

› Review and expand on the content of Unit 3

LOOK BACK

A. Think About This

Think again about the answers you gave in the *Think About This* exercise on page 85. How much do you know now? Have you learned new things in this unit? Write a number next to each topic.

1. I know a lot 2. I know some things 3. I know a little 4. I don't know anything

_____ 1. DNA

_____ 2. the discoveries of Gregor Mendel

_____ 3. genetic engineering and gene therapy

_____ 4. genetic testing

_____ 5. genetic diseases

B. Remember the Readings

What do you want to remember most from the readings in Unit 3? For each chapter, write one sentence about the reading.

Chapter 7: The Science of Genetics _____

_____

Chapter 8: Designing the Future _____

_____

Chapter 9: A Terrible Inheritance, A Difficult Decision _____

_____

Sample Material © Pearson 2023

EXTRA READING

Read the text. Do not use a dictionary.

GM Food

1 Historically, it took individual farmers generations of experimentation to develop the strongest, healthiest, and fastest-growing variety of a crop. Today, however, due to rapid progress in gene research, farmers can buy seeds whose genes have been carefully changed in a laboratory. The crops that grow from these genetically engineered seeds grow faster and are stronger and less likely to suffer from disease than traditional crops. In short, they have all the traits that farmers used to spend generations developing. The food that is produced from these crops is called genetically modified (GM).

2 In the United States, it is difficult to find food that does not contain at least some GM products. Actually, it is not always possible to even determine whether you are buying GM food in the U.S. That is because food labels in the United States do not always identify products that have been genetically modified. In Western Europe, however, things are different. Most food is labeled. Walk into almost any supermarket in France, Great Britain, or Italy, and you will see labels on the food that read "GM free." By reading the labels, customers can identify those products that have not been genetically modified.

3 Why the difference? Although scientists say that GM food is harmless, many Europeans do not believe it. They express concern about the possible negative effects of growing and eating GM food. They worry about the effect it might have on the health of individuals and the environment. Finally, many Europeans are especially sensitive to this issue because of the importance of food to their culture.

4 In the United States, however, scientists and farmers who produce GM food argue that it is not only harmless but actually beneficial to humanity. They claim that by growing GM crops, farmers can produce much more food in a shorter period of time. In that way, GM products can help prevent hunger in parts of the world suffering from food shortages.

Quick Comprehension Check

A. Read these sentences **about the reading**. Circle T (true), F (false), or ? (can't determine the answer from the reading). If you circle T or F, write the number of the paragraph with the answer on the line.

1. In the past, farmers had no way to develop healthier, faster-growing plants. T F ? ____
2. Today, most farmers in the United States benefit from the progress that scientists have made in the field of genetic engineering. T F ? ____

Sample Material © Pearson 2023

3. By reading food labels, customers in the United States can decide for themselves whether or not to buy food that contains GM products. T F ? ____
4. Many western Europeans are worried that GM food could make them sick. T F ? ____
5. It is difficult to find GM food in Europe today. T F ? ____

B. Go back to the reading to find the reason why a sentence is true or false. Correct the false sentences.

Guessing Meaning from Context

Answer these questions.

1. Look at the word *crops* in paragraph 1. Write some examples of crops.

_____

2. What is the meaning of the word *modified* in paragraph 1?

_____

3. Look at the word *labels* in paragraph 2. What information is often written on these kinds of labels?

_____

Understanding Major Points

Answer these questions. Use your own words. Do not copy from the text.

1. What is the definition of genetically modified food?

_____

2. What are some of the benefits of genetically modified food?

_____

3. What are some of the possible problems with genetically modified food?

_____

Expanding Vocabulary

Word Grammar: Transitive and Intransitive Verbs

Some verbs must have a noun immediately after them. This noun is called a **direct object**. Verbs that need a direct object are called **transitive verbs**. The verb "love" is a transitive verb.

		verb	direct object
Transitive:	*I*	*love*	*ice cream.*

Sample Material © Pearson 2023

Other verbs do not have a direct object. These verbs are called **intransitive verbs**. The verb "listen" is an intransitive verb: *He is listening to the radio,* or *He is listening.* We can't say *He is listening radio.*

		verb	object of the preposition
Intransitive:	*He*	*is listening*	*to the radio.*
		verb	**0 object**
	He	*is listening.*	

A. Look at the **boldfaced** verbs in these sentences. Circle T (transitive verb), or I (intransitive verb).

1. Their research **is progressing** rapidly. T I
2. To **prevent** heart disease, you should eat a healthy diet. T I
3. I don't like to see anyone **suffer**. T I
4. When his grandmother died, he **inherited** her house. T I

B. On a piece of paper, write your own sentences with the verbs from part A.

Word Families: Prefixes

Look at these sentences.

Fortunately, your disease is not severe.

Unfortunately, it is incurable.

A **prefix** is a word part added to the beginning of a word. It changes the word's meaning. The prefixes *un-* and *in-* both mean *not*. Other common prefixes include *dis-*, which also means *not*, and *mis-*, which means *wrong* or *bad*.

Complete these sentences with your own ideas. There is more than one correct way to complete each sentence.

1. If your father gives you **unrestricted** use of his car, you can use it any time you want.
2. If your parents **disinherit** you, you won't _____.
3. If you suffer a **misfortune**, your friends might _____.
4. If your way of doing something is **ineffective**, you should _____.
5. If your boss tells you that your work is **unacceptable**, you should _____.

Sample Material © Pearson 2023

6. If someone insults you and then tells you it was **unintentional**, you should _____

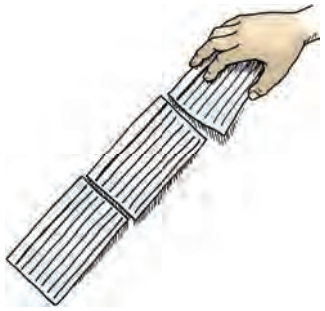
_____.

PLAYING WITH WORDS

You can play the game **Concentration** alone, but it is more fun if you play with one, two, or three other students.

- **Step 1:** Choose 10 words from the unit that you are having trouble learning. Take 20 blank index cards, and make 10 cards with just the words written on them, and 10 cards with the definitions of the 10 words written on them.

- **Step 2:** Next, mix the cards up well, and lay them facedown on a large desk or table, four cards across and five cards down.



- **Step 3:** Now, turn over any two cards, and try to remember what is written on them and where they are. If they form a match—a word or phrase on one card, a matching definition on the other—pick them up from the board and keep them, and take another turn. However, leave the other cards exactly where they were. If the two cards you turn over do not match, turn them both back over. Now it's the next person's turn. Play until all of the cards have been matched up. The winner is the person who has the most cards.

BUILDING DICTIONARY SKILLS

Finding Collocations

Your dictionary is an excellent resource for learning collocations. Look carefully at the entire dictionary entry, including the example sentences, for patterns of words that occur together.

A. These dictionary entries come from the *Longman Dictionary of American English*. Look carefully at each one, and then complete the sentences below. Write one word in each space.

> **in·struc·tion** /ɪn'strʌkʃən/ *n* **1 instructions** [plural] information or advice that tells you how to do something, how to use a piece of equipment or machine, etc. [**= directions**]: ***Follow the instructions*** *at the top of the paper.* | *Did you read the instructions first?* | *He gave us* ***instructions on/about how to*** *fix the toilet.* | *Inside you'll find* ***instructions for*** *setting up your computer.* | *He gave instructions to keep the ball on the ground, not to kick it high.* **2** [U] teaching in a particular skill or subject: *She's never had any formal* ***instruction*** [= lessons or classes] ***in*** *music.* — **instructional** *adj*

Sample Material © Pearson 2023

1. _____ the instructions on the label.

2. I fixed the light. The electrician _____ me instructions over the phone.

pre•scribe /prɪˈskraɪb/ *v* [T] **1** to say what medicine or treatment a sick person should have: *Doctors commonly **prescribe** steroids **for** children with asthma*. **2** *formal* to state officially what should be done in a particular situation: *a punishment prescribed by the law*

pre•scrip•tion /prɪˈskrɪpʃən/ *n* **1** [C] a piece of paper on which a doctor writes what medicine a sick person should have, or the medicine itself: *a **prescription for** painkillers* **2 by prescription** a drug that you get by prescription can only be obtained with a written order from the doctor [**≠ over the counter**]

3. My dentist _____ pain medicine _____ me.

4. My dentist wrote me a _____ _____ pain medicine.

di•et[1] /ˈdaiət/ *n* **1** [C,U] the type of food that you eat each day: *Many kids don't get enough fruit in their diet*. | *The animals live on a **diet of** fruit and insects*. **2** [C] a plan to eat only particular kinds or amounts of food, especially because you want to get thinner or because you have a health problem: *a low-fat diet* | *No dessert for me –I'm **on a diet***.

diet[2] *v* [I] to eat less or eat only particular foods in order to lose weight: *Jill's always dieting*.

5. I can't have any ice cream. I am _____ _____ _____.

B. On a piece of paper, write your own sentences about yourself and your life with the words from part A.

Sample Material © Pearson 2023

Vocabulary Self-Test 1

Sample Material © Pearson 2023

Circle the letter of the word or phrase that best completes each sentence.

1. That performer _____ received $10,000 for just one performance.
   a. rapidly b. reportedly c. morally d. historically

2. The scientist conducted some _____ to find out how much sleep most teens need.
   a. experiments b. equipment c. championships d. patterns

3. I'm tired because I _____ too late last night.
   a. stayed up b. grew out of c. stood out d. burned out

4. The cat _____ her on the face.
   a. scratched b. survived c. cured d. prevented

5. Poems are often written in _____.
   a. spin b. insult c. humiliation d. rhyme

6. That team has won several _____.
   a. complaints b. championships c. cells d. features

7. Leave your little brother alone. Don't _____ him.
   a. pick on b. bring up c. drop out d. call for

8. To be successful, it is important to have high _____.
   a. mystery b. self-esteem c. concern d. violence

9. When your grandmother dies, you are going to _____ this house.
   a. progress b. contribute c. reduce d. inherit

10. The government spends very little money on education. Almost 60 percent of the people in the country are _____.
    a. live b. athletic c. illiterate d. anxious

11. Don't work so hard. You'll _____.
a. stay up b. burn out c. in charge of d. pick on

12. This is a _____ area. You cannot enter.
a. talented b. remarkable c. moral d. restricted

13. He is not doing well in school because he has a bad _____.
a. appearance b. individual c. attitude d. official

14. Stay in school. If you _____, you will never get a good job.
a. recover b. identify c. prevent d. drop out

15. He is _____ from a very serious disease.
a. examining b. reducing c. conducting d. suffering

16. She is very _____. She is good at most sports.
a. economic b. athletic c. intentional d. characteristic

17. He went to the pharmacy to get the medicine that his doctor _____.
a. suffered b. examined c. announced d. prescribed

18. She is on a very restricted _____. She can only eat vegetables.
a. appearance b. background c. diet d. proof

19. They _____ to kill him if he didn't give them all of his money.
a. poisoned b. insulted c. threatened d. survived

20. _____, women have made less money than men.
a. In charge of b. Based on c. Historically d. Physically

21. She is in the hospital, recovering from a serious _____.
a. cure b. humanity c. operation d. victim

22. I'm your friend. I will always _____ you.
a. stand by b. pick on c. grow out of d. get rid of

23. I believe in freedom and _____ for all people.
a. justice b. humiliation c. background d. mystery

24. Because of its beauty, that painting _____.
a. burns out b. stands out c. brings up d. calls for

Sample Material © Pearson 2023

25. He won the competition _____ his illness.

a. due to b. based on c. despite d. at least

26. We gave her the job because of her strong _____ in international business.

a. pattern b. instruction c. background d. challenge

27. Please stop making so much noise. I need to _____.

a. concentrate b. determine c. identify d. prescribe

28. Fortunately, the patient _____ from the illness.

a. suffered b. contributed c. intended d. recovered

29. She is the most _____ woman I know. She wins every competition that she enters!

a. beneficial b. fortunate c. advantageous d. depressed

30. His work is _____, but not brilliant.

a. acceptable b. severe c. heavenly d. evil

31. There are many _____ to getting a university education.

a. complaints b. concerns c. traits d. advantages

32. I'm so sorry I woke you up. I didn't _____ it was so early.

a. identify b. realize c. intend d. examine

33. Teenagers are usually very concerned about the opinions of their _____.

a. experts b. personalities c. peers d. perfectionists

34. He is an _____ man. He set fire to a large building. Fortunately, however, everyone survived.

a. evil b. original c. expert d. intentional

35. I wasn't _____ in the project. He did it by himself.

a. fascinated b. involved c. related d. threatened

36. You don't need to bring any _____. We have everything we need to do the job.

a. technique b. theory c. equipment d. challenge

See the Answer Key on page 265.

Sample Material © Pearson 2023