UNIT 3

MAKING MEDICAL Decisions

1 FOCUS ON THE TOPIC

1. What role can genes play in medicine?
2. Do you think medical treatment could be more effective if doctors had genetic information about their patients?
3. Genetic testing is now available very cheaply. Would you want to be tested to find out if you have the gene for a certain disease, even if there were no cure for the disease?

GO TO MyEnglishLab TO CHECK WHAT YOU KNOW.

READING ONE GENETIC TESTING AND DISEASE: WOULD YOU WANT TO KNOW?

VOCABULARY

1 Read the timeline about the history of medicine and medical decision-making. Try to understand the boldfaced words from the context.

PRIMITIVE TRIBAL SOCIETIES ↓	A shaman (holy person) held all the existing medical knowledge. By **interpreting** the patient's symptoms, he would decide on a treatment.
ANCIENT GREECE (5TH CENTURY B.C.E.) ↓	Socrates began the practice of questioning and testing beliefs to discover knowledge. This "Socratic method" had a tremendous **impact** on medical decision-making because it allowed physicians to evaluate treatment methods. As a result, treatments became more **reliable**.
4TH CENTURY B.C.E. ↓	Medical practice was **revolutionized** by Hippocrates, the "father of western medicine." He changed medicine in many ways. For example, he was an **advocate** for publishing medical knowledge, focusing on patient care rather than diagnosis, and demanding physicians act professionally. He also recognized that disease could be caused by the **environment**. That is, diet and living habits are **linked** to disease, and their modification can be beneficial in reducing disease.
2ND CENTURY C.E. ↓	The Skeptics saw the life-saving **potential** of *trial and error* as the basis of medical decision-making.
17TH CENTURY C.E. ↓	Rene Descartes wrote about the mind-body **interaction**, which is the basis of psychology and psychiatry today.
2003	The Human Genome Project identified all the genes in the human body. Now patients are able to make medical decisions based on their own genetic **risk factor**. However, even with the knowledge provided by human gene mapping, there is not always **consensus** about what the best treatment is for a specific patient. Different doctors may recommend different treatments. That is why in the end, patients must weigh the emotional and medical **aspects** of each option and then make their own decision.

2 Find the boldfaced words in the timeline in Exercise 1. Write each word next to its definition.

1. _____ (**n.**) something that is likely to hurt you or be dangerous
2. _____ (**n.**) the effect that an event or situation has on someone or something
3. _____ (**n.**) the possibility that something will develop or happen in a particular way
4. _____ (**n.**) the circumstances, objects, or conditions that surround you
5. _____ (**n.**) the action or influence of people, groups, or things on one another
6. _____ (**n.**) parts or features of a situation, idea, problem, etc.
7. _____ (**n.**) an agreement that everyone in a group reaches
8. _____ (**n.**) strong supporter of a particular way of doing things
9. _____ (**n.**) explaining or deciding on the meaning of an event
10. _____ (**adj.**) able to be trusted; dependable
11. _____ (**v.**) made a connection between two or more events, people, or ideas
12. _____ (**v.**) to have completely changed the way people think or do things

GO TO MyEnglishLab FOR MORE VOCABULARY PRACTICE.

PREVIEW

Read the first two paragraphs of *Genetic testing and disease: Would you want to know?* Work with a partner to answer the questions. Then read the rest of the article.

1. Why do you think Kristen wants to know?
2. How can knowing if she has the gene for Huntington's disease help her live her life better?
3. What do you think Kristen's father thinks about her being tested?

Genetic testing and disease: Would you want to know?

By Janice Lloyd, USA TODAY

1 Kristen Powers finishes packing her lunch and opens the kitchen door to leave for high school with her brother, Nate, in tow.[1] "I drive but always let him pick the music," she says, smiling. He gives her a gentle nudge[2] and they set off to the car.

2 Nothing like having a kid brother behind you, especially when you are embarking[3] on a courageous journey. Kristen, 18, is having blood work done May 18 to find out whether she inherited the defective gene for Huntington's disease, a fatal, neurodegenerative disorder that can debilitate victims as early as their mid-30s. The siblings have a 50-50 chance of developing the rare disease, which claimed their mother's life last year at age 45.

3 Nate, 16, doesn't know whether he'll follow his sister's lead. Only people 18 or older can be tested, unless they're exhibiting symptoms, because a positive result can be shattering news. There's also no cure. Huntington's is devastating on so many levels: People lose coordination, developing wild jerky movements; they suffer behavioral changes, often becoming depressed and psychotic; and in the end, they develop dementia and require total care. One of their last images of their mother was in a wheelchair in a nursing home.

4 Nate "has been amazingly supportive of my wanting to get tested," Kristen says. "He is interested in the whole process, but he's been hesitant over the years to commit to testing, while I've known since I was 15 that I wanted to do this."

5 "Know thyself" has taken on a scientific meaning for a growing number of people who, like Kristen, want a crystal ball to look into their DNA. Ever since the Human Genome Project identified the 20,000 to 25,000 genes in 2003, researchers have continued to identify the ones that play roles in diseases, from Alzheimer's to type 2 diabetes to certain types of cancer. Though lifestyle and environment are big pieces of the puzzle, consider this: Genetic tests could become part of standard care for everyone and **revolutionize** the way medicine is practiced, proponents say.

6 Gone would be the days of waiting to develop a disease. People would know about diseases they are at risk for and could change their living habits or consider treatments.

[1] **in tow:** following closely behind someone or something

[2] **nudge:** push

[3] **embarking:** starting something new, difficult, or exciting

Opponents warn about the **potential** for invasion of privacy—threatening employment and insurance—and the possibility that people equipped with the knowledge of their genetic makeup might make risky and unhealthy decisions.

7 Kristen has had counseling at the University of North Carolina to prepare her for dealing with her testing news, and she copes with stress by walking with her rescue dog, Jake. "Walking is critical for me," she says. She will return to the campus at the end of May with her father, Ed Powers, to get the results.

8 "She's always wanted to take matters into her own hands," her father says. "She's constantly asking what we can do to make things better. I am her biggest backer and want to be there for her every step of the way during this."

Leaning on social media

9 Kristen leans on her kitchen table and explains in a quiet, clear voice that she is ready to handle the news and has no plans to keep it secret. "I started out trying to find answers on the Internet about Huntington's disease," she says, "but I quickly became very disappointed. There's not a good video or an **advocate** for it, like Michael J. Fox is for Parkinson's disease."

10 She has raised $17,580 on the website Indiegogo.com and hired a video crew to make a documentary about the emotional and medical **aspects** of testing on her and her family. "Social media can be a real unifier. There's not much out there yet for young people on Huntington's. I want to change that."

11 Her mother, Nicola Powers, was diagnosed in 2003 after struggling with symptoms for several years. "I remember watching her stumble and walk like a drunk person at times," Kristen says. "That was before we knew what was wrong with her. She was really struggling. It was very scary."

12 Nicola Powers didn't know the disease ran in her family. She grew apart from her biological father after her parents divorced. Once she looked into his medical history because of her symptoms, she discovered he had Huntington's.

13 Kristen doesn't want the gene to be passed on again. She says she won't have children if she tests positive: "I can be candid with potential partners and be responsible," she says.

14 Genetic counselors warn about the emotional **impact** of testing on the person and family. "Some people like to plan everything out," says Brenda Finucane, president of the National Society of Genetic Counselors. "They think the information is empowering, while some people want to see how life plays out."

15 Robert Green has found that most people will not seek out risk information about late-onset Alzheimer's disease if they're not psychologically prepared to handle it. But "it turns out many people handle this kind of information quite well," says Green, associate director for research in genetics at Brigham and Women's Hospital in Boston. "Some changed their wills,[4] and some made lifestyle changes. Taking these tests is all about actionability.[5]"

16 Timing can be tricky, though. Kristen's father and stepmother, Betsy Banks Saul, suggested she hold off until she has a support system at college. "She's a very intelligent,

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[4] **wills:** legal documents that show whom you want to have your money and property after you die

[5] **actionability:** being able to act upon

strong young woman, and we trust her, but we wish we could be nearby to support her," Betsy says.

17 After high school graduation in June, she will attend Stanford, in California — far from her farm, family, and friends. Kristen listened to her parents' concerns and considered putting off testing, "but I am a type A person who has always craved getting information. I want to know."

Not all tests are equal

18 Her test will look for the single gene that causes Huntington's, but most diseases have a more complicated genetic profile. A growing number of tests look at multiple genes that might increase or decrease a person's risk for developing thousands of diseases. Companies market the tests for as little as $100 on the Internet and don't require a physician's signature. But those kinds of results are not always **reliable**, says Ardis Dee Hoven, former chair of the American Medical Association.

19 "In the absence of a medical professional, a patient might have difficulty **interpreting** the test and make decisions that are not healthy decisions," Hoven says. For instance, someone who tests negative for BRCA1 and BRCA2—genes that put people at a higher risk for developing certain breast and ovarian cancers—might not know there are other **risk factors**. Unless the patient has a physician guiding her, Hoven says, she might think she's home-free[6] and skip routine screening tests.

20 David Agus, author of the new book *The End of Illness*, says that's why the company he co-founded, Navigenics, requires customers to get a signature from their doctors before being tested. Navigenics also offers genetic counseling as part of the $300–$400 fee. "Genetics are a small piece of the puzzle, but they're a very important piece," says Agus, head of the Center for Applied Molecular Medicine at the University of Southern California.

21 A cancer specialist, Agus discovered he has an above-average risk for cardiovascular disease and a slightly lower-than-average risk for colon cancer. His doctor put him on a statin to help prevent heart disease, and, he says, "my kids took it upon themselves to keep me away from french fries." He also had a colonoscopy at age 43, earlier than medical standards call for, and had a polyp removed. "Could my polyp have turned into cancer? Who knows? But why should I wait for that to happen? Unless our country can focus on prevention, which testing is all about, our health care costs will be completely out of control."

22 A study of 1,200 patients that was presented in March at an American College of Cardiology meeting found that those who were told they had a gene **linked** to heart disease improved their adherence to statin therapy by 13% compared with those who had not been tested for the gene.

23 "I could see how testing could become embedded[7] in how we treat our patients," Hoven says. "It's always better to prevent disease than to treat it, and quality of life is so much better for people."

How accessibility could change

24 Since the human genome was unraveled[8] a dozen years ago, genetic testing has been

[6] **home-free:** safe and without problems

[7] **embedded:** put something firmly and deeply into something else

[8] **was unraveled:** something very complicated was understood or explained

cost-prohibitive for the average person. The promise was that this breakthrough would lead to a better understanding of myriad[9] diseases and, ultimately, individualized treatments. Whole genome testing studies the **interaction** of our 20,000 to 25,000 genes with one another and with a person's **environment**. The $10,000 price tag, though, is expected to drop to $1,000 within the decade. When the tests become mainstream, doctors could face a dilemma.[10]

25 A study in March reports that 10 of 16 specialists (62%) favored telling a patient he carried the gene for Huntington's if the finding was incidental to why the test was ordered. The study noted that the specialists unanimously agreed on disclosing 21 of 99 commonly ordered genetic conditions for adults, and "multiple expert panels" might be needed to agree on what to tell patients.

26 "This is one of the toughest issues facing the rollout of clinical sequencing (whole genome sequencing)," Green says. He adds that after the study, he co-chaired a forum March 28 of the American College of Medical Genetics to discuss how to form a **consensus**.

27 That's a non-issue for Kristen. She knows she will get an answer. One of her hardest decisions has been picking who will be in the room when she gets her results. She knows she wants the videographers taping. At first she didn't want her father to be there, but she relented when he asked her to reconsider.

28 "I know I can take the news," she says, "Knowledge is power. But I didn't think I could get a positive result and then watch my father cry. I've never seen him cry before."*

[9] **myriad:** a very large number of something

[10] **dilemma:** situation in which you have to make a choice between two or more difficult actions

*Kristin tested negative for Huntington's disease.

MAIN IDEAS

1 Look again at your answers to the questions from the Preview on page 65. How did your answers help you understand the article?

2 Reading One presents the pros and cons of genetic testing. Complete the chart with the information in the box. Then compare answers with a partner.

can choose appropriate treatment plan	There are other risk factors in addition to genes.	can change lifestyle	Positive result can lead to risky, unhealthy decisions.
can prevent diseases rather than just treat them	Positive result can be shattering for patient and family.	Patient may interpret test results incorrectly.	may threaten employment and insurance

POSITIVE	NEGATIVE
I. Can revolutionize medicine a. b. Quality of life is better.	I. Emotional and physical impact a. b.
II. Information is empowering for patient. a. b.	II. Invasion of privacy a.
	III. Results are not always reliable.
	IV. Professional interpretation is not required. a. b.

DETAILS

Reading One mentions many people, places, and names of diseases connected with genetic testing. Match the people, places, and diseases on the left with the information on the right.

1. ____ Ardis Dee Hoven
2. ____ Robert Green
3. ____ Human Genome Project

a. A progressive, degenerative disorder that attacks the brain's nerve cells, or neurons, resulting in loss of memory, thinking and language skills, and behavioral changes. It can be identified through genetic testing.

b. Head of the Center for Applied Molecular Medicine at the University of Southern California, author of *The End of Illness*, and co-founder of Navigenics, a genetic testing company

c. Location of Kristen Powers' counseling center

4. ____ Alzheimer's disease	**d.** An incurable fatal, neurodegenerative disorder that can debilitate victims as early as their mid-30s. It can be identified through genetic testing.
5. ____ David Agus	**e.** A 2003 study which identified the 20,000–25,000 genes in the human body
6. ____ BRCA1 & BRCA2	**f.** A well-known advocate for Parkinson's disease
7. ____ Huntington's disease	**g.** Website where Kristen Powers raised money to hire a video crew
8. ____ University of North Carolina	**h.** Former chair of the American Medical Association who warned that genetic test results are not always reliable
9. ____ Indiegogo.com	**i.** President of the National Society of Genetic Counselors who talks about the emotional impact of testing
10. ____ Brenda Finucane	**j.** Genes that indicate a high risk factor for developing certain breast and ovarian cancers
11. ____ Michael J. Fox	**k.** Associate director for research in genetics at Brigham and Women's Hospital. He talks about using the test results to take (positive) action.

MAKE INFERENCES

INFERRING DEGREE OF SUPPORT

When reading a text dealing with a controversial topic, it is important to be able to infer the degree of support that different people express about it. Some may be more supportive than others. Some may not be supportive at all. How do we "read between the lines" to get a sense of how supportive a person is? What language is used? How often does a statement of support occur? What reservations are expressed?

Look at the example and read the explanation.

Reading One deals with genetic testing. This is clearly a controversial topic as evidenced by the varying viewpoints of the people mentioned in the story.

How strong is Kristen's support of genetic testing?

Very Weak	Weak	Neutral	Strong	Very Strong

In paragraph 4, she notes, "I've known since I was 15 that I wanted to do this." She adds in paragraph 17, "I am a type A person who has always craved getting information. I want to know." Finally, in paragraph 28, she states, "I know I can take the news. Knowledge is power."

From these statements, we can infer that Kristen's support of genetic testing is *Very Strong.*

Understanding the position of people mentioned in a text concerning controversial topics enables the reader to understand the text more thoroughly.

Think about the people mentioned in Reading One. Rate their support of genetic testing, based on what they say and do, by putting an **X** in the correct column. Reread the indicated paragraph(s) to support your choice. Compare your answers with a partner's.

	Paragraph(s)	Very Weak	Weak	Neutral	Strong	Very Strong
NATE, KRISTEN'S BROTHER	3					
KRISTEN'S FATHER	7, 8					
BRENDA FINUCANE	14					
ROBERT GREEN	15, 26					
BETSY BANK SAUL	16					
ARDIS DEE HOVEN	18, 19					
DAVID AGUS	20, 21					

EXPRESS OPINIONS

Discuss the questions in a small group. Then share your answers with the class.

1. If you were in Kristen's position, would you have chosen to be tested?
2. Do you think genetic testing has more potential benefits than possible problems? Explain.
3. If you had a genetic test and it indicated you were at risk for a certain disease, who would you share the information with? Would you tell your children, brothers and sisters, cousins? How would you make this decision? Explain.

GO TO MyEnglishLab *TO GIVE YOUR OPINION ABOUT ANOTHER QUESTION.*

READING TWO NORMAN COUSINS'S LAUGHTER THERAPY

READ

Norman Cousins was a well-known American writer and editor. When he was diagnosed with a serious illness, he was not content to let the doctor make all of his medical decisions. He decided to use his own type of alternative therapy. He focused on the importance of a positive attitude in healing. After writing about his successful recovery, he received mail from all over the world. Many letters came from doctors who supported his ideas.

1 **Look at the boldfaced words in the reading and think about the questions.**

1. Which words do you know the meanings of?
2. Can you use any of the words or phrases in a sentence?

2 **Read the article about Norman Cousins. As you read, notice the boldfaced vocabulary. Try to guess its meaning from the context.**

Charlie Chaplin

Norman Cousins's Laughter Therapy

1 In the summer of 1964, well-known writer and editor Norman Cousins became very ill. His body ached, and he felt constantly tired. It was difficult for him to even move around. He **consulted** his physician, who did many tests. Eventually, he was diagnosed as having ankylosing spondylitis, a very serious and destructive form of arthritis.[1] His doctor told him that he would become immobilized[2] and eventually die from the disease. He was told he had only a 1 in 500 chance of survival.

2 Despite the diagnosis,[3] Cousins was determined to overcome the disease and survive. He had always been interested in medicine and had read the work of organic chemist Hans Selye, *The Stress of Life* (1956). This book discussed the idea of how body chemistry and health can be damaged by emotional stress and negative attitudes. Selye's book made Cousins think about the possible benefits of positive attitudes and emotions. He thought, "If negative emotions produce (negative) changes in the body, wouldn't positive emotions produce positive chemical changes? Is it possible that love, hope, faith, laughter, confidence, and the will to live have positive therapeutic value?"

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[1] **arthritis:** a disease that causes pain and swelling in the joints of the body
[2] **immobilized:** not able to move
[3] **diagnosis:** identification of what illness a person has

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3 He decided to concentrate on positive emotions as a remedy to heal some of the symptoms of his ailment. In addition to his **conventional** medical treatment, he tried to put himself in situations that would **elicit** positive emotions. "Laughter Therapy" became part of his treatment. He scheduled time each day for watching comedy films, reading humorous books, and doing other activities that would bring about laughter and positive emotions. Within eight days of starting his "Laughter Therapy" program, his pain began to decrease, and he was able to sleep more easily. His body chemistry even improved. Doctors were able to see an improvement in his condition! Within a few months' time, he was able to walk wearing a metal brace. Soon after that, he was able to return to work. He actually reached complete recovery in a few years. He lived for 26 years after he became ill. He died in 1990 at the age of 75.

4 **Skeptical** readers may question the doctor's preliminary diagnosis, but Cousins believed his recovery was the result of a mysterious mind-body interaction. His "Laughter Therapy" is a good example of one of the many **alternative**, or nonconventional, medical treatments people look to today.

COMPREHENSION

Write answers to the questions. Use a separate piece of paper.

1. What was Norman Cousins' original diagnosis and how did he respond?
2. What is the connection between mind and body in Laughter Therapy?
3. What are some examples of Laughter Therapy?
4. How did Cousins benefit from his Laughter Therapy?

GO TO MyEnglishLab FOR MORE VOCABULARY PRACTICE.

READING SKILL

1 In Reading Two, the author describes a number of events that take place around the year 1964: Cousins's diagnosis with arthritis, his reading books by Hans Selye, his invention of Laughter Therapy, etc. What is the order in which these different events take place? How do you know?

USING A TIMELINE TO ORGANIZE THE SEQUENCE OF EVENTS

Making a timeline of events in a narrative is a useful way to organize and remember information. This organization can help readers understand the text. In the article about Norman Cousins, a number of events happen before, during, and after the summer of 1964.

Look at paragraph 3. The author states, "Within eight days of starting his 'Laughter Therapy' program [later in the summer of 1964], his pain began to decrease, and he was able to sleep more easily. His body chemistry even improved."

How would you complete the timeline?

Later in the summer of 1964	
8 days later	

What happened later in the summer of 1964?
Cousins was diagnosed with a severe form of arthritis and started his Laughter Therapy program.

What happened eight days later?
Cousins's pain decreased, he was able to sleep better, and his body chemistry improved.

Understanding how events are related chronologically can increase the comprehension and retention of the information you read. Using a timeline is one way to do this.

2 Go back to Reading Two. Complete the timeline using information from the article.

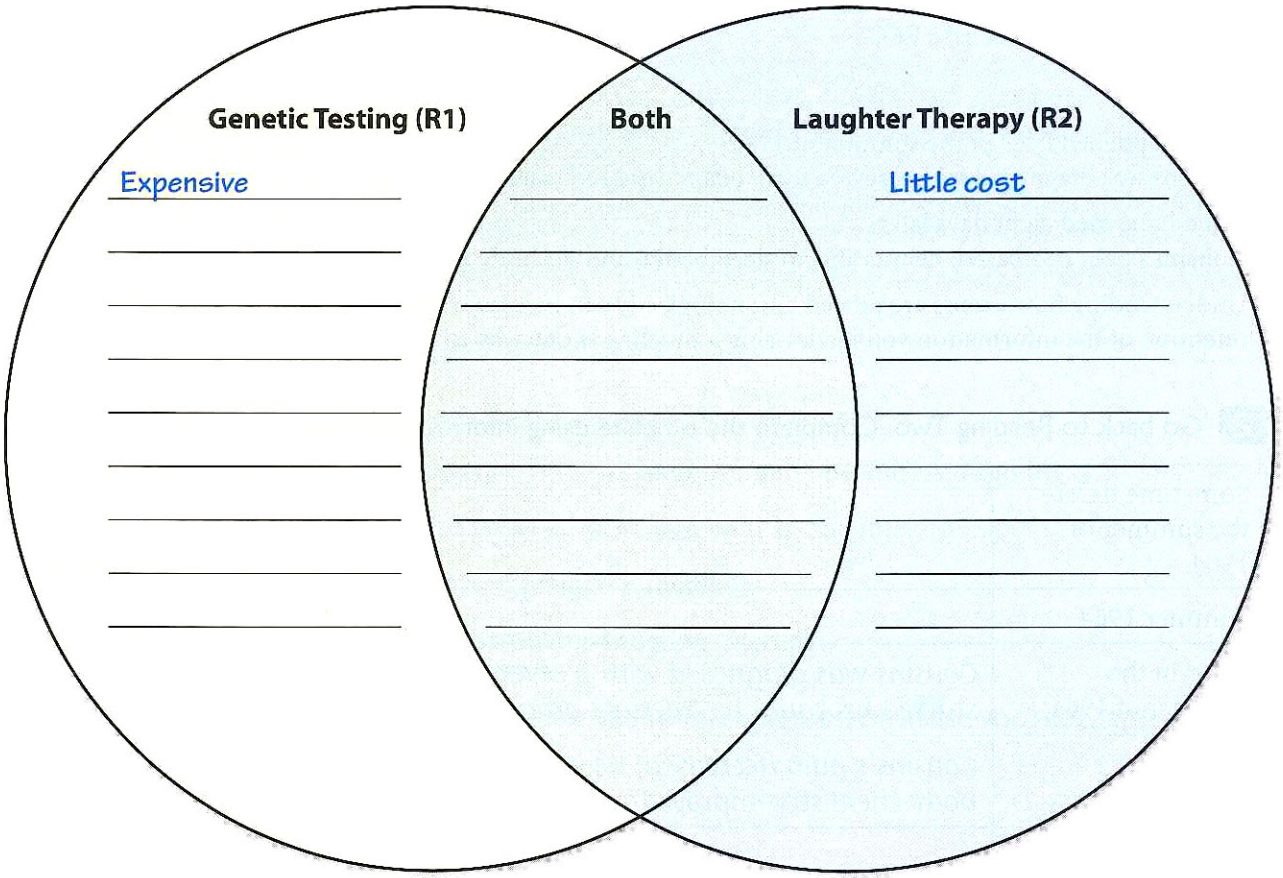
Sometime before the summer of 1964	
Summer 1964	
Later in the summer of 1964	*Cousins was diagnosed with a severe form of arthritis and started his Laughter Therapy program.*
8 days later	*Cousins's pain decreased, he was able to sleep better, and his body chemistry improved.*
A few months later	
Soon after that	
A few years later	
1990	

GO TO MyEnglishLab FOR MORE SKILL PRACTICE.

CONNECT THE READINGS

STEP 1: Organize

You have read about genetic testing in Reading 1 (R1) and Norman Cousins's Laughter Therapy in Reading 2 (R2). What are the similarities and differences between them? Complete the Venn diagram with information from both readings. In the left circle, write notes that are true only about the genetic testing. In the right circle, write notes that are true only about Norman Cousins. In the middle, write notes that are true for both.



STEP 2: Synthesize

On a separate piece of paper, write a short paragraph explaining the similarities and differences between the genetic testing story and Norman Cousins's story. Use the information from Step 1.

GO TO MyEnglishLab TO CHECK WHAT YOU LEARNED.

3 FOCUS ON WRITING

VOCABULARY

REVIEW

Complete the paragraph using the words in the boxes.

advocates	impact	potential	revolutionize	risk factors

Many people believe that genetic testing will _____ (1.) the practice of medicine. These _____ (2.), who support genetic testing, believe it has the _____ (3.) to save many lives. They point out that the _____ (4.) indicated by genetic test results can help patients choose an appropriate treatment plan. These supporters acknowledge that the _____ (5.) of a positive test could be devastating, but point out that with proper counseling this negative aspect of genetic testing will not be a problem.

consult	environment	linked	reliable	skeptical

However, others are _____ (6.) of the value of genetic testing. For one thing, some people don't believe it is _____ (7.). In addition, they note that without professional help to interpret the results, patients may experience more harm than good from the tests. Of course, if patients were required to _____ (8.) with their doctors about the results, this problem would be eliminated. Another problem they see is that some diseases are not caused by genetics. They are _____ (9.) to the _____ (10.).

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alternative	consensus	conventional	interaction

A further area of concern is that doctors still do not fully understand the _____ 11. between specific genes and how this affects the possibility for disease. Although there may never be _____ 12. on the value of genetic testing, the way the public and the medical establishment view specific treatments and therapies may change over time. Don't forget that when Norman Cousins first used Laughter Therapy in the summer of 1964, it was definitely viewed as a(n) _____ 13. therapy. Nowadays, it is used in many hospitals around the world, and has entered the realm of _____ 14. medicine.

EXPAND

1 Work with a partner. Write **S** if the word pairs have a similar meaning and **D** if they have a different meaning.

1. reliable / dependable S
2. impact / interaction ____
3. conventional / alternative ____
4. interpret / elicit ____
5. revolutionize / change ____
6. environment / surroundings ____
7. treatment / diagnosis ____
8. linked / connected ____
9. elicit / produce ____
10. consensus / disagreement ____
11. consulted / asked advice of ____
12. potential / ability ____
13. aspect / factor ____
14. skeptical / doubtful ____
15. advocate / supporter ____

2 Write the word that best completes each sentence.

1. The _____ *(impact / interaction)* of a positive test result can be devastating for a patient.
2. A medical professional can help a patient _____ *(elicit / interpret)* genetic test results.

3. After the doctor told Norman Cousins he was suffering from ankylosing spondylitis, Cousins had to decide on his _____ *(treatment / diagnosis)*.

4. The idea of genetic testing is still a controversial topic. There is ongoing _____ *(disagreement / consensus)* on when it should be used.

5. When Norman Cousins first used Laughter Therapy, it was considered a(n) _____ *(alternative / conventional)* treatment.

6. Norman Cousins watched comedy films as a way to _____ *(revolutionize / elicit)* positive emotions.

7. Some people are skeptical of Cousins's original _____ *(diagnosis / treatment)*. They don't think he was really suffering from a severe form of arthritis.

CREATE

Imagine that you are going to interview Kristen Powers or Norman Cousins. On a separate piece of paper, write four interview questions that you would like to ask. Use at least one word from the box in each question. Then work with a partner. Answer each other's questions as if you were Kristen Powers or Norman Cousins.

advocate	consensus	elicit	impact	link	revolutionize
alternative	consult	environment	interaction	potential	skeptical
aspect	conventional	factor	interpret	reliable	

GO TO MyEnglishLab FOR MORE VOCABULARY PRACTICE.

GRAMMAR

1 Examine the sentences with a partner. Write **T** (true) or **F** (false) for the statements that follow the sentences.

a. **If** Kristen Power's mother **hadn't died** of Huntington's disease, Kristen **might not have wanted** to be tested.

b. **If** Kristen's mother **had been** closer to her biological father, Kristen **could have known** that Huntington's disease ran in her family.

c. **If** Norman Cousins **hadn't read** Hans Selye's book, Cousins **wouldn't have invented** Laughter Therapy.

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1. In sentence *a*: Kristen's mother died. ____

   Kristen didn't want to be tested. ____

2. In sentence *b*: Kristen's mother wasn't close to her father. ____

   Kristen didn't know Huntington's disease ran in her family. ____

3. In sentence *c*: Norman Cousins didn't read Hans Selye's book. ____

   Norman Cousins invented Laughter Therapy. ____

PAST UNREAL CONDITIONALS

1. A **past unreal conditional** sentence has two clauses: the ***if* clause**, which gives the condition, and the **result clause**, which gives the result. The sentence can begin with the *if* clause or the result clause, and the meaning is the same.

2. There are two important things to notice in past unreal conditional sentences:
   - the use of the comma when the *if* clause comes at the beginning of the sentence
   - the verb forms used in each clause

If Clause	Result Clause
If + subject + past perfect,	subject + *would (not) have* + past participle *could (not) have* *might (not) have*
If Kristen's father **hadn't supported** her,	she **might not have wanted** a genetic test.

Result Clause	*If* Clause
Subject + *would (not) have* + past participle *could (not) have* *might (not) have*	*if* + subject + past perfect
Norman Cousins **might not have survived**	if he **hadn't used** Laughter Therapy.

3. The past unreal conditional talks about past unreal, untrue, or imagined conditions and their results. Both parts of the sentence describe events that are the opposite of what happened.

   Conditional statement: Kristen **could not have been tested if** the Human Genome Project **hadn't identified** all the genes in the human body.

   What really happened: Kristen was tested. The Human Genome Project did identify all the genes in the human body.

4. The past unreal conditional is often used to express regret about what really happened. In sentences like this, use *would have* in the result clause. To express possibility or uncertainty about the result, use ***might have*** or ***could have*** in the result clause.

2 Read the conditional sentences. Write **T** (true) or **F** (false) for each statement that follows the sentences.

1. If David Agus hadn't taken a genetic test, he wouldn't have discovered his risk for cardiovascular disease.

   __T__ He took a genetic test.

   __F__ He didn't discover his risk for cardiovascular disease.

2. If Norman Cousins had been healthy, he wouldn't have had to try Laughter Therapy.

   _____ Norman Cousins was healthy.

   _____ He didn't have to try Laughter Therapy.

3. Kristen's parents might not have been so worried if she had decided to go to a nearby college.

   _____ Kristen decided to go to a nearby college.

   _____ Her parents were worried.

4. The family wouldn't have understood Kristen's mother's symptoms if she hadn't been diagnosed with Huntington's disease.

   _____ The family understood her symptoms.

   _____ Kristen's mother was not diagnosed with Huntington's disease.

5. If there had been a famous advocate for Huntington's disease, Kristen might not have decided to make a documentary about her genetic testing.

   _____ There is not a famous advocate for Huntington's disease.

   _____ Kristen decided to make a documentary.

6. If Kristen hadn't had counseling, she might not have been prepared to deal with the test results.

   _____ Kristen didn't have counseling.

   _____ Kristen was prepared to deal with the test results.

7. If Norman Cousins hadn't survived for 26 more years, Laughter Therapy might not have received so much publicity.

   _____ Norman Cousins survived for 26 more years.

   _____ Laughter Therapy received a lot of publicity.

(continued on next page)

8. If Norman Cousins hadn't believed in a mind-body interaction, Laughter Therapy would not have been effective for him.

   _____ Norman Cousins didn't believe in a mind-body interaction.

   _____ Laughter Therapy didn't work for him.

3 Write a sentence about each situation. Use the past unreal conditional.

1. A female patient chose a treatment plan based on her genetic test results. She soon felt better. *If she hadn't chosen the correct treatment plan, she might not have felt better.*

2. Kristen Powers always wanted all the information available. She chose to be genetically tested. _____

3. Norman Cousins read *The Stress of Life* by Hans Seyle. When Cousins was diagnosed with ankylosing spondylitis, he already had some ideas about the mind-body connection. _____

4. Norman Cousins was sick. He tried to cure himself by using Laughter Therapy. He made a complete recovery. _____

5. David Agus had a genetic test, and he found out that he was at risk for cardiovascular disease. His children made him change his diet. _____

6. Kristen's mom contacted her biological father. She learned that Huntington's disease ran in their family. _____

7. Norman Cousins wasn't satisfied with his doctor's treatment plan. He developed his own Laughter Therapy treatment. _____

GO TO MyEnglishLab FOR MORE GRAMMAR PRACTICE AND TO CHECK WHAT YOU LEARNED.

FINAL WRITING TASK

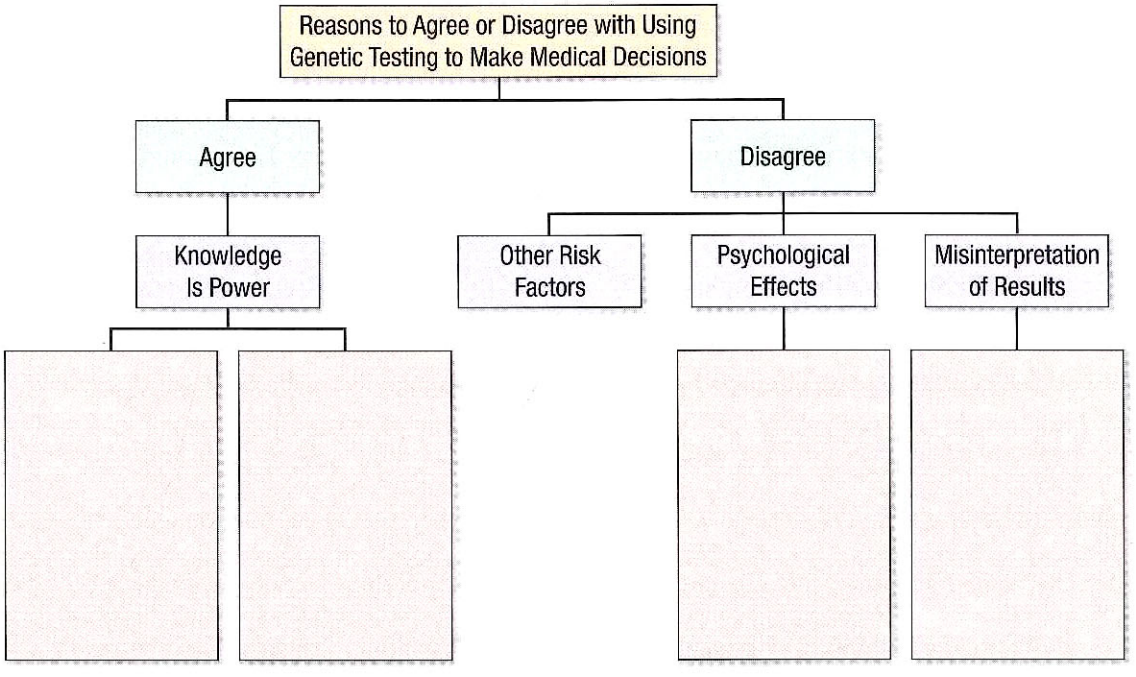
In this unit, you have read about genetic testing. Genetic testing can be ordered and interpreted by medical professionals. It can also be done at home by sending saliva samples to private companies. In these cases, there is often no consultation or interpretation offered.

You are going to ***write a four-paragraph opinion essay expressing your opinion on making medical decisions based on genetic testing***. Use the vocabulary and grammar from the unit.*

PREPARE TO WRITE: Tree Mapping

Tree mapping helps you to organize ideas about a topic. The topic is written on the top line. Your ideas are written in branches leading from the topic. You can include reasons and evidence on smaller branches.

Complete the tree map. Then discuss your tree map with a partner. Notice how the ideas become more detailed as the branches extend.



* For Alternative Writing Topics, see page 89. These topics can be used in place of the writing topic for this unit or as homework. The alternative topics relate to the theme of the unit but may not target the same grammar or rhetorical structures taught in the unit.

WRITE: An Opinion Essay

An **essay** is a group of paragraphs about one topic. An **opinion essay** is written to persuade or convince the reader that your opinion is "the right way of thinking." An opinion essay has three parts: the **introduction**, the **body**, and the **conclusion**.

INTRODUCTION

The **introduction** is the first paragraph of your essay. It includes a thesis statement that introduces the topic and states the main idea. The introduction should capture the readers' attention and make them want to read on. Many introductions begin with general background information on the topic and often end with the thesis statement as the last sentence of the paragraph. In an opinion essay, the thesis statement should state your opinion about the topic. *Tip*: Some writers find it helpful to write their introductory paragraph after they have completed their essay.

BODY

The **body** is one to three paragraphs. The body supports the thesis statement by giving examples, details, reasons, and facts to support the thesis statement. Each paragraph should start with a clearly stated topic sentence that relates to the thesis statement. In addition, because you are trying to convince your readers to accept your opinion, you need to give evidence to support your opinion. You also need to give reasons that explain why the evidence supports your opinion.

CONCLUSION

The **conclusion** should restate the thesis statement and include the writer's final thoughts on the topic. For example, the writer can give advice, suggest a solution to a problem, or predict what will happen in the future. The conclusion should not include new or unrelated topics.

Note: See Unit 1 Final Writing Task, pages 25–32 and Unit 2 Final Writing Task, pages 55–59 for more information on paragraph writing.

1 Read the opinion essay. Then complete the essay organizer with the parts of the essay.

Home Genetic Testing

Disastrous. Depressing. These two words come to mind when reading about home genetic testing. Because of the many adverse effects it can cause, I cannot understand why this type of 'service' is available without stricter regulations. First, let me say that my great-grandfather and my grandmother both suffered from Huntington's disease. I am a well-educated college graduate with a Master's degree in biology. I am thirty years old and so far show no signs of developing Huntington's. I don't think knowing whether I have the potential to develop an incurable disease will, in any way, enhance the quality of my life, nor would I be able to interpret the test results without the help of a medical professional. From this personal perspective, I believe that home genetic testing should be much more strictly regulated, if not prohibited all together.

I have witnessed the devastating effects that home genetic testing can have. A 55 year-old co-worker of mine whose family had a history of cancer submitted a DNA sample to an Internet genetic testing company. He was told that he had an 83% chance of developing colon cancer. He was convinced that because of this test result, he was going to die. After the test, this was all he could think about. This fear of impending tragedy made it impossible for him to concentrate on his work. As a result, his work suffered, and eventually he was let go. Finally, he went to a doctor and was retested. The doctor was able to interpret the results and explain to him that by taking the correct medications and changing his lifestyle, he could expect to live for many more years and very possibly never develop colon cancer. This is exactly why genetic testing must have stricter regulations.

The results of genetic testing are seen as infallible and definitive. Neither of these assumptions is true. Genetic testing is currently in its infancy, and even doctors and researchers do not fully understand the interaction between different genes. Very few diseases can be indicated by a single gene, so, until the link between diseases and multiple genes has been further studied, there is the potential for false positives and false negatives. In addition, environmental factors play a large part in who develops a disease and who doesn't. DNA is not the only factor affecting disease. For example, some cancers and other diseases are caused by exposure to chemicals or even to the sun. They have nothing to do with genetics. Knowledge is power, but it is important that that knowledge be accurate.

If we, as a society, truly believe that genetic testing has more benefits than negative effects, it is our responsibility to regulate it so all testing includes counseling and interpretation by professionals. In this way, patients can choose the treatment that is appropriate and effective for their genetic profile and lifestyle. Do we, as a society, truly believe that home genetic testing can be an effective method of choosing treatment without this professional counseling and interpretation?

Remember, the key is that to truly be able to make the best medical choices, medical professionals need to be involved in any decision.

2 Create an essay organizer like the one below with information for your opinion essay about making medical decisions based on genetic testing.

THREE PARTS OF AN ESSAY	NOTES
I. Introduction	**Background Information:**
Thesis Statement:	
II. Body Paragraph 1	**Body Paragraph 1**
Topic:	Support/Evidence:
Body Paragraph 2	**Body Paragraph 2**
Topic:	Support/Evidence:
III. Conclusion	
Restate the Thesis:	
Final Thought/Wrap Up:	

3 Now write the first draft of your opinion essay. Use the information from Prepare to Write and your essay organizer to plan your essay. Make sure you have four paragraphs: an introductory paragraph, two body paragraphs, and one concluding paragraph. Be sure to use grammar and vocabulary from the unit.

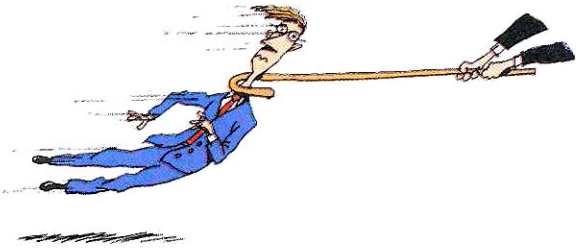
REVISE: Writing Introductions and Hooks

The **introductory paragraph** is very important in all essays. The reader will decide whether or not your essay is worth the time and effort to read, depending on how interesting your introductory paragraph is. The introduction for an opinion essay should:

- state who you are and why your opinion matters;
- provide background information about the topic;
- provoke the reader's interest with a hook;
- include a thesis statement.

A **hook** is a sentence or two meant to grab the reader's attention. The hook could be:

- a shocking or surprising sentence;
- an anecdote (story);
- an interesting point;
- a quote.



1 Is there a hook in the essay "Home Genetic Testing" on page 84? What is it? Is it effective? Why or why not? Share your answer with a partner.

2 Read the hooks from introductions of opinion essays. Check (✓) the hooks you think are effective. Discuss your answers with a partner.

1. ____ "Genetic testing definitely saved my life! If I hadn't been tested, I would never have known that I had an elevated risk of type-2 diabetes. Because of my test results, I was able to change my lifestyle before developing the disease," says Dr. Neville Clynes of Columbia Presbyterian Hospital.
2. ____ People are becoming more interested in genetic testing. Genetic testing can be very useful in making medical decisions.
3. ____ Stop! Don't go to the doctor! You can cure all problems with genetic testing. Or at least that's what people who believe in genetic testing would have you believe.
4. ____ People should stick with conventional medicine because it has been proven. There is no proof that genetic testing is an effective tool in making medical decisions.
5. ____ There are some studies that prove genetic testing can help with medical decision-making. This is why genetic testing should be a regular part of medical treatment.
6. ____ Dr. Robert Grasberger finally, after almost 3 months of consultation, understood what was wrong with his patient. What had he done? He had ordered a genetic test; the results explained everything.
7. ____ Imagine a world in which people are given jobs entirely based on their genes. Marriages are permitted only between couples whose genetic matchup ensures a "perfect" child. This is the future genetic testing will bring! Is this the future you want?

3 Look at the introductory paragraph in your first draft. Make sure you have all the parts of an effective introduction. If you don't have a hook, add one.

EDIT: Writing the Final Draft

Go to MyEnglishLab and write the final draft of your essay. Carefully edit it for grammatical and mechanical errors, such as spelling, capitalization, and punctuation. Make sure you use some of the grammar and vocabulary from the unit. Use the checklist to help you write your final draft. Then submit your essay to your teacher.

FINAL DRAFT CHECKLIST

- ❑ Does the essay have an introduction, two body paragraphs, and a conclusion?
- ❑ Does the introduction include a thesis statement, background information about the topic, and a hook?
- ❑ Does each paragraph have a topic sentence?
- ❑ Do all the topic sentences support the thesis statement?
- ❑ Does the essay have a conclusion that restates the thesis and includes a final thought?
- ❑ Did you use the past unreal conditional correctly?
- ❑ Have you used vocabulary from the unit?

UNIT PROJECT

In this unit, you have read about using genetic testing to make medical decisions. Genetic testing is also used for a variety of other reasons. You are going to research two genetic testing companies and find out what services they offer. Do they provide information about ancestry, ethnicity, paternity, or different health-related issues? Follow these steps:

STEP 1: In small groups, report on two genetic testing companies. Do research on the Internet to complete the following information.

DOES THE COMPANY TEST FOR:	COMPANY #1: _____	COMPANY #2: _____
ANCESTRY?		
ETHNICITY?		
HEALTH? (EXPLAIN)		
PATERNITY?		
OTHER? _____		
MORE QUESTIONS		
WHAT IS THE COST?		
IS THE COST DIRECT TO CONSUMERS?		
HOW IS DNA COLLECTED AND SUBMITTED?		
IS COUNSELING AND INTERPRETATION PROVIDED?		
WHEN WAS THE COMPANY ESTABLISHED?		

STEP 2: Compile your information and prepare a poster or PowerPoint™ presentation with your findings. Present the information to the class.

ALTERNATIVE WRITING TOPICS

Write an essay about one of the topics. Use the vocabulary and grammar from the unit.

1. Ethicists worry that genetic testing will be used not just to help make medical decisions, but to discriminate against people. They foresee a world in which test results could prevent people from getting high-paying jobs, insurance and welfare benefits, and even being able to marry. Do you believe such uses of test results will happen and be a problem? If so, does this issue outweigh the potential medical benefits of genetic testing?
2. What do you think of Norman Cousins's Laughter Therapy? Do you think there is any truth to the idea of a mind-body interaction? Have you, or someone you know, had a medical experience where the mind was stronger than the body?

GO TO MyEnglishLab TO WRITE ABOUT ONE OF THE ALTERNATIVE TOPICS, WATCH A VIDEO ABOUT A SLEEP CLINIC, AND TAKE THE UNIT 3 ACHIEVEMENT TEST.