UNIT 4

The Power of Music

In this unit, you will

- read about how the brain responds to music and about some features of technical description.
- review cause and effect.
- increase your understanding of the target academic words for this unit.

READING SKILLS Finding the Perpetrator; Point of View

Self-Assessment

Think about how well you know each target word, and check (✓) the appropriate column. I have…

TARGET WORDS	never seen the word before	seen the word but am not sure what it means	seen the word and understand what it means	used the word, but am not sure if correctly	used the word confidently in *either* speaking *or* writing	used the word confidently in *both* speaking *and* writing
AWL						
confer						
diminish						
foundation						
fundamental						
incorporate						
intrinsic						
manipulate						
physical						
prime						
project						
refine						
stress						
theory						
transmit						

Oxford 3000™ keywords

Outside the Reading What do you know about music?
Watch the video on the student website to find out more.

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Before You Read

Read these questions. Discuss your answers in small groups.

1. All cultures have music, but cultures and individuals disagree on what sounds good. Is there any kind of music that sounds good to most people?
2. What kind of music do you like most? What makes this music interesting to you?
3. Do you think there will someday be a pill that can make people more creative? Would you take it?

MORE WORDS YOU'LL NEED

auditory: related to hearing
circuitry: a system of electrical pathways (such as neural pathways in the brain)
pitch: the highness or lowness of a musical note
quasi-: prefix meaning "seemingly" or "partially" so

Read

This article from an online magazine reports some of the recent findings concerning the connection between emotional reactions to music and biology.

WHY DOES MUSIC MOVE US?

SCIENCE GETS CLOSER TO THE INTERSECTION OF BIOLOGY AND CREATIVITY

Researchers are only now beginning to unlock the secrets of the brain. It seems like every month some new study or another comes along to explain why we get addicted to nicotine or how our neural pathways were changed because we studied piano as children.

Isolating which part of the brain is responsible for moving your big toe is a neat trick. But what about "softer" functions like figuring out how judgment is formed or music is made? "Why Music Moves Us: The Cognitive Neuroscience[1] of Music," a **conference** at the Swedish Medical Center in Seattle in 2005, tried to ask some **fundamental** questions about how the brain "hears" and translates sound into music.

We know how the ear catches sound and how the sound waves are translated by about 30,000 auditory nerves into electrical and chemical signals that are **transmitted** to the brain. But how is it that the neurons in the brain translate those signals into something we recognize as music? Scans show that the brain is much more actively engaged with music than with speech. But there is no actual **physical** sound in your brain. No notes. No music. Only neurons.

"The idea of pitch is a mental phenomenon," says Robert Zatorre, professor of neuroscience at McGill University in Montreal. Only the way

[1] *neuroscience:* the field of science devoted to the study of the nervous system and the brain

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sounds are organized makes them interesting. Brain scans show that different parts of the brain register activity depending on the kind of music played. Dissonance[2], for example, is generally perceived as unpleasant, and it provokes reactions in a different region of the brain than consonant[3] harmonies do.

Music is a basic human condition. We are born **primed** to pick up on beat regularities and able to put sound in some sort of coherent order. All cultures have music, and the ability to recognize music comes before speech. The brain is wired with reward and avoidance circuitry, and music rates high in the reward region.

There is strong evidence that our attraction to music isn't just for enjoyment. Music helps build community. Think, for example, of how nations and institutions use songs to bring people together, the thrill of singing your national anthem or the "old school song." Music can also aid healing. Patients who have suffered strokes or other brain injuries often show dramatic improvement in their recovery if music or rhythm is played during therapy, reported Michael Thaut, professor of music and neuroscience at Colorado State University.

Our understanding of how the brain perceives music is still rudimentary, and researchers haven't even developed reliable tests to measure what we want to know about some of the most basic brain functions. Trying to measure, for example, if the brain has a different electrical reaction to music it likes than to music it doesn't is quite difficult because "like" and "dislike" are subjective terms that are hard to quantify scientifically.

Still, it's clear that our perceptions of the world have a **physical foundation** in the brain, and those perceptions can be altered. Studies have shown, for example, that the recognition of pitch can be altered by as much as one and a half tones with medication.

Mark Tramo, director of the Institute for Music & Brain Science at Harvard Medical School, told the **conference** that while the field of studying the neuroscience of how we perceive music is still young, someday we'll know enough to be able to plant tiny neuro-bionic chips in the brain to alter perceptions and "fix" problems. It doesn't take much imagination to **project** a little further out and imagine a day when we start to understand how the brain processes ideas or "produces" creativity.

What if it turns out that art and creativity are merely the product of a series of switches in the brain firing off in the right sequence? Would it **diminish** our appreciation of art?

Artists have always occupied a special place in society in part because no one—even artists themselves—has been able to pin down the essential act of making art and explain how inspiration and creativity work. Without a rational explanation for the process of creating art, it's much easier to romanticize[4] artists and attribute their talent to mysterious and unknowable qualities.

But what if we are able to eventually reduce creativity to biochemical formulas? Surely that would change the way we look at artists. It might even take the mystery out of their art. If we could create neuro-bionic chips to cure brain disorders, why not pills that induce creativity on demand? If you created under the influence of these pills, would that seem like cheating, somehow? Surely some might claim that neuro-induced art would give some artists unfair advantage over others. Should we care? After all, if good art is really what's important, then who cares how it was created?

And isn't it true that art **incorporates** so much of the artist's experience that even if we are able to unlock biologically-enhanced creativity, it's doubtful that it would result in a surge of "super-art?"

Still, as science gets closer to the intersection of biology and creativity, and the mystery of the artistic impulse is graphed and charted, it's worth pondering what we consider to be the essential qualities that make art unique.

[2] *dissonance:* a technical term in music referring to combinations of sounds that are unpleasant together
[3] *consonant:* in music, a term describing notes that sound pleasant together; the opposite of dissonant
[4] *romanticize:* make something seem more attractive or interesting than it really is

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Reading Comprehension

A. Mark each sentence as *T* (true) or *F* (false) according to the information in Reading 1. Use the dictionary to help you understand new words.

___ 1. Locating the area of the brain that controls toe movement is impossible.

___ 2. Sound waves themselves do not enter the brain.

___ 3. People need to learn how to speak before they can appreciate music.

___ 4. There is evidence that music may help people with brain injuries.

___ 5. We are now able to improve people's creativity and perception of music with brain implants.

___ 6. The reading says that neuroscience will destroy our appreciation of art.

___ 7. The reading implies that artistic success is entirely a product of the physical brain.

___ 8. The secrets behind artistic success may seem less mysterious in the future.

B. Read these sentences paraphrased from Reading 1. Then scan the article to find the original sentences. Write the line number of the original on the line.

___ 1. Listening to music activates the brain more than listening to speech does.

___ 2. Music is a universal experience for all humans.

___ 3. The facts suggest that music is for more than just pleasure.

___ 4. The way we view the world is largely determined by the physical properties of our brains.

___ 5. We can artificially alter our perception of music.

___ 6. No doubt we would see artists differently.

READING SKILL Finding the Perpetrator

LEARN

In this sentence from Reading 1, the subject of the sentence—*researchers*—is the "perpetrator." These *researchers* are doing something.

Researchers are only now beginning to unlock the secrets of the brain.

When the topic is technical and the style formal, writers often omit mention of the perpetrator. Perhaps the perpetrator is not important, not known, or too obvious.

Dissonance, for example, is generally perceived as unpleasant.

In this sentence, no perpetrator is indicated, but from the context we know it is "people." We can reword the sentence to show the perpetrator.

People generally perceive dissonance, for example, as unpleasant.

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APPLY

Read these excerpts from Reading 1. Look at the excerpts in context to determine the perpetrator and then write it in the blank. Write "unknown" if it is not possible to determine the perpetrator from the context.

Excerpt	Perpetrator?	
1. ...judgment is formed... (line 12)	*Who or what forms it?*	the brain
2. ...music is made? (line 12)	*Who or what makes it?*	_____
3. We are born primed to pick up on beat regularities... (line 39)	*What primes us?*	_____
4. The brain is wired with reward and avoidance circuitry... (line 43)	*Who or what wired it?*	_____
5. ...if music or rhythm is played during therapy... (line 54)	*Who or what plays it?*	_____
6. ...and those perceptions can be altered. (line 68)	*What can alter them?*	_____
7. ...how it was created? (line 108)	*Who created it?*	_____
8. ...and the mystery of the artistic impulse is graphed and charted... (line 115)	*Who or what graphed and charted it?*	_____

The sentences in the preceding exercise have passive verb forms: *is formed, is made, can be altered*. With passive verb forms, we can add a prepositional phrase to show the perpetrator. The phrase usually starts with *by* or *with*.

The sound waves are translated by about 30,000 auditory nerves into electrical and chemical signals.

The recognition of pitch can be altered with medication.

"Auditory nerves" and "medication" are the perpetrators.

Vocabulary Activities

Noun	Verb	Adjective	Adverb
conference	confer	_____	_____
diminishment	diminish	diminishing diminished	_____
foundation	_____	foundational	_____
fundamental	_____	fundamental	fundamentally
incorporation	incorporate	incorporated	_____
_____	_____	physical	physically
primacy	prime	prime primed	_____
transmission transmitter	transmit	_____	_____

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A. Fill in the blanks with a target word from the chart that completes the sentence in a grammatical and meaningful way.

1. Music is _____ a product of the brain and its neural mechanisms.
2. The human auditory organs and the brain seem to be _____ to respond to music.
3. The scientists held a _____ to discuss the latest research into creativity and the brain.
4. The people at the meeting are interested in exploring the neural _____ of our appreciation of music.
5. How are the _____ properties of sound translated into music that the brain can hear?
6. Neurons _____ information via chemical and electrical synapses in the brain.
7. Will our appreciation of art _____ if we learn the secrets of human creativity?
8. Art almost certainly _____ the artist's personal experiences.

B. Using your dictionary, decide which meaning of the word *physical* is expressed in each sentence. Match it with the definition on the right. Compare answers with a partner.

___ 1. Pitch is a physical property of sound.	a. relating to the body
___ 2. The game became very physical in the fourth quarter.	b. relating to natural things that can be observed or measured
___ 3. Ray Harryhausen's stop-motion characters are more physically expressive than puppets.	c. involving bodily force and contact

The adjective and verb *prime* has several meanings in different contexts.

a. main, most important, most likely, most typical	*prime* example/reason/aim/concern/suspect/target/cause/mover
b. the best, the most perfect or excellent	*prime* position/location/cut (of meat) *prime* time (television)
c. the most productive time	in one's *prime*; past one's *prime*; in the *prime* of life
d. to be prepared or readied	*primed* to learn/to listen/to respond/for action
e. prepare something for use or to get it started	*prime* wood (for painting); *prime* an explosive; *prime* the economy; *prime* someone to take over a job or task

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C. **Which meaning of the word *prime* is expressed in each sentence? Match the sentences with the definitions in the box above. Compare answers with a partner.**

___ 1. We are born primed to pick up on beat regularities and able to put sound in some sort of coherent order.

___ 2. Prime seats for the show cost over $500 each.

___ 3. In his final Olympics, he was obviously way past his prime and performed poorly.

___ 4. Harryhausen's prime concern was to make the figures more realistic and expressive.

___ 5. To prime the state's economy, the governor cut taxes on businesses and individuals.

Transmit and *transmission* can also be used in several contexts.

a. send electronically or over airwaves	*The broadcast was **transmitted** to over 50 nations.*
b. spread an idea, emotion, or disease	*The disease can only be **transmitted** through direct contact.*
	*He encouraged teachers to **transmit** positive values to their students.*
c. to allow energy to pass through	*Water **transmits** sound four and a half times faster than air does.*
d. a piece of machinery in a car	*A **transmission** (manual or automatic) **transmits** energy from the car's engine to the axles and wheels.*
e. a radio or TV signal	*We listened to the BBC on short-wave radio **transmissions.***

D. **Which meaning of *transmit* or *transmission* is expressed in each sentence? Match the sentences with the definitions in the box above. Compare answers with a partner.**

___ 1. It came equipped with a five-speed transmission.

___ 2. An optical fiber permits data in the form of light to be transmitted over long distances.

___ 3. The material absorbs and transmits heat to circulating fluids.

___ 4. The transmission was too weak to be heard.

___ 5. Parents complained that the movie transmitted the wrong values to children.

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Before You Read

Read these questions. Discuss your answers in small groups.

1. Do you know how to play a musical instrument? If so, describe how the instrument produces sound.
2. As a small child in school or at home, did you ever make your own musical instruments out of simple materials—for example, a drum from an old can? Describe what kind of materials you used and what sound the instruments made.
3. If you heard people talking about a Fender, a Martin, a Gibson, a Yamaha, or a Takamine, would you know what subject they were talking about? How about an acoustic or an electric?

MORE WORDS YOU'LL NEED

magnet: an object that attracts other objects toward it, either naturally or because of an electric charge

pluck: to play the strings of a guitar by pulling with the fingers or with a pick

Read

This magazine article describes the guitar's rise to the star musical instrument it is today.

Guitars: The Quest for Volume

Today, people tend to think of the guitar as a loud instrument. Yet, before the 1920s, **projecting** sound was a problem for the guitar. The volume was simply too low to compete with louder instruments, limiting its use to solo performance and vocal accompaniment. The versatility and portability of the guitar, however, were simply too appealing to allow it to drift into obscurity. Guitar makers began experimenting with new designs and materials that could increase its volume.

To understand the **fundamental** challenge facing guitar designers, first consider what a guitar is trying to do. A guitar operates on the principle that a tightly stretched string, when plucked, will vibrate rapidly and agitate the air enough to make a musical tone that people can hear. The shorter, tighter, and thinner the string, the more vibrations per second and the higher the pitch of the tone. The longer, looser, and thicker the string, the lower the pitch. So by plucking strings of various thicknesses, tensions, and lengths, a variety of musical notes can be created.

But there's a problem. A vibrating string does not make much sound. It needs to be made louder, or amplified, in some way. Try this grade-school experiment: Wrap a small, thin rubber band around your thumb and index finger. Stretch it tight and pluck it. It will make a sound but not a loud one, and the volume will **diminish** quickly. Now stretch the rubber band around a small, thin-walled box with one open side. Pluck the string where it crosses the opening. A much louder, longer sound should result. That is because the string vibrates the box, which in turn vibrates the air inside the box and creates a sound. Because the sound can echo a bit, it also sounds fuller—that is, it has a better tone. So, a thin box with an opening makes a rather good amplifier for strings.

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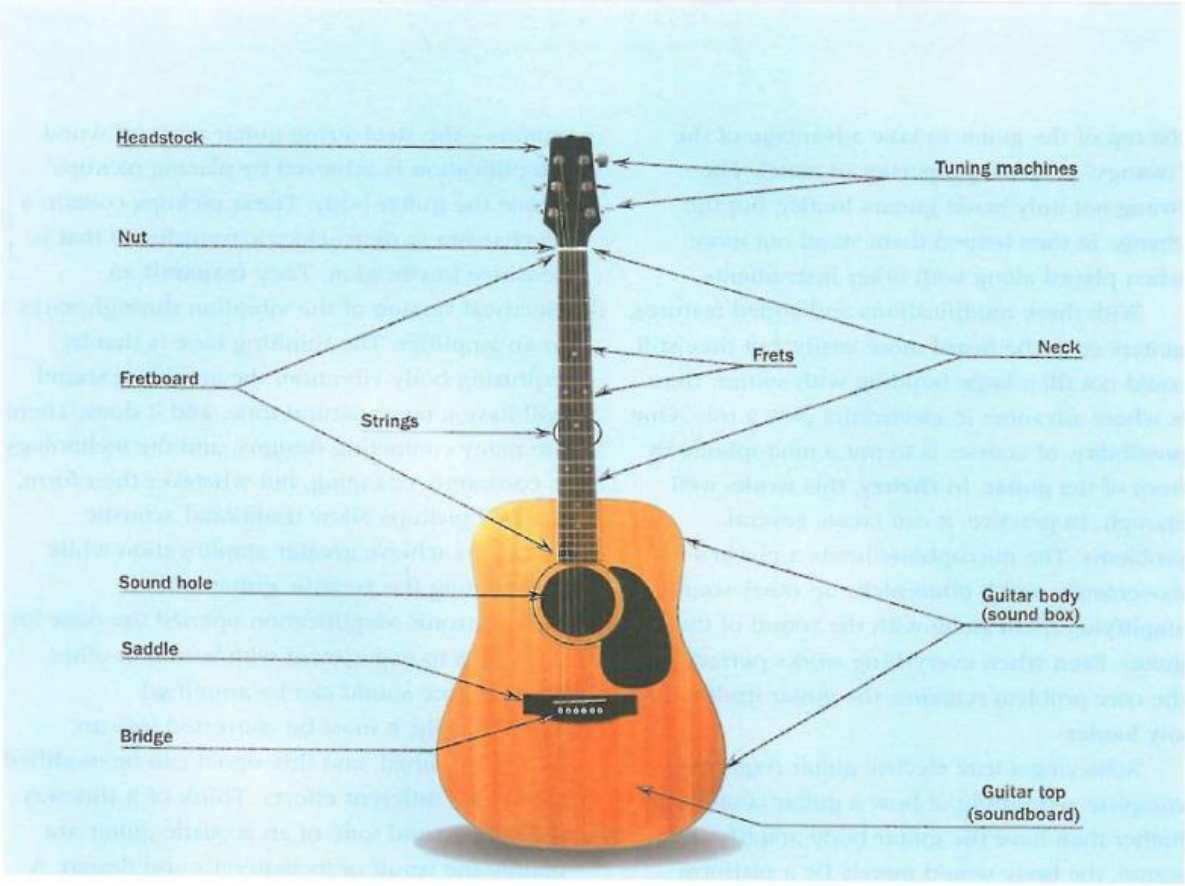

A guitar takes advantage of box amplification by attaching a long piece of wood—the neck—to the hollow guitar body, or sound box. The strings run down the neck to the middle of the body to a piece of wood called the bridge. The bridge has two purposes. It anchors the strings to the guitar top (also called the soundboard). It also contains the saddle, a thin piece of hard material that lifts the strings slightly above the neck and top. When the strings are plucked, the saddle **transmits** the vibrations into the guitar body. The wooden sides of the body vibrate the air inside and create an echo that increases the volume of the original vibration. The sound exits through one or more sound holes cut into the top of the guitar.

The shape and dimensions of the guitar body are important in making sure that the vibrations from the different strings are amplified fully and equally. Guitar designers experimented with many different designs. After much **refinement**, they found that a figure-eight shape with a larger and a smaller chamber separated by a narrower waist works best. This shape best amplifies and smoothes the sound of all the tones that a guitar can make.

Even with this optimal design, a guitar made entirely of wood is not very loud. Guitar designers faced an **intrinsic** difficulty in the **physical** properties and design of a guitar. Heavier, tighter strings are louder. Thinner wood is also louder. But heavier, tighter strings place tremendous **stress** on the guitar, requiring thicker wood to strengthen the guitar and keep it from breaking. So the increase in volume gained by using heavier strings and greater tension is offset by the thicker wood needed to strengthen the guitar. Guitars, it seemed, would never be loud.

In the early 20th century, the search for a louder guitar intensified. Two solutions appeared. One design strengthened the guitar by running a metal rod through the neck of the guitar and by adding more support in the bridge area. This way, louder steel strings could be used without damaging the guitar. Today, these design improvements are **incorporated** into most hollow body, steel-string guitars. The second solution added metal resonator plates[1] to

[1] *resonator plate:* a device, typically a metal plate, for making sound loud and clear

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the top of the guitar to take advantage of the "twangy" acoustic properties of metal. The twang not only made guitars louder, but the change in tone helped them stand out more when played along with other instruments.

With these modifications and added features, guitars could be heard more easily, but they still could not fill a large building with sound. Here is where advances in electronics play a role. One possibility, of course, is to put a microphone in front of the guitar. In **theory**, this works well enough. In practice, it can create several problems. The microphone limits a player's movements, and it often picks up other sounds, amplifying them along with the sound of the guitar. Even when everything works perfectly, the core problem remains: the guitar itself is not any louder.

Achieving a true electric guitar required a complete rethinking of how a guitar could work. Rather than have the guitar body amplify the sound, the body would merely be a platform that holds vibrating strings—similar to those on an acoustic guitar—and electronics. The body could even be solid, not hollow. With a solid body, the strings make a very soft sound—softer than the sound achieved in the rubber-band-around-the-box experiment, and not nearly enough to amplify successfully through a typical microphone. Instead of a hollow sound box, the strings are placed just above tiny magnets, or pickups. When the strings vibrate, they create a weak but precise disturbance in the pickup's magnetic field[2]. That disturbance (the audio signal) is **transmitted** as a weak electrical current through wires and cables to an electrical device that amplifies the signal through a speaker, sometimes to ear-splitting levels. By the 1950s, electrics were revolutionizing popular music.

Meanwhile, efforts were being made to electrify what were now called acoustic guitars—the steel string guitar made of wood. Amplification is achieved by placing pickups inside the guitar body. These pickups contain a mechanism (a piezo-electric transducer) that is sensitive to vibration. They **transmit** an electrical version of the vibration through wires to an amplifier. The thinking here is that by capturing body vibration, the amplified sound will have a more natural tone, and it does. There are many competing designs, and the technology is constantly changing, but whatever their form, internal pickups allow traditional acoustic guitars to achieve greater amplification while maintaining the acoustic guitar sound.

Electronic amplification opened the door for musicians to experiment with sound in other ways. Before sound can be amplified electronically, it must be converted into an electronic signal, and this signal can be modified to achieve different effects. Think of it this way: the volume and tone of an acoustic guitar are mainly the result of its materials and design. A well-designed acoustic guitar made of good materials sounds better than a less carefully constructed one. With a solid body electric guitar, however, the electronics build and shape the instrument's naturally thin tone by enriching the audio signal before it is **transmitted** to speakers.

After decades of research and development, guitar players can now **manipulate** and modify the audio signal in the most astounding ways. Just consider the colorful vocabulary they use to describe the sounds of an electric guitar—crunch, punch, fuzz, flange, wah wah, chorus, screaming, delay, gated. Some of the possibilities are quite unpleasant. Others add to the library of wonderful sounds that are used to make music. These acoustic gifts are the unexpected but natural consequence of the long effort to do one simple thing—to make a very mellow instrument a little bit, or a whole lot, louder. ■

[2] *magnetic field:* the area around a magnet influenced by the positive and negative poles

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Reading Comprehension

Mark each statement as *A* (referring to the acoustic guitar), *E* (solid body electric guitar), or *B* (both), according to the information in Reading 2.

___ 1. The shape of the guitar has only a marginal effect on the sound.

___ 2. String thickness and tightness determine the pitch of a note.

___ 3. This guitar cannot be used in a live performance with a large audience without electronic help.

___ 4. Thinner material in the guitar body improves the volume of the instrument.

___ 5. Capturing the sound electronically requires a device that senses vibrating air or vibrating materials inside the guitar.

___ 6. This guitar cannot be played through a microphone.

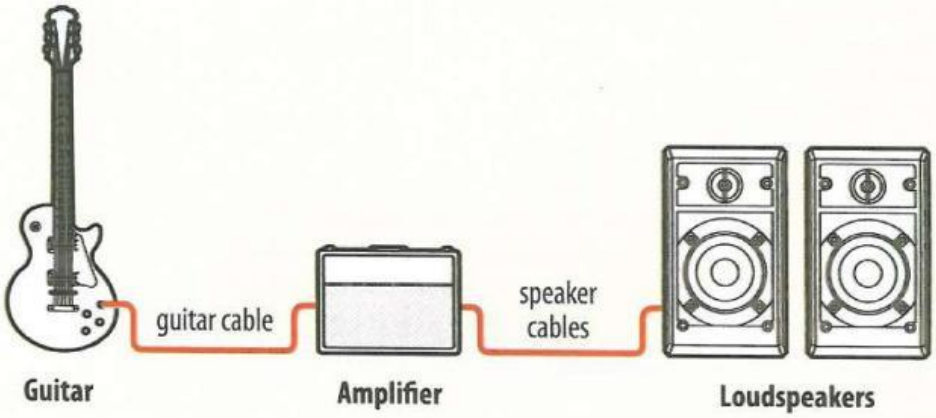
___ 7. This guitar works on the principle that a vibrating string creates a disturbance.

___ 8. The bridge and saddle transmit vibration to the guitar body, which amplifies the sound.

READING SKILL Point of View

LEARN

A technical process or design can be described from several points of view depending on the purpose and audience. Here is a simple electric guitar setup involving three components connected by cables.



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APPLY

Read these paragraphs describing the diagram above from different points of view. For each paragraph, complete the task.

Description	Task
1. **How do I set it up?** Insert one end of a guitar cable into the jack in the elecric guitar. Insert the other end of the cable into the input jack on the amplifier. Then run speaker cables from the output jacks of the amplifier to the input terminals.	This version gives instructions to the reader. Underline the verbs that tell the reader what to do.
2. **How is it set up or designed?** One end of a guitar cable is inserted into the jack in the guitar. The other end is plugged into the input jack in the amplifier. A speaker cable runs from the output jack of the amplifier to the input jack of the loudspeaker.	This version describes the setup without indicating who set it up. Underline any intransitives verbs. (See Unit 3, page 45, for more on transitive and intransitive verbs.)
3. **How does it work?** When the guitarist plucks a string, the guitar sends a weak electric signal through a cable to an amplifier. The amplifier increases the energy in the signal and transmits this stronger signal via cables to loudspeakers. The speakers turn the signal back into sound.	This version tells what each device does. The verbs are active—*plucks, sends, increases.* Underline the "perpetrators" of the action described by each active verb.
4. **What happens to the signal?** When a guitar string is plucked, a weak electrical signal is transmitted through a cable to an amplifier, a device that adds energy to the signal. This amplified signal is delivered through speaker cables to loudspeakers, where the signal is converted back into sound.	This version tells what happens to the sound signal. The passive verbs make the paragraph seem technical or scientific. Underline the passive verbs.

REVIEW A SKILL **Cause and Effect** (See p. 26)

In Unit 2, you practiced isolating causes and effects. Reread the article and make a list of the factors that affect the volume of a guitar.

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Vocabulary Activities

Noun	Verb	Adjective	Adverb
_____	_____	intrinsic	intrinsically
manipulation	manipulate	manipulative	manipulatively
projectile* projection	project	projected	_____
refinement	refine	refined	_____
stress	stress	stressful stressed	stressfully
theory	theorize	theoretical	theoretically

*The noun *project* will be treated in Unit 9.

A. Fill in the blanks with a target word from the chart that completes the sentence in a grammatical and meaningful way. Be sure to use the correct form.

1. Although it is _____ possible for a guitar to be made of a single wood, most guitars use a variety of woods.
2. Wood is a popular material for guitars because it can be _____ in many ways, including shaping, bowing, and slicing.
3. Woods are selected for their ability to impart sound, their beauty when finished, and their ability to withstand the _____ of day-to-day playing.
4. Several approaches are available for _____ sound in large spaces.
5. The technology for amplifying acoustic guitars is still being _____ .

B. In the reading, *stress* refers to physical force, but it can also refer to emphasis or to psychological pressure. In your notebook, write sentences that link these words in a meaningful and grammatical way. Compare sentences with a partner.

1. consultant / stress / need / better quality control

   The consultant stressed the need for better quality control.
2. teacher / stress / read Chapter 5 very carefully
3. assign / too many tasks at once / stressful
4. must / greater stress on / open / new markets for our products
5. psychologist / stress / multitasking / not a reliable strategy for saving time
6. feel stress / work / go to school / at the same time

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C. **Discuss these questions in a small group; then write a paragraph for each about your ideas. Be prepared to read aloud and discuss your paragraphs in class.**

1. What are some good ways to relieve stress when a busy schedule leaves little time for rest and recreation?
2. What skills or courses should high schools stress the most?

D. **Like the word *stress*, the verbs *project* and *manipulate* can have physical and psychological senses. Match the meaning of the word in each sentence with the most appropriate definition below.**

Project

___ 1. The company projected a four percent increase in sales.
___ 2. The 3-D image is projected onto a screen with angled ridges.
___ 3. The actor's voice projects well.
___ 4. She projects the image of confident leadership.
___ 5. He projected his own fears about succeeding in college onto his friends.
___ 6. Several stock market analysts projected record earnings this year.

a. estimate future quantities/sizes/amounts
b. make an image or sound fill a space
c. give an impression to other people
d. assume that others have the same thoughts or feelings

Manipulate

___ 1. They all grew tired of their boss's manipulative behavior.
___ 2. She learned to manipulate the clumsy machine.
___ 3. The computer can manipulate huge amounts of data.
___ 4. The lawyer tried to manipulate the jury by playing on their emotions.
___ 5. The teacher sensed that her students were trying to manipulate her.
___ 6. The manipulative child convinced his mother that buying him the toy would make *her* happy.

a. operate or manage something skillfully
b. process data/information smoothly
c. use or control people in a tricky, dishonest way
d. good at controlling people in a tricky way

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Collocations Chart		
Verb/Adverb	**Adjective**	**Noun**
confer	_____	greatness, an advantage, titles, prizes, rewards (on sb)
rapidly, gradually	*diminishing* *diminished*	resources, role, prospects, expectations, returns, number, effect, threat
_____	*fundamental*	change, questions, issues, difference, principle, shift, problem, concept
learn, grasp, teach, master, cover, explain	basic	*fundamentals*
_____	*intrinsic*	value, motivation, part, limitation, problem, flaw, sense, rewards, nature, reason
highly, very, more, less, increasingly, continuously, gradually	*refined*	_____
advance, have, confirm, prove, disprove, support, test, challenge, propose	complete, new, current	*theory* (that...) *theory* (of...)

E. The chart above shows some common collocations, or word partners, for selected target vocabulary. Refer to the chart and complete these sentences. Compare work with a partner.

1. Drawing on several studies, some child development specialists have proposed a _____ that has been called the "Mozart Effect." They claim that listening to Mozart's music may _____ several advantages on children, calming them and helping them think spatially.
2. Other researchers feel they have uncovered _____ flaws in the studies and doubt that briefly listening to Mozart before attempting a task has any significant effect.
3. They warn that the "Mozart Effect" is a rapidly _____ one. In fact, any mental stimulation before doing a task showed a similar effect.
4. By the age of six, Mozart had mastered the _____ of keyboard instruments and the violin. Already a composer, he began touring and giving concerts.
5. The clavichord, a stringed keyboard, sounds beautiful but has one _____ limitation: its lack of volume means it cannot be heard well when other instruments are playing.
6. By the 18th century, violin-making had become highly _____, and violins from that era still set the standards for violin perfection.
7. Several _____ changes were made to violins in this era, most noticeably in the length and angle of the neck.

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