



# Music An Appreciation

## **Roger Kamien**

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with Anita Kamien



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For Anita, David, Joshua, and Adina











## About the Author



Joshua Kamien

**ROGER KAMIEN** was born in Paris and raised in the United States. He received his BA in music from Columbia College in New York, and his MA and PhD in musicology from Princeton University. He studied piano with his mother—composer-conductor Anna Kamien—and with Nadia Reisenberg and Claudio Arrau. He returned to Paris as a Fulbright scholar for research on eighteenth-century music.

Professor Kamien taught music history, theory, and literature for two years at Hunter College and then for twenty years at Queens College of the City University of New York, where he was coordinator of the music appreciation courses. During this time he was active as a pianist, appearing both in the United States and in Europe. In 1983, he was appointed to the Zubin Mehta Chair of Musicology at the Hebrew University of Jerusalem.

In addition to *Music: An Appreciation*, Dr. Kamien was the editor of *The Norton Scores*, one of the coauthors of *A New Approach to Keyboard Harmony*, and a contributor to *The Cambridge Companion to Beethoven*. He has written articles and reviews for journals including *Music Forum*, *Beethoven* 

Forum, Musical Quarterly, Journal of Music, The Music Theory Spectrum, Journal of Musicology, and Journal of the American Musicological Society. Roger Kamien has been honored as a "musician, theorist and teacher" by the volume *Bach to Brahms: Essays on Musical Design and Structure*, edited by David Beach and Josef Goldenberg (University of Rochester Press: 2015).

Professor Kamien has appeared as a piano soloist in thirty-two countries on five continents. He frequently performs together with his wife, the conductor-pianist Anita Kamien, who has contributed immeasurably to *Music: An Appreciation*. The Kamiens have three children and eight grandchildren.











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## **Preface**

*Music:* An Appreciation welcomes nonmajors to the art of listening to great music. Roger Kamien continues to focus on coverage of the elements of music, fostering each student's unique path to listening and understanding. The 13<sup>th</sup> edition of *Music:* An Appreciation equips students with the language, tools, and listening skills required to sustain a lifelong enthusiasm for music.

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Typically the first material that a Music Appreciation student encounters in the semester is about the elements of music. Often it is a student's first exposure to musical vocabulary and concepts. The new edition features four learning tools that supplement and expand on Roger Kamien's narrative on the elements.

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Each of the 15 video tutorials, found in the eBooks and Media Bank, covers a broad topic of music fundamentals. These videos reinforce what students read in *Music: An Appreciation*.

#### **Spotify Playlists**

Recognizing the elements in an unfamiliar piece of music is a learned skill. Spotify playlists, accessed through the eBooks, help students develop that skill by providing an avenue into the musical elements through music they are already familiar with.

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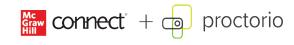
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Instant and detailed reporting gives instructors an at-a-glance view of potential academic integrity concerns, thereby avoiding personal bias and supporting evidence-based claims.

## New and Updated Content

The Thirteenth Edition expands the range of composers, performers and music genres discussed. New composers and performers include Barbara Strozzi, Elisabeth Jacquet de la Guerre, Fanny Mendelsohn Hensel, Lili Boulanger, Maurice Ravel, Sergei Prokofiev, Lin-Manuel Miranda, Bob Dylan, Prince, Beyoncé, Taylor Swift, and Kendrick Lamar. New music genres discussed include the secular cantata, piano trio, hip-hop musical, and rap music. **Part I: Elements** has new musical examples throughout and revised discussions of rhythm and melody.

In **Part IV: The Baroque Period,** discussion of baroque vocal music has been revised, along with reorganization of chapters to break the discussion of the cantata between secular and sacred contexts. This part now includes a section on the baroque cantata and considers the lives of Barbara Strozzi and Elisabeth Jacquet de la Guerre and movements from their secular cantatas.

New to **Part VI: The Romantic Period** are discussions of Fanny Mendelsohn Hensel and the second movement from her String Quartet in E-Flat major. Also added is a discussion of the third movement of Clara Wieck Schumann's Piano Trio in G Minor.

**Part VII: The Twentieth Century and Beyond** now includes a discussion of Ravel's *Boléro*, one of the most widely-performed orchestral works. Also new to this part is a discussion of Lili Boulanger's *Psalm 24* for Chorus and Orchestra, a chapter on primitivism, and a discussion of the first movement of Prokofiev's *Classical Symphony* as an example of neoclassicism.

**Part IX:** Music for Stage and Screen now includes discussions of the hip-hop musical *Hamilton* and its hit song *My Shot* and John William's music for the *Desert Chase* scene from the film *Raiders of the Lost Ark*, starring Harrison Ford. **Popular Music Genres**, a completely new **Part X**, covers rock, country, rap, hip hop and other genres and styles of American music from 1945 to the present. Examples presented in the narrative include Bob Dylan's *Blowin' in the Wind*, The Beatles' *Lucy in the Sky with Diamonds*, Prince's *Purple Rain*, Beyoncé's *Irreplaceable*, Taylor Swift's *Shake It Off*, and Kendrick Lamar's *GOD*.

New musical selections and recordings include the following:

- Lili Boulanger, Psaume 24 (Psalm 24)
- Elisabeth Jacquet de la Guerre, La Têmpete (The Storm), from Le sommeil d'Ulisse (The Sleep of Ulysses)

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- Fanny Mendelssohn Hensel, String Quartet in E Flat Major, second movement
- Sergei Prokofiev, Classical Symphony in D Major, Op. 25, first movement
- Clara Wieck Schumann, Trio for Violin, Cello, and Piano in G Minor, Op. 17
- Barbara Strozzi, Che si può fare (What can you do?)

Teaching resources such as the Instructor's Manual and lecture PowerPoints have been updated and can be accessed through McGraw-Hill Connect®.

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Roger Kamien

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■ All musical elements come together when people play or sing.

2



## **PART I**

Rhythm and harmony find their way into the inward places of the soul...

—Plato

### **LEARNING OBJECTIVES**

- Describe the properties of sound and explain how music is part of the world of sound.
- Identify basic voice ranges for men and women and the categories of instruments in western music.
- Explain how rhythm is basic to life and how it forms the lifeblood of music.
- Recognize how music notation indicates pitch and rhythm.
- Discuss some elements of melody.
- Explain basic principles of chords and harmony.
- Compare and contrast major and minor scales.
- Identify and describe the three kinds of musical texture.
- Explain the techniques that create musical form.
- Describe the role of a performer.
- Discuss the different meanings of the term "musical style."



# Elements

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3



usic plays a vital role in human society. It provides entertainment and emotional release, and it accompanies activities ranging from dances to religious ceremonies. Music is heard everywhere: in auditoriums, homes, elevators, sports arenas, places of worship, and on the street.

Live performances provide special excitement. In a live performance, artists put themselves on the line; training and magnetism must overcome technical difficulties to involve the listener's emotions. What is performed, how it sounds, how the artist feels about it that evening—all this exists for a fleeting moment and can never be repeated. An audience responds to the excitement of such a moment, and feelings are exchanged between stage and hall.

Recorded performance was a sensational innovation of the twentieth

century. Today, the Internet gives access to a practically unlimited variety of recorded sounds and images. Portable audio and media players permit us to hear and watch what we want, wherever we want.

Our response to a musical performance or an artist is subjective and rooted in deep feeling. Even professional critics can differ strongly in

their evaluations of a performance. There is no one "truth" about what we hear and feel. Does the performer project a concept, an overall idea, or an emotion? Can you figure out why? It's up to us as listeners to evaluate performances of music. Alert and repeated listening will enhance our ability to compare performances so that we can fully enjoy them.



Informal music making is a source of pleasure for players and listeners. RimDream/ Shutterstock



Whether in a public park or a concert hall, live performances have a special electricity. Media Union/Shutterstock

4





Bruce Springsteen: The exchange between singer and audience contains something magical, direct, and spellbinding.

Jamie Squire/Getty Images

The use of computers and electronics has revolutionized the way we create, play, and listen to music.

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Music making transcends boundaries of many kinds. Pictured here are musicians playing in a gamelan, an ensemble found in Indonesia. ASK Images/Alamy Stock Photo

People listen to music in many ways. Music can be a barely perceived background or a totally absorbing experience. Part I of this book, "Elements," introduces concepts that can

contribute to your enjoyment of a wide range of musical styles. For example, awareness of tone color—the quality that distinguishes one instrument from another—can heighten

your pleasure when a melody passes from a clarinet to a trumpet. Perceptive, aware listening makes any musical experience more intense and satisfying.

5



# 1 Sound: Pitch, Dynamics, and Tone Color

Sounds bombard our ears every day—the squeaks and honks of traffic, a child's laugh, the bark of a dog, the patter of rain. Through them we learn what's going on; we need them to communicate. By listening to speech, cries, and laughter, we learn what others think and how they feel. But silence, an absence of sound, also communicates. When we hear no sound in the street, we assume no cars are passing. When someone doesn't answer a question or breaks off in the middle of a sentence, we quickly notice, and we draw conclusions from the silence.

Sounds may be perceived as pleasant or unpleasant. Fortunately, we can direct our attention to specific sounds, shutting out those that don't interest us. At a party, for instance, we can choose to ignore the people near us and focus instead on a conversation across the room. Actually, we shut out most sounds, paying attention only to those of interest. The composer John Cage (1912–1992) may have meant to show this with his "composition" entitled 4'33", in which a musician sits at a piano for 4 minutes and 33 seconds—and does nothing. The silence forces the people in the audience to direct their attention to whatever noises, or sounds, they themselves are making. In a sense, the audience "composes" this piece. To get the effect, listen to the sounds that fill the silence around you right now.

What are these sounds that we hear? What is "sound"? What causes it, and how do we hear it?

**Sound** begins with the vibration of an object, such as a table that is pounded or a string that is plucked. The vibrations are transmitted to our ears by a medium, which is usually air. As a result of the vibrations, our eardrums start vibrating too, and impulses, or signals, are transmitted to the brain. There the impulses are selected, organized, and interpreted.

Music is part of this world of sound, an art based on the organization of sounds in time. We distinguish music from other sounds by recognizing the four main properties of musical sounds: *pitch, dynamics* (loudness or softness), *tone color*, and *duration*. We'll look now at the first three of these properties of musical sound. Duration—the length of time a musical sound lasts—is discussed in Chapter 3, "Rhythm."

# Pitch: Highness or Lowness of Sound

**Pitch** is the relative highness or lowness we hear in a sound. Sing or listen to the song *Happy Birthday to You*. Notice that the highest tone comes on the third **birth-day**, just before the name of the person celebrating his or her birthday.

The pitch of a sound is determined by the frequency of its vibrations. The faster the vibrations, the higher the pitch; the slower the vibrations, the lower the pitch. Vibration frequency is measured in cycles per second. On a piano the highest-frequency tone is 4,186 cycles per second, and the lowest is about 27 cycles per second.

In general, the smaller the vibrating object, the faster its vibrations and the higher its pitch. All other things being equal, plucking a short string produces a higher pitch than plucking a long string. The relatively short strings of a violin produce higher pitches than do the longer strings of a double bass.



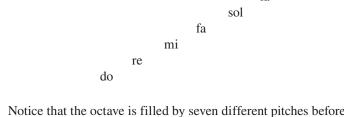
Octave: See Arlen's Over the Rainbow, opening (page 43).

In music, a sound that has a definite pitch is called a tone. It has a specific frequency, such as 440 cycles per second. The vibrations of a tone are regular and reach the ear at equal time intervals. On the other hand, noiselike sounds (squeaking brakes or clashing cymbals) have an indefinite pitch because they are produced by irregular vibrations.

Two tones will sound different when they have different pitches. The "distance" between any two tones is called an *interval*. When tones are separated by the interval called an *octave*, they sound very much alike. Sing or listen to the opening of the song Over the Rainbow: "Somewhere over the rainbow." Notice that the tone on -where sounds like the tone on *Some*-, even though it is higher. An octave lies between them. The vibration frequency of the tone on *Some*- is exactly half that of the tone on *where*. If the Some- tone was 440 cycles per second, the where tone—an octave higher—would be 880 cycles per second. A tone an octave lower than the *Some*- would be half of 440, or 220 cycles per second. When sounded at the same time, two tones an octave apart blend so well that they almost seem to merge into one tone.

The interval of an octave is important in music. It is the interval between the first and last tones of the familiar scale. Sing or listen to this scale.





Seven different tones are produced by the white keys of the piano.

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Notice that the octave is filled by seven different pitches before arriving at the high do, which "duplicates" the low do. If you start from the higher do and continue the scale upward, each of your original seven tones will be "duplicated" an octave higher. This group of seven tones was the basis of music in western civilization for centuries. The seven tones are produced by the white keys of the piano keyboard, as shown in the illustration at the left.

As time passed, five pitches were added to the original seven. These five are produced by the black keys of the keyboard. All twelve tones, like the original seven, are "duplicated" in higher and lower octaves. Every tone has "close relatives" 1, 2, 3, or more octaves away. (In nonwestern music, the octave may be divided into a different number of tones—say, seventeen or twenty-two.)

The distance between the lowest and highest tones that a voice or instrument can produce is called its pitch range, or simply its range. The range of the average untrained voice is between 1 and 2 octaves; a piano's range is over 7 octaves. When men and women sing the same melody, they usually sing it an octave apart.

Organization of pitch is a composer's first resource. In Chapters 5 and 6, where melody and harmony are explored, we look at how pitch is organized. For now, we'll simply observe that composers can create a special mood by using very low or very high pitches. For example, low pitches can intensify the sadness of a funeral march; high pitches can make a dance sound lighter. And a steady rise in pitch often increases musical tension.

Though most music we know is based on definite pitches, indefinite pitches—such as those made by a bass drum or by cymbals—are important as well. Some percussion instruments, such as gongs, cowbells, and woodblocks, come in different sizes and therefore produce higher or lower indefinite pitches. Contrasts between higher and lower indefinite pitches play a vital role in contemporary western music and in musical cultures around the world.

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## **Dynamics**

Degrees of loudness or softness in music are called *dynamics*—our second property of sound. Loudness is related to the amplitude of the vibration that produces the sound. The harder a guitar string is plucked (the farther it moves from the fingerboard), the louder its sound. When instruments are played more loudly or more softly, or when there is a change in how many instruments are heard, a dynamic change results; such a change may be made either suddenly or gradually. A gradual increase in loudness often creates excitement, particularly when the pitch rises too. On the other hand, a gradual decrease in loudness can convey a sense of calm.

A performer can emphasize a tone by playing it more loudly than the tones around it. We call an emphasis of this kind an *accent*. Skillful, subtle changes of dynamics add spirit and mood to performances. Sometimes these changes are written in the music; often, though, they are not written but are inspired by the performer's feelings about the music.

When notating music, composers have traditionally used Italian words and their abbreviations to indicate dynamics. The most common terms are

Term	<b>Abbreviation</b>	Meaning
pianissimo	pp	very soft
piano	p	soft
mezzo piano	mp	moderately soft
mezzo forte	mf	moderately loud
forte	f	loud
fortissimo	$f\!f$	very loud

For extremes of softness and loudness, composers use *ppp* or *pppp* and *fff* or *ffff*. The following notations indicate gradual changes in dynamics:

Symbol	Term	Meaning
	decrescendo (decresc.) or diminuendo (dim.)	gradually softer
	crescendo (cresc.)	gradually louder

Like many elements of music, a dynamic indication is not absolutely precise. A tone has a dynamic level—is soft or loud—in relation to other tones around it. The loudest sound of a single violin is tiny compared with the loudest sound of an entire orchestra, and even tinier compared with an amplified rock group. But it can be considered fortissimo (very loud) within its own context.

## **Tone Color**

8 PARTII Elements

We can tell a trumpet from a flute even when each of them is playing the same tone at the same dynamic level. The quality that distinguishes them—our third property of musical sound—is called *tone color*, or *timbre* (pronounced *tam'-ber*). Tone color is described by words such as *bright*, *dark*, *brilliant*, *mellow*, and *rich*.\*

Like changes in dynamics, changes in tone color create variety and contrast. When the same melody is played by one instrument and then by another, it takes on different

<sup>\*</sup> An explanation of the physical basis of tone color appears in Appendix 2.



expressive effects because of each instrument's tone color. On the other hand, a contrast in tone color may be used to highlight a new melody: after violins play a melody, an oboe may present a contrasting one.

Tone colors also build a sense of continuity; it is easier to recognize the return of a melody when the same instruments play it each time. Specific instruments can reinforce a melody's emotional impact: the brilliant sound of a trumpet is suited to heroic or military tunes; the soothing tone color of a flute fits the mood of a calm melody. In fact, composers often create a melody with a particular instrument's tone color in mind.

A practically unlimited variety of tone colors is available to composers. Combining different instruments—violin, clarinet, and trombone, for example—results in new colors that the instruments cannot produce by themselves. And tone color can be changed by varying the number of instruments or voices that perform a melody. Finally, electronic techniques developed in recent years allow composers to create colors completely unlike those of traditional instruments.

# Listening Outlines, Vocal Music Guides, and the Properties of Sound

Reading about pitch, dynamics, and tone color without hearing music is too abstract. To understand and recognize the properties of sound, we must *listen for them*. In this book, Listening Outlines (for instrumental music) and Vocal Music Guides (for music with vocal texts) will help focus your attention on musical events as they unfold. These outlines and guides must be read as you listen to the music; otherwise, their value to you is limited.

In a Listening Outline, each item describes some musical sound. It may point out dynamics, instruments, pitch level, or mood. (Remember, though, that indications of mood in music are subjective. What one person calls "triumphant," for instance, someone else may call "determined.")

In a Vocal Music Guide, the vocal text appears with brief marginal notes that indicate the relationship between words and music and help the listener follow the thought, story, or drama.

The outlines and guides are preceded by descriptions of the music's main features. Within the guide or outline, timings appear at the left. In addition, the outlines include instrumentation, notes about our recordings (where important), and the duration of selections in our recordings.

Before you listen to a piece of music, you will find it helpful to glance over the entire Listening Outline or Vocal Music Guide. Then, while hearing one passage, look ahead to learn what's next. For example, in the Listening Outline for the Prelude to Act III of Richard Wagner's opera *Lohengrin*, the first item (1a) is "Full orchestra, very loud (ff), main melody in violins, cymbal crashes." While listening to the music described by item 1a, glance at item 1b: "Brass melody, pulsating accompaniment in strings."

Sometimes, not all the instruments playing are listed; instead, only those that are prominent at a given moment are shown. For example, item 2 in the Listening Outline for Lohengrin reads "Soft (p), contrasting oboe melody. Melody repeated by flute. Clarinet and violins continue." Although other instruments can be heard, this description focuses attention on the instruments that play the melody.

Music selection in the text with an outline or guide can be streamed in Connect or downloaded after purchasing the mp3 card.

## Lohengrin, Prelude to Act III (1848), by Richard Wagner

In the Prelude to Act III of his opera Lohengrin, Richard Wagner (1813-1883) makes wide and brilliant use of dynamic contrasts to set the scene for the wedding of the hero and heroine. The prelude opens with a feeling of exultation—great energy is conveyed

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by the massive sound of the full orchestra. Later, the music suddenly becomes calm and gentle as we hear fewer instruments, playing softly. This is followed by another sudden contrast when Wagner again employs the full orchestra.

## **Listening Outline**

## WAGNER, Lohengrin, Prelude to Act III

3 flutes, 3 oboes, 3 clarinets, 3 bassoons, 4 French horns, 3 trumpets, 3 trombones, bass tuba, timpani, triangle, cymbals, tambourine, 1st violins, 2d violins, violas, cellos, double basses (Duration 2:59)

Listen for contrast of dynamics and tone color between the full orchestra (in 1.a.) and the oboe melody (in 2).

1. a. Full orchestra, very loud (ff), main melody in violins, cymbal crashes.
 b. Brass melody, pulsating accompaniment in strings.
 c. Full orchestra, main melody in violins, cymbal crashes.
 2. Soft (p), contrasting oboe melody. Melody repeated by flute. Clarinet and violins continue.
 3. a. Full orchestra, very loud (ff), main melody in violins, cymbal crashes.
 b. Brass melody, pulsating accompaniment in strings.
 c. Cymbals, very loud orchestral close.

## The Firebird, Scene 2 (1910), by Igor Stravinsky

In the second—and final—scene of the ballet *The Firebird*, Igor Stravinsky (1882–1971) repeats one melody over and over, creating variety and contrast through changes of dynamics, tone color, and rhythm. During this scene, the hero triumphs and becomes engaged to a beautiful princess.

The second scene begins softly but becomes increasingly grand as the music gradually grows louder (crescendo), more instruments play, and the melody is repeated at higher pitches. After this slow buildup to a climax, there's a sudden quiet as all the instruments but the strings stop playing. A quick crescendo then leads to a brilliant concluding section.

# **Listening Outline**

### STRAVINSKY, The Firebird, Scene 2

Piccolo, 3 flutes, 3 oboes, English horn, 3 clarinets, bass clarinet, 3 bassoons, contrabassoon, 4 French horns, 6 trumpets, tuba, timpani, triangle, cymbals, bass drum, 3 harps, 1st violins, 2d violins, violas, cellos, double basses (Duration 3:06)

**Listen** for gradual crescendo (*dynamics*) and the repetition of the main melody in increasingly higher octaves (*pitch*) during 1.a—e.



0:00	<b>1. a.</b> Slow melody in French horn, soft $(p)$ , quivering string accompaniment.	
0:29	<b>b.</b> Violins, soft, melody an octave higher. Flutes join.	
0:43	c. Grows louder (crescendo) as more instruments enter.	
1:03	<b>d.</b> Violins and flutes, loud $(f)$ , melody at even higher octave, crescendo to	
1:17	e. Full orchestra, melody very loud (ff), timpani (kettledrums).	
1:34	<b>f.</b> Suddenly very soft $(pp)$ , strings, quick crescendo to	
1:41	<b>2. a.</b> Brasses, very loud ( $ff$ ), melody in quick detached notes, timpani.	
2:04	<b>b.</b> Melody in slower, accented notes, brasses, <i>ff</i> , timpani, music gradually slows.	
2:35	c. High held tone, ff, brass chords, extremely loud (fff), lead to sudden pp and crescendo to extremely loud close.	
		٠,

# *C-Jam Blues* (1942), by Duke Ellington and His Famous Orchestra

A succession of different tone colors contributes to the variety within *C-Jam Blues* (1942), as performed by Duke Ellington and His Famous Orchestra. A repeated-note melody is played first by the piano and then by saxophones. Then we hear solos by the violin, cornet (brass instrument of the trumpet family), tenor saxophone, trombone, and clarinet. These solos are improvised by the players. Each instrument is first heard alone and then heard with accompaniment. The cornet and trombones are played with mutes, devices inserted into the instrument to alter its sound. *C-Jam Blues* ends climatically when the full band is heard for the first time.

# Listening Outline

### **ELLINGTON**, C-Jam Blues

Piano (Duke Ellington), violin (Ray Nance), 2 trumpets (Wallace Jones, Ray Nance), cornet (Rex Stewart), 2 trombones (Joe "Tricky Sam" Nanton, Lawrence Brown), valve trombone (Juan Tizol), clarinet (Barney Bigard), 2 alto saxophones (Johnny Hodges, Otto Hardwick), 2 tenor saxophones (Barney Bigard, Ben Webster), baritone saxophone (Harry Carney), guitar (Fred Guy), bass (Junior Raglin), percussion (Sonny Greer) (Duration 2:38)

**Listen** for different *tone colors* of the piano, saxophone, violin, muted cornet, muted trombone, and clarinet (during 1-7), and the contrast between instruments playing with and without accompaniment.

0:00	1.	Plano, repeated-note melody, accompanied by bass, guitar, drums.
0:17	2.	Saxophones, repeated-note melody, accompanied by rhythm section (piano, bass, guitar,
0:33	3.	Violin alone, then accompanied by rhythm section.
0:54	4.	Muted cornet alone, then accompanied by rhythm section.
1:15	5.	Tenor saxophone alone, then accompanied by rhythm section.
1:37	6.	Muted trombone alone, then accompanied by rhythm section.
1:59	7.	Clarinet alone, then accompanied by hand

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percussion).



2:20

8. Full band.





# 2 Performing Media: Voices and Instruments

## **Voices**

Throughout history, singing has been the most widespread and familiar way of making music. Ancient Greek drama included a chanting chorus, and the Bible records that Moses, Miriam, and the Israelites sang to glorify the Lord. Singers seem always to have had a magnetic appeal, and even today adoring audiences imitate the looks and lifestyles of their favorites.

The exchange between singer and audience contains a bit of magic, something direct and spellbinding. Probably because the singer becomes an instrument, we identify with him or her especially—a human body like our own expressing emotions through sounds and words.

The voice has a unique ability to fuse a word with a musical tone, and for this reason poetry and singing have been inseparable in many cultures. Singing can make words easier to remember and can heighten their emotional effect.

For many reasons, it is difficult to sing well. In singing we use wider ranges of pitch and volume than in speaking, and we hold vowel sounds longer. Singing demands a greater supply and control of breath. Air from the lungs is controlled by the lower abdominal muscles and the diaphragm. The air makes the vocal cords vibrate, and the singer's lungs, throat, mouth, and nose come into play to produce the desired sound. The pitch of the tone varies with the tension of the vocal cords; the tighter they are, the higher the pitch.

Throughout history, singing has been the most widespread way of making music. Shown here is the Westminster Symphonic Choir with the Vienna Philharmonic Orchestra at Carnegie Hall, March 2015.

Hiroyuki Ito/Getty Images



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The range of a singer's voice depends both on training and on physical makeup. Professional singers can command 2 octaves or even more, whereas an untrained voice is usually limited to about 1½ octaves. Men's vocal cords are longer and thicker than women's, and this difference produces a lower range of pitches. The classification of voice ranges for women and men follows, arranged from highest to lowest. (The four basic ranges are soprano, alto, tenor, and bass.)

WomenMensopranotenormezzo-sopranobaritonealto (or contralto)bass

Because of differences in taste, methods of singing vary widely from culture to culture. Asian singing, for example, is more nasal than that of the west. Whereas classical singers in our culture stand erect, singers in west Africa stand bending forward; and singers in India sit on the floor. In fact, there are differences in performing styles in the west alone: classical, popular, jazz, folk, and rock music are all sung differently. Classical singers, for example, normally don't rely on microphones, but rock gets its point across partly by amplification.

Until the late 1600s, most music of western culture was vocal. But by the end of the seventeenth century, instrumental music rivaled vocal music in importance. Since then, composers have continued to write solo and choral vocal works, with and without instrumental accompaniment. There are compositions for male chorus; for female chorus; and for mixed chorus, which usually combines sopranos, altos, tenors, and basses. The accompaniment to vocal works ranges from a single instrument, such as a guitar or piano, to an entire orchestra.

## **Musical Instruments**

People around the world use musical instruments that vary greatly in construction and tone color. An *instrument* may be defined as any mechanism—other than the voice—that produces musical sounds. Western musicians usually classify instruments in six broad categories: *string* (such as guitar and violin); *woodwind* (flute, clarinet); *brass* (trumpet, trombone); *percussion* (bass drum, cymbals); *keyboard* (organ, piano); and *electronic* (synthesizer).\*

An instrument is often made in different sizes that produce different ranges. For instance, the saxophone family includes sopranino, soprano, alto, tenor, baritone, and bass saxophones. An instrument's tone color may vary with the *register* (part of the total range) in which it is played. A clarinet sounds dark and rich in its low register, but its high register is brilliant and piercing.

Instrumental performers try to match the beautiful, flexible tone of a singer's voice. Yet most instruments have a wider range of pitches than the voice does. A trained singer's range is about 2 octaves, but many instruments command 3 or 4 octaves, and some have 6 or 7. Also, instruments usually produce tones more rapidly than the voice. When writing music for a specific instrument, composers have to consider its range of pitches and dynamics and how fast it can produce tones.

**Soprano:** See Puccini's *La Bohème*, Mimi's aria (Vocal Music Guide, Part VI, ch. 20).

**Mezzo-soprano:** See Bizet's *Carmen*, Carmen's Habanera (Vocal Music Guide, Part VI, ch. 18).

**Tenor:** See Puccini's *La Bohème*, Rodolfo's aria (Vocal Music Guide, Part VI, ch. 20).

**Baritone:** See Bizet's *Carmen*, Toreador song (Vocal Music Guide, Part VI, ch. 18).

Bass: See Mozart's *Don Giovanni*, Leporello's solo (Vocal Music Guide, 00:15 to 01:41, Part V, ch. 11).

Chorus: See Handel's Messiah, Hallelujah Chorus (Vocal Music Guide, Part IV, ch. 19) and Ompeh (Listening Guide, Part XI, ch. 2).





<sup>\*</sup>The scientific classification of instruments, based on the way sound is made, has five categories: chordophones (a stretched string is the sound generator—our "string" category); aerophones (a column of air is the sound generator—our "woodwind" and "brass" categories); idiophones (instruments whose own material is the sound generator, such as cymbals, gongs, and bells—part of our "percussion" category); membranophones (instruments with a stretched skin or some other membrane for the sound generator, such as drums—part of our "percussion" category); and electrophones (instruments generating their sounds by means of electricity—our "electronic" category).



West Point marching band performing at 90th Macy's Thanksgiving Day Parade in 2016.

Erik Pendzich/Shutterstock



Instruments provide entertainment and accompany singing, dancing, religious rites, and drama. But they have served other functions too. In some cultures, instruments are thought to have magical powers. Bells are worn to guard against harm, and rattles are used by traditional healers. In parts of Africa, drums are so sacred that religious rites are not performed without them, and special ceremonies and sacrifices are sometimes enacted when the drums are being made.

Instruments have been used for communication as well. Detailed messages have been sent by drumbeats; hunters have blown horns for signals; and musicians have announced the time by sounding brass instruments from towers. Trumpets have been used for military signals and to bolster soldiers' courage in battle. For centuries, trumpets and kettledrums announced kings and queens.

Musical instruments have even been status symbols. During the nineteenth century and the early twentieth century, the piano was a fixture in any home that aspired to be middle-class. "Proper" young ladies were expected to learn the piano as one of many "accomplishments." Such ideas lost their currency when women began to move more freely in the world (around the time of World War I), and when the radio and phonograph began to replace the piano as a source of home entertainment.

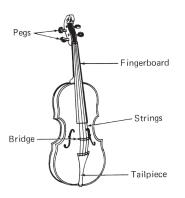
Instruments' popularity rises and falls with changing musical tastes and requirements. Today only a fraction of all known instruments are used. Interest in music of earlier times has led to the revival of instruments such as the harpsichord, an ancestor of the piano, and the recorder, a relative of the flute. Modern replicas of instruments used before 1800 are being built and played. Today, musicians are flexible and far-ranging in their choice of instruments. Rock composers have used nonwestern instruments, such as the Indian sitar (a plucked string instrument). Some jazz musicians have turned to classical instruments, such as the flute, and classical composers have used instruments associated with jazz, such as the vibraphone.

Compositions may be written for solo instruments, for small groups, and for orchestras with more than 100 musicians. Modern symphony orchestras contain string, woodwind, brass, and percussion instruments. (A photograph of a symphony orchestra is shown on the opposite page, and the following page shows a typical









seating plan for a large orchestra.) Keyboard instruments also find their way into the modern orchestra as needed. Bands consist mainly of brass, woodwind, and percussion instruments.

Instruments commonly used for western music are described in this chapter, by categories. Nonwestern instruments are discussed in Part XI.

## **String Instruments**

The *violin, viola, cello* (*violoncello*), and *double bass* (sometimes called simply a *bass*) form the symphony orchestra's string section. They vary in tone color as well as in size and range: the violin is the smallest and has the highest range; the double bass is the largest and has the lowest range. For symphonic music the strings are usually played with a *bow*, a slightly curved stick strung tightly with horsehair (see the illustration below). Symphonic strings also may be plucked with the finger.



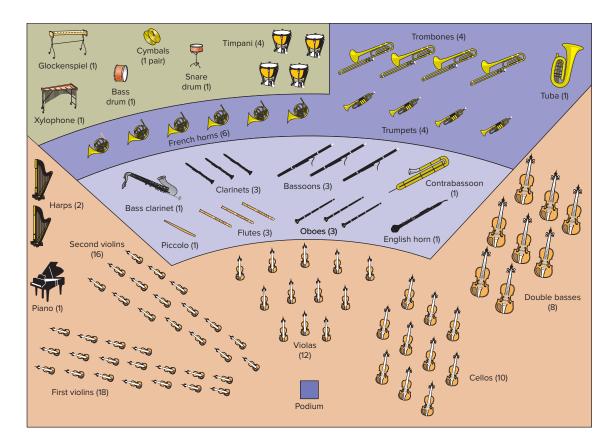
Violin and bow.



A symphony orchestra.

JACQUES SARRAT/Sygma via Getty Images





Typical seating plan for a large orchestra (about 100 instrumentalists), showing the distribution of instruments.

## **Strings**

**(** 



The violin is often used as a solo instrument. In the orchestra, the violins are divided into first and second violins, with the first violins frequently playing the main melody. The violinist shown here is Joshua Bell.

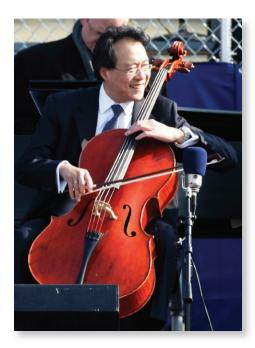
Paul Morigi/Getty Images



The body of the viola is about two inches longer than that of the violin, and thus the viola's range is somewhat lower. Its tone color is darker, thicker, and a little less brilliant than the violin's. The violist here is Tabea Zimmermann. Brill/ullstein bild via Getty Images



Although eighteenthcentury composers generally used the cello in its bass and baritone registers, later composers exploited its upper registers as well. The cellist shown here is Yo-Yo Ma. Alex Wong/Getty Images



The double bass (or bass) has a very heavy tone and is less agile than other string instruments. It is generally played with a bow in symphonic music, but in jazz and popular music it is commonly played by plucking the strings. Jan Šmydke





The harp—with forty-seven strings stretched on a triangular frame—has a wide range of 6 octaves. The harpist plucks with the fingers of both hands. Joshua Kamien

The guitar has six strings, which are plucked with the fingers or strummed with a plectrum, or pick. The frets on the fingerboard mark the places where the strings must be pressed with the fingers of the other hand.

Olena Yakobchuk/Shutterstock



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Of all the instrumental groups, the strings have the greatest versatility and expressive range. They produce many tone colors and have wide ranges of pitch and dynamics. String players can produce tones that are brilliant and rapid or slow and throbbing; they can control tone as subtly as a singer. Orchestral works tend to rely more on the strings than on any other group. Even with their differing tone colors, the four string instruments blend beautifully. Here it will be helpful to consider the construction and tone production of the string instruments; the violin can represent the entire family.

The hollow wooden body of the violin supports four strings usually made of metal or synthetic material. (Even today, some players prefer traditional gut strings made of tightly wound intestine.) The strings stretch, under tension, from a *tailpiece* on one end over a wooden *bridge* to the other end, where they are fastened around wooden *pegs*. The bridge holds the strings away from the *fingerboard* so that they can vibrate freely; the bridge also transmits the strings' vibrations to the *body*, which amplifies and colors the tone. Each string is tuned to a different pitch by tightening or loosening the pegs. (The greater the tension, the higher the pitch.)

The musician makes a string vibrate by drawing the bow across it with the right hand. The speed and pressure of the bow stroke control the dynamics and tone color of the sound produced. Pitch is controlled by the musician's left hand. By pressing a string against the fingerboard, the player varies the length of its vibrating portion and so changes its pitch. This is called *stopping* a string (because the vibrations are stopped at a certain point along the string's length). Thus, a range of pitches can be drawn from each of the four strings.

Basically the viola, cello, and double bass are made in the same manner and produce sound by similar means. How the string instruments are played—what string performance techniques are used—determines which of many musical effects they will produce. The most frequently used techniques are listed here:

**Pizzicato** (plucked string): The musician plucks the string, usually with a finger of the right hand. In jazz, the double bass is played mainly as a plucked instrument, rather than being bowed.

**Double stop** (two notes at once): By drawing the bow across two strings, a string player can sound two notes at once. And by rotating the bow rapidly across three strings (*triple stop*) or four strings (*quadruple stop*), three or four notes can be sounded almost—but not quite—together.

*Vibrato:* The string player can produce a throbbing, expressive tone by rocking the left hand while pressing the string down. This causes small pitch fluctuations that make the tone warmer.

*Mute:* The musician can veil or muffle the tone by fitting a clamp (mute) onto the bridge.

*Tremolo:* The musician rapidly repeats tones by quick up-and-down strokes of the bow. This can create a sense of tension, when loud; or a shimmering sound, when soft.

*Harmonics:* Very high-pitched tones, like a whistle's, are produced when the musician lightly touches certain points on a string. (See Appendix 2.)

Though the violin, viola, cello, and double bass are similar, they, like members of any family, have their differences. The photographs in this section show why each adds something distinctive to the orchestra's total sound.

Some string instruments are not played with a bow but are plucked instead, with the fingers or with a *plectrum* (plural, *plectra*). The most important of these are the *harp* and the *guitar*. The harp is the only plucked string instrument that has gained wide acceptance in the symphony orchestra.

#### **Woodwind Instruments**

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The woodwind instruments are so named because they produce vibrations of air within a tube that traditionally was made of wood. During the twentieth century, however, piccolos and flutes came to be made of metal. All the woodwinds have little holes along their length that are opened and closed by the fingers or by pads controlled by a







key mechanism. By opening and closing these holes, the woodwind player changes the length of the vibrating air column and so varies the pitch.

The main woodwind instruments of the symphony orchestra are as follows, arranged in four families, in approximate order of range from highest (piccolo) to lowest (contrabassoon). (Only the two most frequently used instruments of each family are listed.)

Flute Family piccolo	Clarinet Family	<b>Oboe Family</b>	<b>Bassoon Family</b>
flute	clarinet		
J		oboe	
		English horn	
	bass clarinet		bassoon
			contrabassoon

Woodwind instruments are great individualists and are much less alike in tone color than the various strings. The flute, with its silvery tone, differs more from the nasal-sounding oboe than the violin does from the viola. The woodwinds' unique tone colors result largely from the different ways in which vibrations are produced. Flute and piccolo players blow across the edge of a mouth hole much as one makes sounds by blowing across the top of an empty bottle. (Players of the *recorder*, a relative of the flute, blow through a "whistle" mouthpiece.) The rest of the woodwind instruments rely on a vibrating reed. A *reed* is a very thin piece of cane, about  $2\frac{1}{2}$  inches long, that is set into vibration by a stream of air. There are single- and double-reed woodwinds.

In *single-reed woodwinds* the reed is fastened over a hole in the mouthpiece and vibrates when the player blows into the instrument. The clarinet and bass clarinet are single-reed woodwinds. The *saxophone*, too, an instrument used mainly in bands, has a single reed. In *double-reed woodwinds* two narrow pieces of cane are held between the musician's lips. The oboe, English horn, bassoon, and contrabassoon are double-reed woodwinds.

### Woodwinds



The piccolo—whose name is short for *flauto piccolo*, or small flute—is half the size of the flute and plays an octave higher. The piccolo's high register is shrill and whistlelike.

Joshua Kamien



The flute has a high range and is extremely agile, capable of producing a rapid succession of tones. Its tone is full and velvety in the low register and bright and sparkling at the top. Shown here is flutist James Galway.

Richard E. Aaron/Redferns/Getty Images

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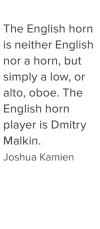








The oboe has a nasal, intense, expressive tone. Because the oboe's pitch is difficult to adjust, the entire orchestra is tuned to its A. Joshua Kamien







The recorder, like the flute and piccolo, has no reed. The recorder's tone resembles a flute's but is softer and gentler. It is commonly found in five sizes: sopranino, soprano, alto, tenor, and bass. Joshua Kamien



The clarinet can produce tones very rapidly and has a wide range of dynamics and tone color. Pictured here is Sabine Meyer. Jazz Archiv Hamburg/ullstein bild via Getty Images





The tone of the bassoon is deeply nasal. The bassoonist is Richard Paley.

Joshua Kamien



The contrabassoon can produce the lowest pitch in the orchestra.

Joshua Kamien



The bass clarinet is larger than the clarinet and has a much lower range. imageBROKER/Alamy Stock Photo



The saxophone has a single-reed mouthpiece like a clarinet, but its tube is made of brass. Its tone is rich, husky, and speechlike. Shown here is the jazz saxophonist Sonny Rollins.

Tim Mosenfelder/Corbis via Getty Images



Heard by itself, a reed produces only a squawklike sound. Although the tone color of reed woodwinds is mainly determined by the bore of the instrument's tube, the reed does affect the tone color somewhat. Professional woodwind players spend much time soaking and shaping their supply of reeds to ensure the best possible tone.

Tone colors also differ greatly among the various registers of each woodwind instrument. In general, low registers tend to be breathy and thick, and top registers are more penetrating. Unlike the strings, which can be double-stopped, the woodwinds can produce only a single note at a time. In symphonic music they are frequently given melodic solos. Woodwind instruments are well suited for outdoors (shepherds have played simple woodwinds for thousands of years). Therefore, they are often featured in music that evokes a rustic mood.

### **Brass Instruments**

From high register to low, the main instruments of the symphony orchestra's brass section are the *trumpet*, *French horn* (sometimes called simply a *horn*), *trombone*, and *tuba*. Trumpets and trombones are often used in jazz and rock groups.

The vibrations of brass instruments come from the musician's lips as he or she blows into a cup- or funnel-shaped *mouthpiece*. The vibrations are amplified and colored in a tube that is coiled (to make it easy to carry and play). The tube is flared at the end to form a *bell*. Modern brass instruments are actually made of brass, but their earlier counterparts were made of hollow animal horns, elephant tusks, wood, and even glass.

Some brass instruments, such as the cornet, baritone horn, and euphonium, are used mainly in concert and marching bands. The *cornet* is similar in shape to the trumpet, but its tone is more mellow. The *baritone horn* looks like a tuba and has the same range as the trombone. The *euphonium* is the tenor instrument of the tuba family.

## Brass



The trumpet sounds brilliant, brassy, and penetrating. The trumpeter shown here is Wynton Marsalis.

Erika Goldring/Getty Images



The French horn has a tone that is less brassy, more mellow, and more rounded than the trumpet's.

Lawrence Migdale/Science Source







The trombone has a tone that combines the brilliance of a trumpet with the mellowness of a French horn.

Joshua Kamien



The thick, heavy tone of the tuba is used to add weight to the lowest register of an orchestra or band.

Carl Court/Getty Images

The pitch of brass instruments is regulated both by varying lip tension and by using *slides* and *valves* to change the length of the tube through which the air vibrates. The trombone uses a slide, a U-shaped tube that fits into two parallel straight tubes. By pulling the slide in or pushing it out, the player changes the length of tubing and makes it possible to play different pitches. The trumpet, French horn, and tuba use three or four valves to divert air through various lengths of tubing. The longer the length of tubing through which air is diverted, the lower the possible pitch. Valves came into common use around 1850. Before then, French horn and trumpet players would insert additional curves of tubing (called *crooks*) into their instruments to change the range of available pitches. When valves came into use, these instruments could produce many more tones and became much more flexible.

Brass players can alter the tone color of their instruments by inserting a *mute* into the bell. Mutes for brass instruments come in different shapes and are made of wood, plastic, or metal. They are most common in jazz, where they create a variety of effects, including a buzzing sound, a mellowing of the tone, and the comical "wah-wah."

Brass instruments are very powerful, so they are often used at climaxes and for bold, heroic statements. Since the late nineteenth century, they are frequently given rapid solo passages as well. Today, brass instruments are very popular, owing to ensembles such as the Canadian Brass and soloists like the trumpeter Wynton Marsalis.

#### **Percussion Instruments**

Most percussion instruments of the orchestra are struck by hand, with sticks, or with hammers. Some are shaken or rubbed. Percussion instruments are subdivided into instruments of definite and indefinite pitch, depending on whether they produce a tone or a noiselike sound.

### **Definite Pitch**

timpani (kettledrums) glockenspiel xylophone celesta chimes

### **Indefinite Pitch**

snare drum (side drum)
bass drum
tambourine
triangle
cymbals
gong (tam-tam)

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