1.2: Performing Forces for Music

Music consists of the intentional organization of sounds by and for human beings. In the broadest classification, these sounds are produced by people in three ways: (1) through the human voice, the instrument with which most of us are born, (2) by using acoustic musical instruments, or (3) by using electronic and digital equipment to generate purely electronic sounds.

The Human Voice as a Performing Force

The human voice is the most intimate of all the musical instruments in that it is the one that most of us have. We breathe in, and, as we exhale, air rushes over the vocal cords causing them to vibrate. Depending on the length of the vocal cords, they will tend to vibrate more slowly or more quickly, creating pitches of lower or higher frequencies. The muscles in the larynx contract, causing the vocal cords to close, and air pressure forces them open. This closing and opening can happen hundreds of times a second. To reach a higher pitch, vocal cords vibrate more rapidly. Changing the shape of your vocal cavity allows for different timbres and vowel sounds.

Changing the position of the mouth and lips allows for further variety in sound and for the production of consonants. Because men tend to have thicker and longer vocal cords, they tend to have lower voices than women, whose vocal cords tend to be shorter and slimmer.

The natural speaking voice exhibits some variation in pitch. One’s voice often rises at the end of a question. When you have a cold and the vocal chords are swollen, you often speak in lower pitches than normal. Singing generally differs from speaking in that it uses a wider range of definite pitches that often occur in a regular meter (discussed later). By range, we mean the number of pitches, expressed as an intervallic distance. A trained opera singer might have a range of three to four octaves, whereas the average person has a range of a little over an octave.
Additionally, as we speak we generally focus on consonants, which articulate the beginnings and ends of syllables and help make our meaning plain. In singing, performers often focus on the vowels, as vowels carry better than consonants. Also, the meaning of the words is sometimes deemed less significant than the melodies themselves. Here's an explanation of how and why the vowels are so important--

Ex. 1.2: Why vowels are important

In Western music, voice ranges are typically split into four categories (see video below for subdivisions of these ranges):

1. **Bass**: lowest male voices; sing in a low **register**, below middle C on the piano (middle C being the C approximately in the middle of the range of the piano)
2. **Tenor**: highest male voices; sing in a register around and below middle C
3. **Alto**: lowest female voices; sing in a register around and above middle C
4. **Soprano**: highest female voices; sing almost exclusively above middle C

Ex. 1.2: Vocal Ranges

Western classical music uses all four of these ranges, whereas melodic register and range in jazz, rock, and pop are more limited.

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**Musical Instruments as Performing Forces**

Humans have been making music with bone, stone, wood, textiles, pottery, and metals for over 35,000 years. A musical instrument is any mechanism, other than the voice, that produces musical sounds. As we study both classical and commercial music, we will be listening to two types of musical instruments, purely acoustic instruments and electronic instruments.

A purely **acoustic instrument** is an instrument whose sound is created and projected through natural acoustic characteristics of the materials of which it is made—such as bone, stone, wood, textiles, pottery, and metals. When one hits wood or bone or stone or metal, one sends vibrations through it which might be amplified by the use of a
small chamber like a sound box or a gourd. When one plucks a string, one creates sound waves that might be amplified through a piece of wood or box of wood, such as one finds in an acoustic guitar or violin. As with the voice, the larger the instrument, the deeper the pitches it plays—consider, for example, the cello versus the violin. Instruments also differ in their ranges, some being able to produce a wide variety of notes while others are much more restricted in the pitches that they can play. (For example, the piano has a range of over seven octaves, while the saxophone normally plays only two and a half). The **timbre** (pronounced *tam-ber*) of a sound coming from a musical instrument is affected by the materials used and the way in which the sound is produced. Based on these two characteristics, we categorize acoustic instruments into five groups: strings, woodwinds, brass, percussion, and keyboard.

1. **Strings**: instruments whose sound is produced by setting strings in motion. These strings can be set in motion by plucking the strings with your finger, or a pick (a piece of plastic). They can also be set in motion by bowing. In bowing, the musician draws a bow across the string, creating friction and resulting in a sustained note. Most bows consist of horsehair held together on each end by a piece of wood. String examples: violins; violas; violoncellos; string bass (also known as the double bass or stand-up bass); classical, acoustic, and bass guitars; harps.

For more information and listening examples of the different orchestral string instruments, go to [http://www.philharmonia.co.uk/explore/instruments](http://www.philharmonia.co.uk/explore/instruments). Click on the individual instruments for an introduction and demonstration of the

![String Family](https://human.libretexts.org/Bookshelves/Music/Book%3A_Understanding_Music_-_Past_and_Present_(Clark_et_al.)/01%3A...
1. **Woodwinds**: instruments traditionally made of wood whose sound is generated by forcing air through a tube, thus creating a vibrating air column. This can be done in one of several ways. The air can travel directly through an opening in the instrument, as in a flute. The air can pass through an opening between a reed and a wooden or metal mouthpiece as in a saxophone or clarinet or between two reeds as in a bassoon or oboe. Although many woodwind instruments are in fact made of wood, there are exceptions. Instruments such as the saxophone and the modern flute are made of metal while some clarinets are made of plastic. These instruments are still considered woodwinds because the flute was traditionally made of wood and the saxophone and clarinet still use a wooden reed to produce the tone. Woodwind examples: flute, clarinet, oboe, bassoon.

For more information and listening examples of the different orchestral woodwind instruments, go to

![Woodwind Family](https://human.libretexts.org/Bookshelves/Music/Book%3A_Understanding_Music_-_Past_and_Present_(Clark_et_al.)/01%3A…)
http://www.philharmonia.co.uk/explore/instruments. Click on the individual instruments for an introduction and demonstration of the instrument.

3. **Brass**: instruments traditionally made of brass or another metal (and thus often producing a “bright” or “brassy” tone) whose sound is generated by “buzzing” (vibrating the lips together) into a mouthpiece attached to a coiled tube. This “buzzing” sets the air within the tube vibrating. The pitches are normally amplified by a flared bell at the end of the tube. Brass examples: trumpet, bugle, cornet, trombone, (French) horn, tuba, and euphonium.

For more information and listening examples of the different orchestral brass instruments, go to http://www.philharmonia.co.uk/explore/instruments. Click on the individual instruments for an introduction and demonstration of the instrument.

Figure \(\PageIndex{4}\): A Kyrgyz Military Band performing during II Military Music Festival of Armed Forces of the SCO member-states. (Creative Commons Attribution 4.0 Source: Wikim...
4. **Percussion**: instruments that are typically hit or struck with the hand, with sticks, or with hammers, or that are shaken or rubbed. Some percussion instruments (such as the vibraphone) play definite pitches, but many play indefinite pitches. The standard drum set used in many jazz and rock ensembles, for example, consists of mostly indefinite-pitch instruments. Percussion examples: drum set, agogo bells (double bells), glockenspiel, xylophone, vibraphone, bass drum, snare or side drum, maracas, claves, cymbals, gong, triangle, tambourine.

For more information and listening examples of the different orchestral percussion instruments, go to [https://philharmonia.co.uk/resources/instruments/](https://philharmonia.co.uk/resources/instruments/). Click on the individual instruments for an introduction and demonstration of the instrument.
5. **Keyboards**: instruments that produce sound by pressing, or striking keys on a keyboard. The keys set air moving by the hammering of a string (in the case of the piano) or by the opening and closing of a pipe through which air is pushed (as in the case of the vibraphone, organ, and accordion). All of these instruments have the capacity of playing more than one musical line at the same time. Keyboard examples: piano, organ, vibraphone, and accordion.

For more information and listening examples of the different orchestral keyboard instruments, go to [http://www.philharmonia.co.uk/explore/instruments](http://www.philharmonia.co.uk/explore/instruments). The keyboard link is found within the percussion instruments.

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**The Orchestra**

When we put these families together, in various combinations and numbers, we get the performing ensembles of various sizes (number of performers) that are unique to classical music. For example, the performing ensemble that has become the focal point for much classical music is the symphony orchestra which is the largest of the instrumental ensembles and plays symphonies, overtures, concertos, and the like. In fact, as we begin to explore music in its historical context, we will often be looking at the growth of the orchestra from a small group to the larger version we know today and much of the music used as examples will be played by orchestras of various sizes.

Ex. 1.3: George Meets the Orchestra
Non-acoustic instruments

**Electric sounds and instruments**: instruments can be electric in several ways. In some cases, an acoustic instrument, such as the guitar, violin, or piano may be played near a microphone that feeds into an amplifier. In this case, the instrument is not electric. In other cases, amplifiers are embedded in or placed onto the body of an acoustic instrument. In still other cases, acoustic instruments are altered to facilitate the amplification of their music. Thus, solid body violins, guitars, and basses may stand in for their hollow-bodied cousins.

Another category of electronic instruments are those that produce sound through purely electronic or digital means. Synthesizers and the modern electric keyboard, as well as beat boxes, are examples of electronic instruments that use wave generators or digital signals to produce tones.

**Synthesizers** are electronic instruments (often in keyboard form) that create sounds using basic wave forms in different combinations. The first commercially available compact synthesizers marketed for musical performance were designed and built by Dr. Robert Moog in the mid-1960s.
Figure \(\PageIndex{9}\): Early Minimoog by R. A. Moog Inc. (ca. 1970) by “glacial23” Source: Wikimedia

A staple of twenty-first-century music, synthesizers are widely used in popular music and movie music. Their sounds are everywhere in our society. Synthesizers are computers that combine tones of different frequencies. These combinations of frequencies result in complex sounds that do not exist in nature. Listen to the recording below of Bjork, which incorporates live musicians with a variety of strange and interesting synthesized sounds.

Ex. 1.4: Björk – Hyperballad

https://human.libretexts.org/Bookshelves/Music/Book%3A_Understanding_Music_-_Past_and_Present_(Clark_et_al.)/01%3A…

Updated: Tue, 19 Jul 2022 02:12:17 GMT
Powered by
Solid-state electronics have enabled the synthesizer to shrink in size from its early days in the 1970s. Compare the number of electronic components in the photo of Keith Emerson’s “rig” with the much smaller one used by RZA linked below.

Ex. 1.5: Emerson, Lake, and Palmer – “Tarkus” 1997
Synthesizers can also be used to imitate the complex sounds of real instruments, making it possible for a composer to create music and have it played without having to hire a real orchestra. The video below features music created using sample-based synthesis, a method that incorporates recorded audio “samples” to approximate the sound of an orchestra through a computer. (Jump ahead to 1:30 to skip the specs.)

Ex. 1.6: Vienna Symphonic Library
The ultimate techno dominance in pop music is heard in Hip Hop. Here, RZA demonstrates his portable Beat Thang at Guitar Center. He shows how he creates and customizes a beat on the fly. (He also shows off his freestyling skills.)

EX. 1.7 RZA demos his Beat Thang.
Media, iframe, embed and object tags are not supported inside of a PDF.

https://youtu.be/rrcV2W73rGc