

Production of American English Consonant Sounds

In order to produce speech sounds, it is helpful to understand how the different sounds are produced when air escapes through the mouth (oral cavity) or through the nose (nasal cavity). We will begin with some basic information about the articulators or the organs that produce speech sounds.

Articulators can be active or relatively passive. Starting at the front of the mouth are the lips. These are active or movable articulators (e.g., they can be closed or opened). Inside the mouth there are passive articulators such as the upper and lower teeth. Immediately behind the upper teeth is a ridge called the alveolar ridge. You may be able to feel this “bumpy” area with the tip of your tongue. Moving back in the mouth is the palate, also known as the hard palate; it is a sensitive area, even ticklish, if you touch it with the tip of your tongue. As we move back farther, we find the velum or soft palate.

In addition to the lips, the other active or movable articulator is the tongue. The end or tip moves close to or in contact with other passive articulators to create a shape inside the oral cavity to produce different sounds. The blade of the tongue is right behind the tip. The back of the tongue is also important in creating speech sounds.

In the throat, there is an opening called the *glottis*, which is surrounded by folds of tissue called *vocal cords* or *vocal folds* (also *vocal bands*). When these cords are relaxed, air moves up from the lungs through the glottis freely, producing a *voiceless* sound. When the muscles tighten and move closer together, they vibrate when the air passes through and produce a *voiced* sound. This voicing distinction is an important one for English consonants because it can create differences in meaning between pairs of words; for example, *fan* (a device with blades that spin around to circulate air and keep you cool) versus *van* (a vehicle that usually can carry more passengers or goods than a car). The difference in sound between *fan* and *van* is the voicing feature of the initial consonant. You can feel voicing if you place your fingertips gently on the front of your throat and hum – you will feel the vibration.

Some sounds are made as a result of air passing through the nose or nasal cavity. These are called nasal sounds.

Describing American English Consonants

Consonants are classified or described according to three characteristics: place of articulation (**where** they are produced), manner of articulation (**how** they are produced), and **voicing** (whether the vocal cords are vibrating or not).

Place or Point of Articulation: The following are the places or points of articulation that are important for describing the consonants of American English. We start at the front of the mouth.

- Bilabial: *Bi* means two, and labial refers to the lips so bilabial sounds are created when the lips are put together.
 - Example: big

- Labiodental: *Labio* refers to a lip and dental refers to teeth so labiodental sounds are made when the lower lip curls backward below the upper teeth.
 - Example: fish
- Interdental: *Inter* means between so interdental sounds are made when the tongue tip comes forward to some degree between the upper and lower teeth.
 - Example: think
- Alveolar: The alveolar ridge area is a popular one for English consonants. These sounds are made when the tongue is in contact with or close to the alveolar ridge.
 - Example: dog
- Palato-alveolar: Sounds in this area are made with the tip of the tongue approaching or touching the alveolar ridge and the blade of the tongue near the hard palate.
 - Example: ship
- Palatal: The palatal sound in English is made by raising the blade of the tongue toward or against the hard palate.
 - Example: yes
- Velar: These sounds involve the back of the tongue approaching or touching the velum (soft palate).
 - Example: good
- Glottal: There is one sound in English classified as a consonant which is referred to as glottal.
 - Example: hello

Manner of articulation or how sounds are produced is the second major characteristic of consonants. We use the following categories to describe their manner of articulation.

- Stop or plosive: Stops are made by blocking the air from the lungs (i.e., creating an obstruction) and then releasing this closure. The release creates the sound.
 - Examples: big, dog, good
- Nasal: A nasal sound is created when air escapes through the nose.
 - Examples: my, nine
- Flap: In American English, an alveolar stop (/t/) is frequently produced as a flap in words where the sound occurs between vowel-like elements and is not at the beginning of a stressed syllable. A flap is a rapid striking of the tongue tip against the alveolar ridge. It may sound like a short /d/.
 - Examples: pretty, city
- Fricative: There are numerous fricatives in English. These sounds are produced when articulators create a narrow channel through which the air flows and generally produces noise (friction). Fricatives are different from stops or plosives because there is no complete closure or obstruction of the flow of air.
 - Examples: fish, think, soup, ship
- Affricate: An affricate is made when there is a closure as if to produce a stop, but it is released into a fricative.

- Example: church
- Approximant: Approximants are produced when one articulator is brought close to another without causing audible friction. English approximants are voiced. This category includes two sounds described as *glides* or *semivowels*, and two sounds that are described as *liquids*.
 - Glides/semivowels:
 - The palatal glide is made when the body of the tongue is high in the mouth near the palate. Example: yes.
 - The labiovelar glide involves a rounding of the lips (*labio*) and a raising of the back of the tongue toward the velum. Example: window.
 - Liquids:
 - There are different /r/-like sounds. Be cautious of statements that make generalizations regarding /r/: Not all speakers of North American varieties of English use a retroflex articulation, which is produced with the tip of the tongue curled back toward the alveolar ridge. This approach is generally more difficult for second-language speakers of English and is more likely to lead to the production of an incorrect sound. A *bunched* /r/ is easier. Follow these guidelines:
 - Do not curl up the tip of the tongue.
 - There is some protrusion or movement forward of the lips.
 - The sides of the tongue can be felt pressing against the gap between the upper and lower teeth.
 - Raise and retract (“bunch”) the body of the tongue as if you were going to produce the first sound in the word *good*, but do not make the closure.
 - Example: right, rock.
 - The other liquid is also called a lateral approximant. The word lateral refers to the sides of the tongue. This /l/ sound is made by touching the tip of the tongue to the alveolar area and allowing the air to flow over the sides of the tongue to create the sound. Example: light, lock.

Voicing and Aspiration

The third characteristic used to describe a consonant is the voicing feature. This is a very important feature in English. If a consonant is voiced, it is produced with vibration of the vocal cords, which you can feel by placing the tips of your fingers gently on the front of your throat. However, the voicing distinction may not be easily heard by listeners because the production of a stop is quick; the sound is created by the release of a closure.

In English, there is an additional difference between the voiceless and voiced stops in some contexts. It’s called *aspiration* and refers to an extra puff of air that escapes after the release of the stop; for example, the first consonant sound in the words *pet*, *time*, and *cook* are aspirated stops. You can feel aspiration by placing your hand in front of your mouth. This aspiration occurs with voiceless stops when they are in initial position of a syllable that carries stress.

Sample Articulatory Descriptions of Consonants

Now that we have reviewed the places and manners of articulation of the consonants, we can make their descriptions clearer by adding the voicing or aspiration feature to their descriptions. The following sample articulatory descriptions match those in the consonant audio files.

Aspirated bilabial stop: pot. The initial sound in *pot* is created by putting the lips together and releasing the sound with no vocal cord vibration (no voicing), but with an extra puff of air following the release (aspiration).

Voiced bilabial stop: big. The initial sound in *big* is created by putting the lips together and releasing the sound with vocal cord vibration.

Voiced alveolar nasal: not. The initial sound in *not* is created by placing the tip of the tongue against the alveolar ridge and forcing the air through the nose (instead of the mouth). Nasal sounds are voiced.

Voiced velar nasal: sing. The final sound in *sing* does not occur at the beginning of words in English. It is often represented in spelling as –ng, and is found at the end of verb forms such as *walking*, *talking*, etc.

Voiceless labiodental fricative: find. The initial sound in *find* is produced by curling the lower lip backwards under the front teeth but without stopping the airflow. A narrow channel is produced so when the air flows through, it creates noise. There is no vocal cord vibration (voicing) with this sound.

Voiced interdental fricative: the. The initial sound in *the* is produced by extending the tip of the tongue forward between the teeth allowing the air to escape between the tongue surface and the teeth. This sound is accompanied by vocal cord vibration.