The Four Processes of Speech Production:

* Respiration
* Phonation
* Resonance
* Articulation

**Respiration** (i.e., breathing) is the power mechanism for speech; it provides energy for the sound produced.

There are two phases of respiration:

* Inhalation – The diaphragm contracts drawing air down into the lungs; first the abdomen expands, then the chest (thoracic) cavity.
* Exhalation – The diaphragm relaxes forcing air back out of the lungs

When not speaking, inhalation and exhalation phases take the same amount of time.
For speech, the exhalation phase is longer.

**Phonation** refers to the creation of voice sounds caused by the rapid vibration of the vocal folds when air passes between them.

The opening between the vocal folds (i.e., the space through which air passes) is called the **glottis**.

There are three aspects of voice influenced by movements of the vocal folds:

* Pitch – the frequency of the vibration
	+ an increase in pitch involves an increase in frequency
	+ the frequency of vocal fold vibrations depends on the mass and length of the vocal folds and the tension
* Loudness – the intensity of the sound (aka, volume)
	+ Involves the amount of energy generated by the vibrations of the vocal folds
	+ Intensity increases with greater air pressure from the lungs (increases the amplitude of the vibrations)
* Quality – the sound quality of the voice, also referred to as timbre (pronounced “TAM-ber”)
	+ This is affected by the pattern of movement of the vocal folds

**Resonance** is the process by which the basic product of [phonation](http://en.wikipedia.org/wiki/Phonation) is enhanced in [timbre](http://en.wikipedia.org/wiki/Timbre) and/or intensity by the air-filled cavities (the pharynx, nasopharynx, nasal cavitiy, oral cavity) through which it passes on its way to the outside air.

Resonance describes a relationship that exists between two bodies vibrating at the same frequency (or a multiple thereof). In other words, the vibrations emanating from one body cause the other body to start vibrating in tune with it. For example, the vibrations of the vocal folds cause vibrations of the chest, head, nose, etc.

So, a **resonator** **may be defined as a secondary vibrator** which is set into motion by the main vibrator and which adds its own characteristics to the generated sound waves.

There are two basic kinds of resonance:

* **Sympathetic resonance** (or free resonance) in which there is no physical contact between the two bodies. The resonator starts functioning because it receives vibrations through the air and responds to them sympathetically.
* **Conductive resonance** (or forced resonance) in which the resonator starts vibrating because it is in physical contact with a vibrating body.

The essential difference between both types is what causes the resonator to start vibrating.

Both types of resonance are at work in the human voice during speaking and singing. Much of the vibration felt by singers while singing is a result of conductive resonance. The vibrations created by the vocal folds travel along the bones, cartilages, and muscles of the neck, head, and upper chest, causing them to vibrate. There is little evidence that these vibratory sensations make any significant contribution to the external sound.

These same conductive vibrations, however, are good sensation guides for the singer, regardless of their effect on the external sound. These sensations provide evidence to the singer that his [vocal folds](http://en.wikipedia.org/wiki/Vocal_folds) are forming strong primary vibrations which are being conducted to the head and chest. Thus these vibratory sensations can supply [sensory feedback](http://en.wikipedia.org/wiki/Sensory_feedback).

In contrast, the sound a person hears listening to a singer is a product of sympathetic resonance. Vibrations created by the [vocal cords](http://en.wikipedia.org/wiki/Vocal_cords) travel through air from the [larynx](http://en.wikipedia.org/wiki/Larynx) into the cavities of the throat and head, setting them into vibration. This is sympathetic resonance, without physical contact between these cavities and the vocal cords.

* McKinney, James (1994) The Diagnosis and Correction of Vocal Faults, Nashville, TN: Genovex Music Group.
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* McCoy, Scott (2004) Your Voice: An Inside View. Princeton, NJ: Inside View Press.
* Vennard, William (1967). *Singing: the Mechanism and the Technic* (4th ed.). New York: Carl Fischer. ISBN 978-0-8258-0055-9.

**Articulation** involves shaping and manipulating the phonated voice into distinct sounds which are further arranged into comprehensible words.

The **articulators** are:

* Lips
* Teeth
* Alveolar Ridge
* Tongue
* Hard Palate
* Soft Palate (also called the **velum**)
* Uvula (not used in English)
* Epiglottis (not used in English)