

Understanding Consonant and Vowel Phonemes in English

Consonant Phonemes

There are 25 consonant phonemes in the English language.

Consonant phonemes:

- Are **CLOSED** (airflow is obstructed when the sound is produced)
- Can be **STOPS** or **CONTINUANTS**
- Can be **VOICED** or **UNVOICED**



Visualize placing a multi-pattern nozzle on the end of a hose. The nozzle obstructs the flow of water. Depending on the setting you select, the flow of water is changed by the way the flow is obstructed. When the handle is disengaged, the flow of water stops. One setting allows water to spray in a fine mist; another creates an arc. The obstruction in each setting changes the way the water exits the hose. This is a good analogy for understanding how consonant sounds work.

Consonant phonemes are categorized by place of articulation and manner of articulation.

The **PLACE** of articulation refers to the location in the mouth that is engaged to direct air flow when producing a phoneme (e.g., lips, teeth, roof of mouth, or tongue).

Phonemes are produced in the front, middle, or back of the mouth in one of the following ways. Practice making each of these sounds, noting the location in the mouth and what articulators (parts of the mouth) are engaged when forming the sound:

Front

Lips together (<i>bilabial</i>)	/p/	/b/	/m/		
Teeth on lower lip (<i>labiodental</i>)	/f/	/v/			
Tongue placed between teeth (<i>dental</i>)	/th/	/ <u>th</u> /			
Tongue placed on ridge behind upper front teeth (<i>alveolar</i>)	/t/	/d/	/n/	/s/	/z/

Middle

Tongue pulled back, touching roof of mouth (<i>palatal</i>):	/sh/	/zh/	/ch/	/j/	/y/	/r/
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Back

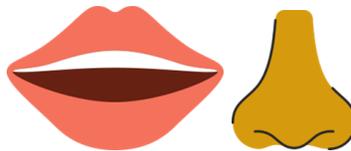
Tongue/back of throat (velar):	/k/	/g/	/ng/	/wh/	/hw/
Glottis (<i>glottal</i>):	/h/				

Ask: What parts of our mouth do we use when we make this sound?

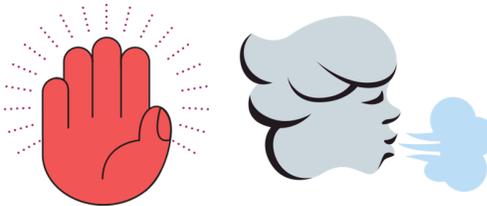


The MANNER of articulation refers to the way the air is directed or obstructed by the lips, teeth, or tongue and what we do with our vocal cords when producing a phoneme. All consonant phonemes are produced by obstructing airflow. When a consonant phoneme is produced, air is forced through either the mouth or the nose, and the flow of air is either stopped briefly or is continuous (can continue to be produced as long as one has breath). Further, consonant sounds are produced by engaging the vocal cords to produce a voiced sound, or disengaging the vocal cords to produce an unvoiced sound. With the exception of the glottal sound /h/, all unvoiced consonant sounds in English have a voiced “partner”, a sound which is produced in the same location in the mouth, in the same manner, with the only difference in articulation being voicing. Place your hand on your throat and make the following sounds: /f/, /v/. You should only feel vibration in your throat for the /v/ sound, because your vocal cords are engaged to produce this sound. The /f/ sound is unvoiced, so no vibration is detected.

Ask: When I make this sound, does the air come out of my mouth or my nose?



Ask: When I make this sound, does it stop or continue?



Ask: When I make this sound, is my voice box turned on or turned off?



Using these guidelines, we can classify consonant sounds by manner of articulation in 6 categories. Practice making each of these sounds correctly, noting what is happening to the air flow as you produce each sound:

- **Stops:** stop sounds are made by stopping the flow of air and then pushing the sound out in a quick burst. These sounds can not be made continuously. There are six stop sounds in three voiced/unvoiced pairs:

Voiced	/b/	/d/	/g/
Unvoiced	/p/	/t/	/k/

- **Fricatives:** Fricatives are named because of the amount of friction produced when these sounds are made. All fricatives are continuous sounds and can be voiced or unvoiced. Voiced fricatives feel “tickly” when produced, where unvoiced fricatives feel “hissy.” There are eight fricative sounds in four voiced/unvoiced pairs:

Voiced	/v/	/th̩/*	/z/	/zh/*
Unvoiced	/f/	/th/	/s/	/sh/

* /th̩/ as in **there**; /zh/ as in **measure**

The /h/ sound can also be classified as an unvoiced fricative.

- **Affricates:** Affricates are a combination between a stop sound and a fricative. Friction is created, but the air is stopped before the sound is released. There are two affricates, which are also a voiced and unvoiced pair:

Voiced	/j/
Unvoiced	/ch/

- **Nasals:** Phonemes produced by directing air through the nasal cavity are called “nasals. These sounds cannot be produced correctly if you hold your nose as you try to say them. All nasals are voiced and continuous. There are three nasal sounds:

Voiced	/m/	/n/	/ng/
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- **Liquids:** Liquid sounds are hard to “pin down” and tend to roll around in the mouth depending on the sounds around them. These sounds have the ability to alter the vowel sounds that come before them. The liquid sounds are both continuous and voiced:

Voiced	/l/	/r/
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- **Glides:** Glides are named for the way they easily slide into the vowel phoneme that always follows them. (It is important to note that the unvoiced /hw/ sound typically represented by the grapheme ‘wh’ (*when, where*) is rarely produced this way in American English. British English tends to maintain this pronunciation).

Voiced	/y/	/w/
Unvoiced		/hw/

While good phonemic awareness instruction does not require the teacher to be experts in English phonology, it is important to have an understanding of how sounds are produced, where children might experience problems, and how articulation and perception of phonemes can affect learning. Oftentimes, when engaged in practicing correct phoneme articulation, teachers realize they have been demonstrating sounds incorrectly to students. For example, it is not uncommon to hear voicing added to unvoiced sounds (/p/ as /PUH/), or stopping a sound that should be continuous (/v/ as /VUH/). Precise articulation of phonemes supports students as they begin to make sound/symbol correspondences and use this to begin decoding and encoding words.

VOWEL PHONEMES

Vowel phonemes are classified by the way they are produced in contrast to consonant phonemes.

ALL vowel phonemes meet the following criteria:

- **OPEN** (shaped by the mouth, but unobstructed)
- **CONTINUOUS**
- **VOICED**

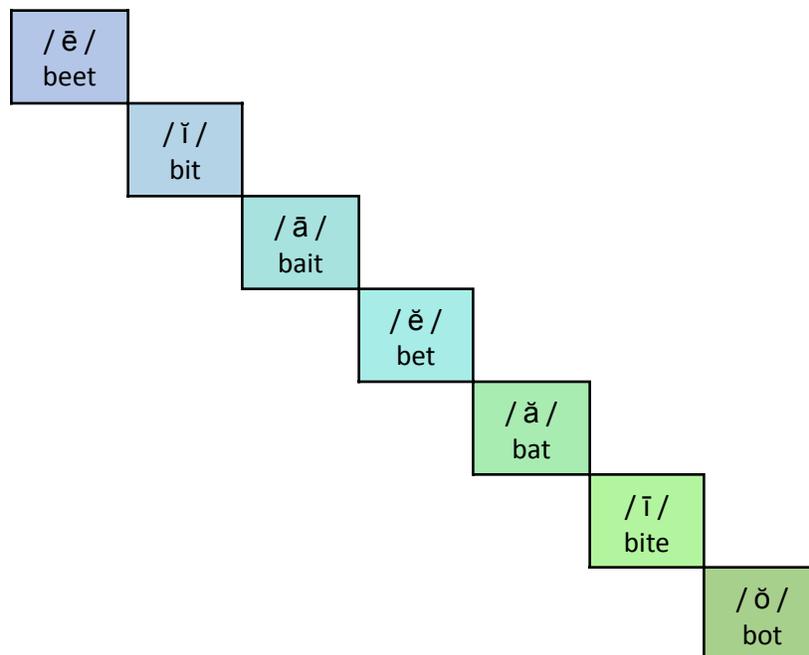


Picture the garden hose once again, this time with no nozzle attached. When you turn on the spigot, the water comes rushing out the end of the hose. It is unobstructed (open). Once the water is turned on, it doesn't stop coming out of the hose until we turn it off. The flow is continuous. This analogy helps us understand how vowel sounds are produced. All vowel phonemes are also voiced. These characteristics allow vowels to act as a connector between all the sounds in a syllable (and why each syllable must have one!).

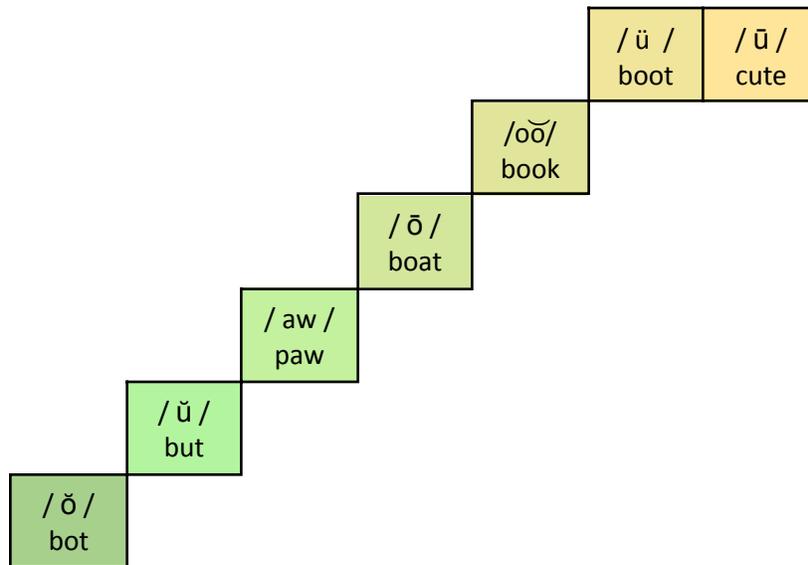
There are 19 vowel phonemes in the English language. With so many vowels, some students have difficulty discriminating between them auditorily, especially vowels that are produced in close proximity in the mouth. Fifteen of the English vowels are characterized by position and height of the tongue and the shape of the lips.

The frontmost vowel sound, /ē/ (*eagle, evil*) is produced with the lips pulled back in a smile and the tongue high in the mouth. From this position, the chin drops slightly as the mouth opens and the tongue drops slightly with each vowel sound until we reach the low, open sound /ō/ (*octopus, ostrich*).

Place your hand under your chin as you make each vowel sound:



From the low, open /ɔ̃/ sound, the lips begin to round and the tongue pulls back slightly with each sound until we reach the back, rounded mouth vowel sound /ü / (*moon, soup*) and similarly placed sound /yū/ (*unicorn, use*).



The remaining vowel phonemes are placed in three categories: diphthongs, r-controlled vowels, and schwa.

Diphthongs

A diphthong (pronounced *dif-thong*) is a vowel sound that is characterized by two distinct mouth placements in its production. The /ow/ sound (*out, fowl*) is produced by beginning with the mouth open, then moving to a rounded position. The /oy/ sound (*oil, coin*) is produced by beginning with a rounded mouth and moving to a “smiley” position.

Make the sounds of each diphthong and feel how your mouth position moves to produce each sound:

/ ow / plow	/ oy / coin
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Note: The long /i/ sound (ice, mine) is technically a diphthong but is placed on the vowel chart because of its close proximity to /ɔ̃/.

R-Controlled Vowels

R-controlled vowels, alternatively called vowel + R or “Bossy R” phonemes, are vowel phonemes in which the vowel sound is impacted by the letter ‘r’ that follows it. The three r-controlled vowel phonemes are /ar/ (*car, art*), /er/ (*her, fur, third*), and /or/ (*for, lord*).

Make each r-controlled sound. How does the 'r' influence the vowel in each sound?

/ ar / car	/ er / bird	/ or / fork
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Schwa

The final vowel phoneme is called *schwa*. Schwa is a unique vowel sound because it is unstressed. The sound of schwa is similar to a short /u/, but can also sound like a short /i/ and can be represented by any vowel grapheme. However, schwa is only found in syllables that are unaccented.

For example, the schwa sound occurs in the first syllable of the word *about*, and the last syllable in the word *important*. The symbol for the schwa sound looks like an inverted lowercase 'e.' (/ə/).

/ ə / the

Listen for the schwa sound in each of these words. Which syllable is unaccented?

about *seven* *contain* *banana*

Considering the sheer number of vowel phonemes in English, it is reasonable that some students have difficulty distinguishing vowel sounds, particularly sounds which are produced in close proximity to one another.

CONNECTING PHONOLOGY TO SPELLING

One of the benefits of understanding English phonology is the insight it can give us into student reading and spelling errors. Making a connection between what a student might hear when producing a word and how spelling and reading can be impacted by that allows teachers to both better understand and more effectively remediate spelling errors in student writing.

There are several things to consider when analyzing students' spelling errors. First, one must determine if a student is able to identify each phoneme in a word and represent each sound with an appropriate corresponding grapheme. This would indicate that the student has full phonemic awareness and can segment each phoneme in a word, and also that the student has knowledge of phoneme/grapheme correspondences. We can consider how and where sounds are produced to help make sense of student errors. This section explores ways in which the perception of phonemes affects students' spelling, information that can help teachers to better understand and correct spelling problems.

Sound Confusion

Phonemes that are produced in a similar location in the mouth, or in a similar manner, can be cause for confusion when it comes to both proper articulation and spelling. This confusion can apply to both consonant and vowel sounds. Understanding why these misconceptions happen can help teachers better identify and correct student errors in both reading and spelling.

For example, a student tells you she poked her finger on a /forn/. You know that what she means to say is “thorn,” but the way she has perceived the pronunciation of the word is incorrect. Why is she making this error?

		Place of Articulation	
		Teeth on lip	Tongue between teeth
Manner of Articulation Fricative	voiced	/v/	/th/
	voiceless	/f/	/th/

The phonemes /f/ and /th/ are both voiceless fricatives, and both are produced in the front of the mouth. The phonemes differ only in their specific place of articulation: /f/ is produced with the teeth on the lower lip, while /th/ is produced with the tongue between the teeth. Phonemes that sit adjacent to or above or below one another on the consonant or vowel charts are “neighbors”. Because they are produced so similarly, they can be easily confused.

This sound confusion transfers to students' spelling. A child might write “pin” for “pen” because the two vowel sounds have minimal differences in production and can be hard to discriminate.

Look at the consonant phoneme chart. Why might a child produce the following spelling errors?

“Ship” for chip

“efer” for ever

Allophonic Variations

Phonemic awareness, the ability to hear and isolate, segment, blend, and manipulate individual speech sounds, is critical to developing strong foundational skills for reading. However, it is not a naturally obtained skill. In spoken language, sounds are *coarticulated*. This means that speech sounds are articulated together and influence each other. **Allophones** are the slight variations in the way a phoneme is pronounced when influenced by the sounds around it.

Some common allophonic variations are listed below.

Allophonic Variation	What/Why	Spelling Errors
Nasalization	<p>A vowel sound before a nasal consonant (/m/,/n/,/ng/) gets pushed through the nasal passage and takes on qualities of a nasal sound. This can make the nasal sound hard to hear when it is followed by a consonant. Students may omit the nasal in their spelling of these words.</p>	<p>Bank = “bak” Jump = “jup” Sent = “set”</p>
	<p>Try: Hold your nose when you say these words: bake/bank; pup/pump; lit/lint. You will feel the air being forced through the nose in each word that includes a nasal consonant. Doing this with students can help them identify nasals to improve their spelling.</p>	
Aspiration/Deaspiration	<p>Unvoiced stop consonants /p/, /t/, and /k/ lose their “pop of air” when they are the second sound in a consonant blend, as in the words <i>spot, skip, stay</i>. Without this “pop”, students may mistake these sounds for their voiced counterparts.</p>	<p>Spin = “sbin” Skip = “sgip” Stay = “sday”</p>
	<p>Try: Hold a tissue in front of your lips and make each unvoiced stop sound: /p/, /t/, /k/. Notice the puff of air? Now, hold the tissue up and say these words: spin, skin, stay. Did you notice that the tissue moves much less?</p>	
Affrication	<p>The phonemes /t/ and /d/, when followed by /r/ or /y/, can be produced more like an affricate (/ch/ or /j/). On the consonant phoneme chart, you can see that in order to get to the /r/or /y/ sound produced in the back of the mouth from the /t/ or /d/ sound at the front of the mouth, your tongue travels through the location where the affricates are produced.</p>	<p>Trip = “chrip” Try = “chry” Drop = “jrop” Dragon = “jragen”</p> <p>Education = ejudashen</p>
	<p>Try: Say /t/. Now say /r/. Feel the distance between these two locations in the mouth. Now say /tr/. The mouth must anticipate the /r/ sound and round the lips, causing the variation in sound. Do the same with /d/ and /r/. Can you feel and hear the difference?</p>	

Flapping	When the phonemes /t/ and /d/ are in the medial position in a word, between an accented and an unaccented syllable, the sound is often changed to a “tongue flap.” The /t/ is produced more like a /d/ in a word like <i>later</i> . A /d/ sound in a word like <i>kidding</i> is “lazy” and not produced crisply like in the beginning of a word.	Settle = ‘sedl’ Water = “wadr”
	Try: Pronounce words like “little” and “water” in a British accent. In these crisp pronunciations, we can clearly hear the /t/ sound in the medial position.	

Dialect and Accent

Dialect, the variation of a language particular to a region or area, can affect not only the terminology and references used within the language, but also the way certain sounds are articulated or perceived.

Accents within a dialect of English tend to specifically influence vowel phonemes, but can also impact the way consonant phonemes are pronounced. Here are a few examples:

“Car” pronounced /kah/

“Wash” pronounced /worsh/

“Cot” and “caught” pronounced exactly the same (or pronounced with different vowel sounds)

“Pen” and “pin” pronounced with the same vowel sound

“Ring” pronounced with a voiced /g/ at the end

“Chips” pronounced /ships/

It is helpful to point out to students the differences between oral production and standardized English spellings, particularly if there is significant contrast between the two. Explicit teaching supports the connection for students, and the more a teacher understands about English phonology, the better he or she can address differences in dialect.

REFERENCES

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