

Articulatory Phonetics: Advanced Version

LEVEL 1: Single-Syllable Words

A guide to the International Phonetic Alphabet
and English pronunciation for speech pathology,
vocal performance, and linguistics majors

Cheri Montgomery

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PREFACE

Articulatory Phonetics: Advanced Version teaches proper pronunciation and the formation of English speech sounds using the International Phonetic Alphabet (IPA). Intended for university coursework, its concepts are applicable across multiple disciplines, including speech pathology, vocal performance, and linguistics studies. This text can be used in a university course alongside the *Articulatory Phonetics Series*, which features the same word lists but employs a simplified phonetic system to introduce a phonetic approach to reading and proper pronunciation for special education students, English Language Learners (ELLs), and students acquiring clear speech. While the content is closely related, each workbook in the series serves a unique purpose. Following is the preface to the pre-college version.

Today's middle and high school teachers serve students with diverse abilities and language backgrounds. How can a single curriculum address such a wide range of learning needs? This series enables all students to participate in the same lesson.

Reading and Phonetics: Articulation is the speech-support version of a reading and spelling program. Level 1 teaches students to recognize single-syllable words and their corresponding phonetic symbols. It features a simplified phonetic system designed for diverse learners and provides instruction in the formation and articulation of each sound.

Individual learning needs are supported through four parallel workbooks created for students, parents, and teachers who are new to:

- braille
- manual signing and lipreading
- English language learning
- articulatory phonetics

Each workbook contains the same carefully ordered selection of words, phrases, and sentences. All exercises include only the sounds and spellings previously introduced. Sentences are deliberately constructed to avoid predictability and prevent guesswork. The intentional design supports early literacy development and proper pronunciation, while the separate formats enhance accessibility for students with distinct learning needs.

The parallel books provide unique instructions for:

- tactile training in braille with audio examples for those learning through touch and hearing
- manual-visual learning through signing and lipreading for those who rely on visual communication
- visual articulatory study using front and midsagittal views of the vocal tract with audio examples for those developing clarity of speech
- visual definition of vocabulary through carefully selected images with audio examples for those acquiring English in the multilingual classroom environment

Reading and Phonics: Articulation, Level 1 focuses on clarity of speech. Detailed images of the vocal tract, presented in midsagittal and front views, illustrate the formation of each vowel and consonant sound. The instructional pages provide thorough descriptions of each sound, accompanied by diagrams showing articulatory formation and the airflow pathway. Audio examples are included.

Because the linguistic core is identical, all student groups can participate in the same lesson while engaging through the pathway best suited to their learning needs. Audio recordings of each sound, as pronounced in multiple languages, further strengthen comparison and deepen phonetic awareness. Additional sensory associations, including scent, touch, taste, and sound, provide alternate avenues for learning when visual or auditory cues are limited.

Level 1 covers the spellings and phonetic transcriptions of single-syllable words. Level 2 expands the vocabulary of single-syllable words, includes words with diphthongs, and provides additional opportunities for phonetic transcription. Level 3 extends the instruction to include words with multiple syllables.

Students are encouraged to sing their words as a way of developing clarity of speech. Singing slows the articulatory process, allowing vowels to be sustained and consonants to be articulated with energy and clarity.

The decision to offer this approach originates from more than two decades of experience teaching lyric diction at the Blair School of Music at Vanderbilt University. The concepts have been refined and shared through presentations for the National Opera Association, the National Association of Teachers of Singing, and the International Congress of Voice Teachers.

From this research emerged a phonetic system first developed for braille readers, now integrated throughout the series. Each workbook offers a simplified and accessible approach to the International Phonetic Alphabet (IPA) with this text offering standard phonetic symbols. The symbols are placed between brackets to distinguish phonetic content from conventional spelling. A conversion chart listing the standard IPA symbols with the simplified version is provided below.

The resources needed to create the exercises in this series originated from research developed for the Lyric Diction Workbook Series and the IPA Scramble game app by Montgomery. Computer-based search tools and a database of more than 87,000 English words with phonetic symbols were used to organize a graded approach to learning English spellings and phonetics.

This workbook follows the Moore teaching model, an interactive approach to instruction developed by mathematician Robert Lee Moore and first implemented at the University of Pennsylvania in 1911. His methodology engages students in the learning process by giving each class member the opportunity to present individually assigned work.

Each class meeting follows a consistent routine. Students begin by presenting a written transcription assignment from one of twelve phrases provided in each unit. The instructor introduces new material in a brief lecture, followed by a guided phonetic reading activity. Finally, each student receives a unique phonetic assignment to prepare and present in the next class meeting. The twelve exercises in each unit are also suitable for independent study.

ABOUT THE AUTHOR

Cheri Montgomery is an author and lecturer specializing in voice and diction. She teaches voice and English, Italian, German, French, Latin, Spanish, and Russian lyric diction at the Blair School of Music at Vanderbilt University. This series is used in her articulatory phonetics course designed for Vanderbilt University students majoring in voice, English language learning, speech-language pathology, or special education.

Phonetic Conversion Chart

IPA	Simplified	Example	IPA	Simplified	Example	IPA	Simplified	Example
[æ]	[a]	<u>h</u> at	[k ^h]	[k]	<u>c</u> ake	[θ]	[th]	<u>th</u> ing
[ɑ]	[A]	f <u>a</u> ther	[l]	[l]	<u>l</u> ittle	[ð]	[Th]	<u>th</u> is
[b ^h]	[b]	<u>b</u> aby	[m]	[m]	<u>m</u> eme	[u]	[u]	<u>m</u> oon
[tʃ]	[tS]	<u>ch</u> air	[n]	[n]	<u>n</u> ote	[ʊ]	[U]	<u>b</u> ook
[d ^h]	[d]	<u>d</u> ance	[ŋ]	[N]	<u>s</u> ing	[ʌ]	[x]	<u>u</u> p
[ɛ]	[E]	b <u>e</u> d	[ɔ]	[O]	<u>o</u> ught	[v]	[v]	<u>v</u> ase
[f]	[f]	<u>f</u> ig	[p ^h]	[p]	<u>p</u> in	[w]	[w]	<u>w</u> in
[g ^h]	[g]	<u>g</u> ood	[ɹ]	[r]	<u>r</u> ing	[j]	[j]	<u>y</u> es
[h]	[h]	<u>h</u> ear <u>t</u>	[ɜ]	[R]	<u>e</u> ar <u>th</u>	[z]	[z]	<u>z</u> oo
[i]	[i]	<u>s</u> ea <u>t</u>	[s]	[s]	<u>c</u> ea <u>s</u> e	[ʒ]	[Z]	b <u>e</u> ig <u>e</u>
[ɪ]	[I]	<u>f</u> it	[ʃ]	[S]	<u>sh</u> irt	stress: [']	[']	be' <u>l</u> ieve
[dʒ]	[dZ]	<u>j</u> ud <u>g</u> e	[t ^h]	[t]	<u>t</u> ime	glottal: [ʔ]	[ʔ]	I, ever

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UNIT 1:

Spellings and phonetic symbols:

a [æ], i [ɪ], b [b^h], d [d^h], g [g^h]

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INSTRUCTIONAL TOOLS

THE SOUNDS OF ENGLISH

Speech sounds consist of two groups. *Vowels* are formed with an open flow of air. *Consonants* are formed with a narrowing of the airflow pathway.

SINGING

Students are encouraged to sing the practice lists. Singing is elongated speech. Vowels are sustained in song. This provides time for careful examination of each formation. Consonants quickly introduce or finalize the vowel sound in song. This provides opportunities to explore energetic articulation.

CONSONANT CLASSIFICATIONS

Voicing. Consonants are classified according to voicing. Voiced consonants can only be sung. Place your fingertips on your throat (Adam's apple) and feel the vibration that occurs during the articulation of a voiced *z* or *m*. Voiceless consonants can only be whispered. Notice how the throat is still during the articulation of a voiceless *s* or *f*.

Point of articulation. Consonants are classified according to point of contact. The lips contact for bilabial *b*, *p*, and *m*; the inside of the lower lip contacts the upper front teeth for labiodental *f* and *v*; the tongue tip contacts the edge of the upper front teeth for dental *th*; the tongue tip contacts the alveolar ridge for alveolar *d*, *n*, *t*, *l*, *s*, *z*, and *r* (the tongue tip contacts the upper front teeth during articulation for the Romance languages); the tongue arch rises toward the hard palate for prepalatal *sh*; the tongue arch contacts the soft palate for velar *g* and *k*; and the vocal folds draw near for the articulation of glottal *h*. A glottal stop is the grunt like sound made before the articulation of an initial vowel word (as in the words *eye*, *it*, and *ever*). The glottal stop does not exist in the Romance languages.

Airflow. Consonants are classified according to the manner of airflow. The breath flows through the nasal passages for *m*; it flows laterally over the sides of the tongue for *l*; it flows up for retroflex *r*; it glides past the articulators for *w*; and it flows with friction for *v* and *s*. Consonant articulation either stops or continues. A stop is formed by constricting and releasing the airflow. The contact between the

articulators is released with a mix of air and vocalized tone for *b*, *d*, *g*. The contact between the articulators is released with a puff of air for *p*, *t*, *k*. This breathy quality is not present in the Romance languages. Non aspirate stops are called plosives. A plosive consonant releases directly into the vowel sound. The remaining consonants are continuants. They maintain a consistent flow of air as in *s* or *n*.

VOWEL CLASSIFICATIONS

Tongue arch. Vowels are formed with the tongue tip touching the lower front teeth and the front or back arching toward the palate. The tongue arches toward the front of the mouth for [i] as in *meet* and toward the back of the mouth for [u] as in *boot*. There are also degrees of arching. The tongue forms angles (like the slope of a roof) which can be steep, moderately steep, or mildly sloping. The degree of arching is most clearly depicted using a side view image of the vocal tract.

Tongue shape. Vowels are paired according to two shapes of the tongue: peak or furrow. It can fold in half forming an arch shape (peak) or it can fold in half and lower in the middle to form a furrow. The furrow runs from the tip to the back of the tongue. One English vowel has a flat shape. The tongue lays on the floor of the mouth for *uh* as in *up*. The *uh* vowel can be compared to any other vowel to feel the difference between various vowel formations.

The first three units of this workbook introduce the consonant stops. The first 12 units of this workbook introduce the most frequently occurring vowel sounds: [æ] as in *hat* and [ɪ] as in *sit*. The formation of these sounds is uniquely English and requires study for those new to the language.

PHONETIC SYMBOLS

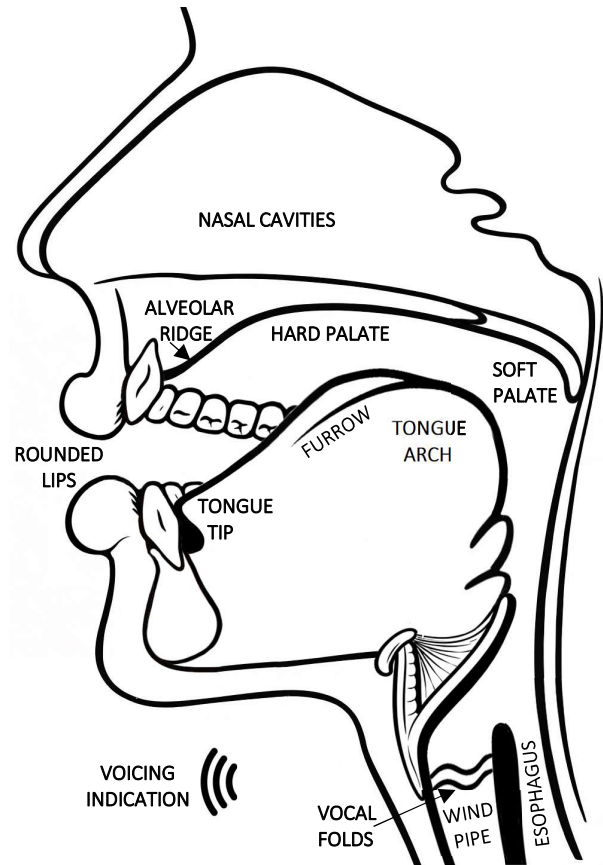
Understanding the correlation between spelling and pronunciation is vital to literacy. The International Phonetic Alphabet (IPA) provides one phonetic system for all languages. The other texts in this series use a modified version of the IPA that is ideal for beginning readers and students with distinct learning needs. In those versions, upper and lowercase letters are used to represent each vowel and consonant sound. Phonetic symbols are enclosed in brackets.

THE VOCAL TRACT

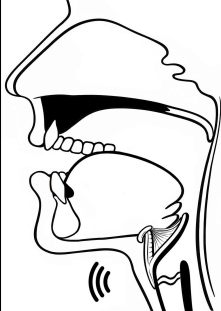
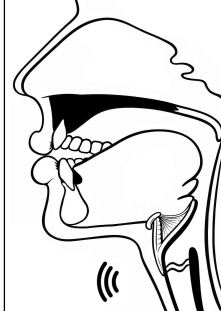
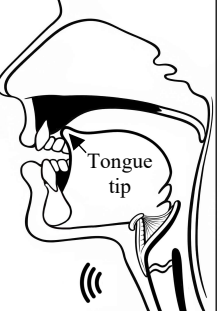
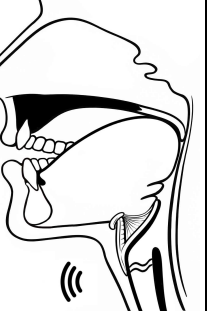
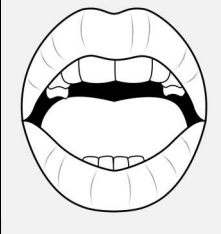
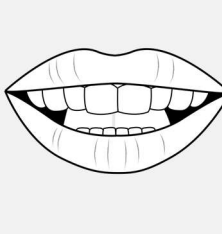
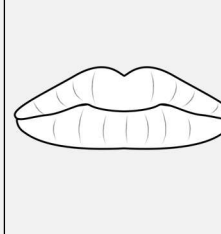
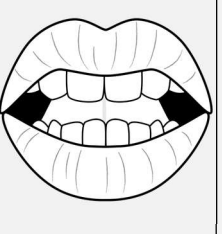
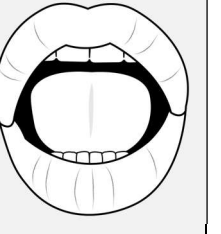
Image Key

The midsagittal (side-view) images created for this text contain intricate detail. The lips may be rounded or unrounded, positioned together or apart, to indicate various vowel or consonant formations. The soft palate may be lowered or elevated to indicate nasal or oral airflow. The tongue tip may draw near or contact the teeth or alveolar ridge for various consonant formations. The tongue may arch toward the front or back of the mouth in varying degrees, with or without a furrow, for particular vowel formations. The voice may be engaged or silent during articulation.

Voiced consonants are indicated by a sound bar and two jagged vocal fold lines. Voiceless consonants are indicated by two straight vocal fold lines. A large-scale version of the vocal tract is provided for each formation on the instructional pages. Trace the flow of air, paying close attention to the position of the lips, tongue tip, tongue arch, tongue sides, soft palate, and voicing.



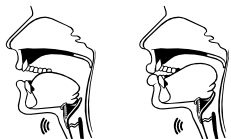
INSTRUCTIONAL TOOLS

	a [æ]/[a]	i [ɪ]/[I]	b [bʰ]/[b]	d [dʰ]/[d]	g [gʰ]/[g]
MIDSAGITTAL VIEW  AUDIO					
FRONT VIEW					
ARTICULATION INSTRUCTIONS	The tongue tip touches the lower front teeth while the front of the tongue forms a mildly sloped arch.	The tongue tip touches the lower front teeth while the front of the tongue forms a steep arch. The middle is lowered to form a furrow.	The lips lightly contact while the tongue tip touches the lower front teeth. Vocalized tone is released with aspiration.	The tongue tip touches the alveolar ridge. Vocalized tone is released with aspiration.	The tongue tip touches the lower front teeth while the back contacts the soft palate. The tone is released with aspiration.

SYMBOLS AND SPELLINGS

Place the correct phonetic symbol in front of each formation:

1. ab



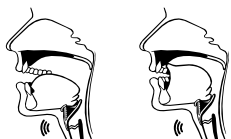
2. ad



3. dad



4. add



5. bad



6. dab



7. bag



8. gag



Articulatory Awareness

Shade in the tongue for vowels.
Shade in the lip formation for [b^h].
Shade in the tongue tip for [d^h].
Shade in the soft palate for [g^h].

Transcription notes

Transcription is the process of converting the spelling of a word into its pronunciation using phonetic symbols.

Phonetic symbols are enclosed in brackets. Each symbol represents one vowel or consonant sound.

Consonants that are doubled in spelling are not doubled in transcription. Silent vowels or consonants are not transcribed.

A glottal stop precedes a word that begins with a vowel. A glottal stop has a grunt-like sound. The International Phonetic Alphabet symbol for a glottal stop is [ʔ].

9. gab



10. bib



11. did



12. bid



13. gig



14. big



15. dig



16. Gib



PRESENTATION EXERCISE

Provide phonetic symbols and intone the following words for the class:

1. dad

4. bag

7. dab

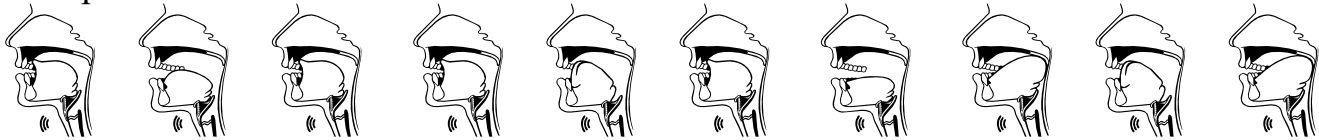
10. did

2. gag5. dig8. big11. add3. bib6. bid9. bad12. gab

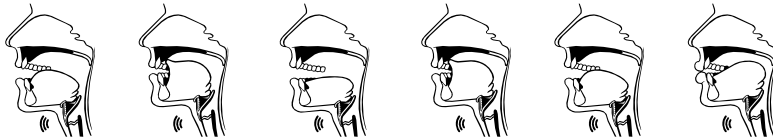
PHRASE ASSIGNMENTS

Place the correct phonetic symbol in front of each formation:

Group Exercise



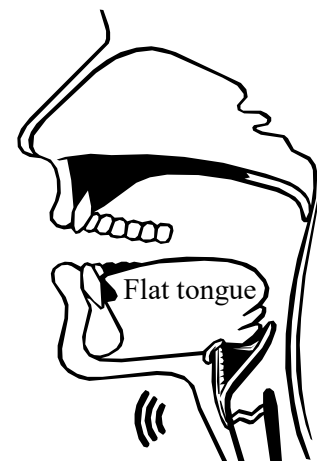
1.



2.



3.



[ʌ]/[x]

cup

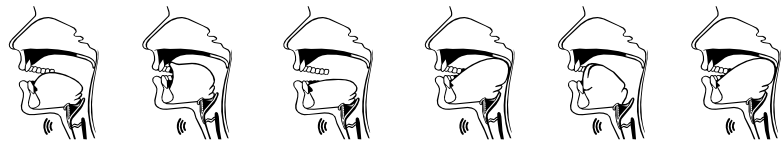
INSTRUCTIONAL NOTE

The word *a* is needed for the creation of phrases and sentences. It is a necessary sight word for beginning readers. The phonetic symbol for *a* is [ʌ]/[x] (as in *cup*). The [ʌ] sound is the stall vowel in English. It is the sound we make when we do not know what to say. It is the only vowel that has no tongue arch. The tongue lies flat on the floor of the mouth. Compare [ʌ] to the formation of all other vowels by using an exercise called “tongue push-ups”. Alternate between [ʌ] and the particular vowel to feel the formation of the tongue and shape of the lips.

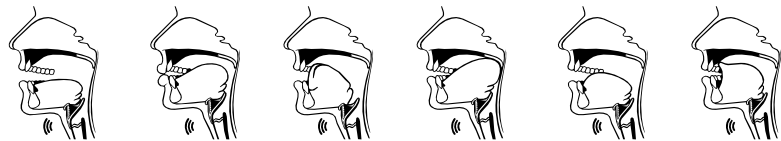
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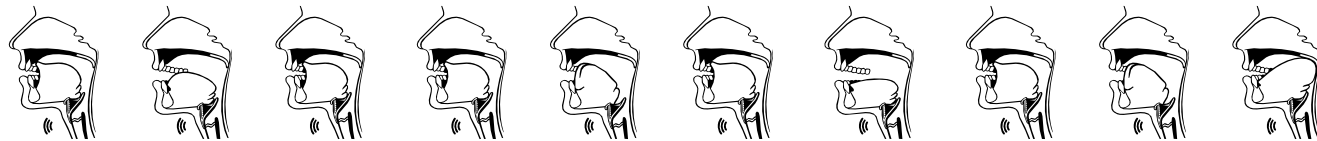
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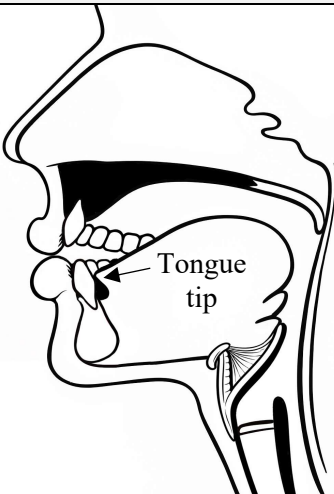
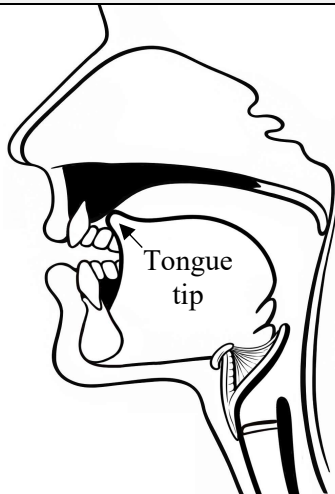
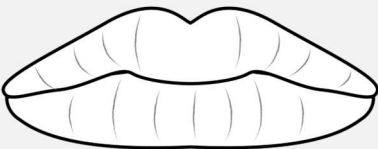
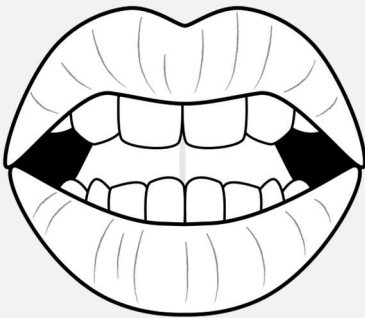


UNIT 2:

Spellings and phonetic symbols:

p [p^h], t [t^h]

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INSTRUCTIONAL TOOLS		
MIDSAGITTAL VIEW	p [p ^h]/[p]	t [t ^h]/[t]
		
FRONT VIEW		
ARTICULATION	The lips contact while the tongue tip touches the lower front teeth. The breath is released with aspiration.	The tongue tip touches the alveolar ridge. The breath is released with aspiration.

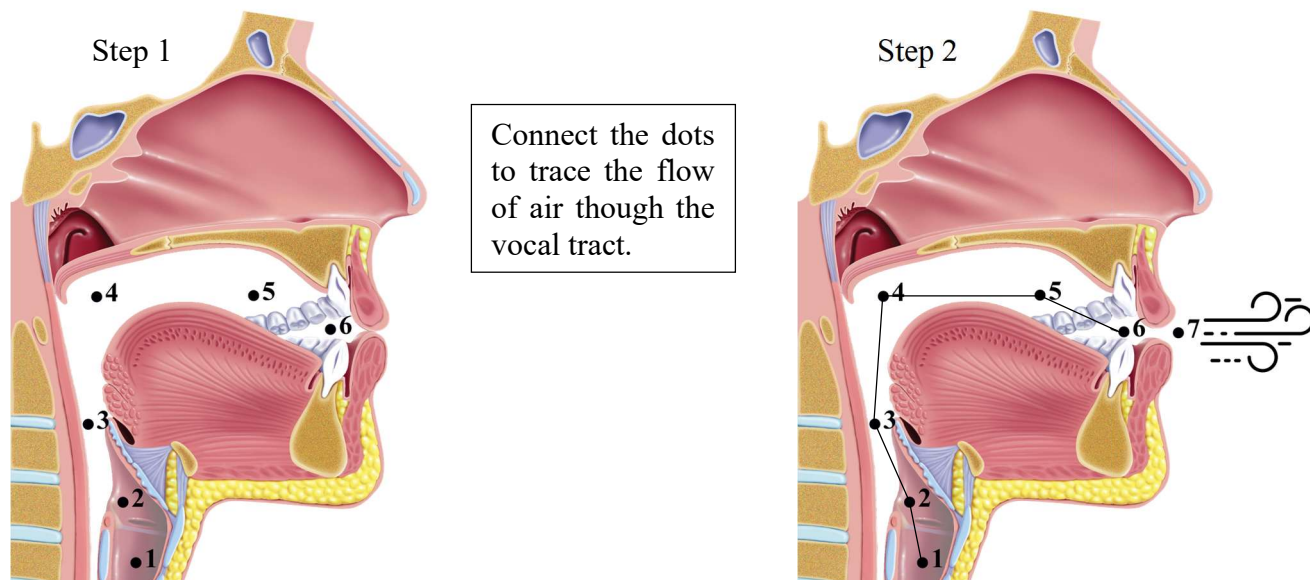
INSTRUCTIONAL NOTE

In English, a voiceless stop is released with an audible puff of air. Learners who are new to English may need to adjust to this added breath sound. In the Romance languages, the articulatory contact is released directly into the following vowel sound without aspiration.

Manner of Airflow for [b^h] and [p^h]

The bilabial stops [b^h] and [p^h] share the same point and manner of articulation. The only difference is voicing: [b^h] is voiced, while [p^h] is voiceless.

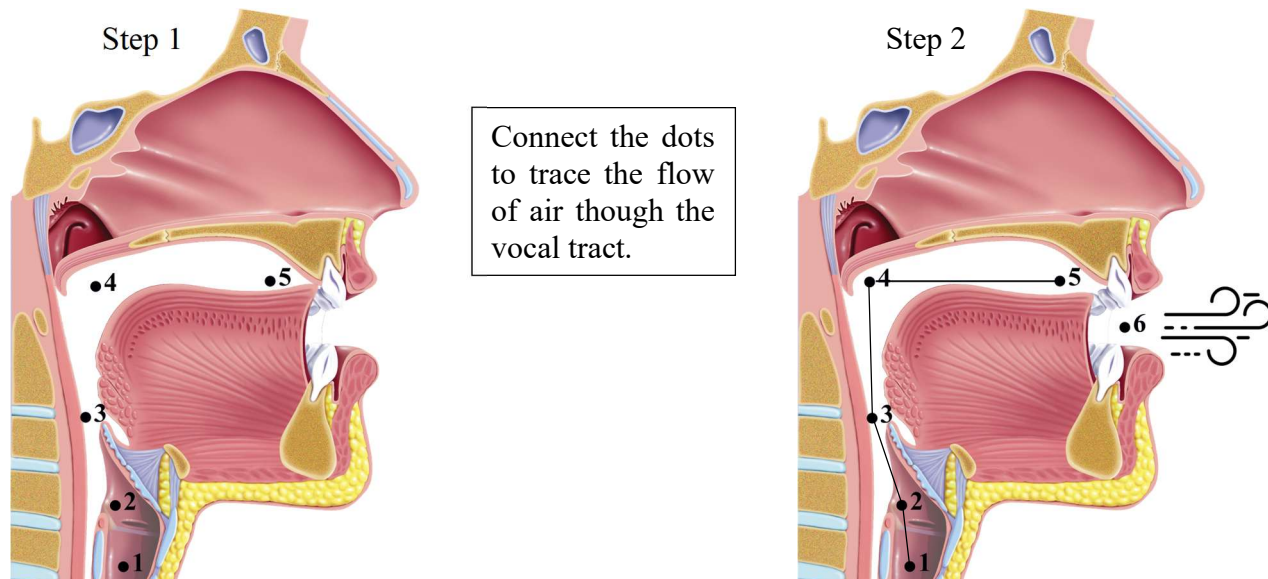
Their production occurs in two stages. First, airflow is completely blocked by full closure of the lips. Second, the lips separate and the air is released with an aspirate sound.



Manner of Airflow for [d^h] and [t^h]

The alveolar stops [d^h] and [t^h] share the same point and manner of articulation. The only difference is voicing: [d^h] is voiced, while [t^h] is voiceless.

Their production occurs in two stages. First, airflow is completely blocked by full contact of the tongue tip with the alveolar ridge. Second, the tongue tip separates from the alveolar ridge and the air is released with an aspirate sound.



SYMBOLS AND SPELLINGS

Place the correct phonetic symbol in front of each formation:

1. app



Articulatory Awareness
Shade in the tongue for vowels.
Shade in the lip formation for [p^h].
Shade in the tongue tip for [t^h].

9. pat



2. pad



10. tap



3. dip



11. it



4. pig



12. bit



5. tab



13. pit



6. bat



14. tip



7. tad



15. tidbit



8. tag



16. tat



PRESENTATION EXERCISE

Provide phonetic symbols and intone the following words for the class:

1. gap

4. tab

7. tip

10. pit

2. bit5. dip8. Pat11. tad3. pad6. tap9. tag12. bat

PHRASE ASSIGNMENTS

Place the correct phonetic symbol in front of each formation:

Group Exercise



1.



2.



3.



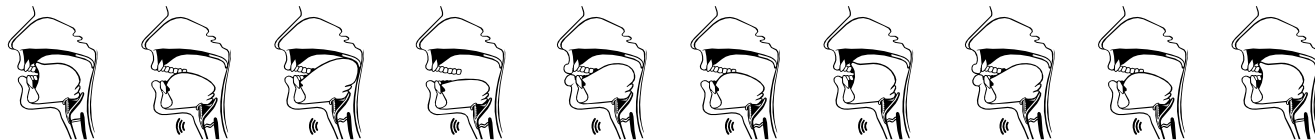
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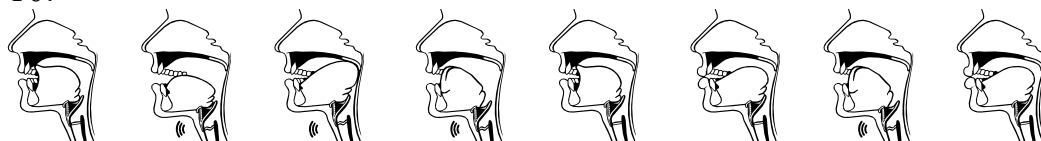
8.



9.



10.



11.



12.



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