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## **An appendix: the sound system of English**

This appendix is about sounds and their spellings. Regardless of what level and what students a teacher is dealing with, a minimum basic understanding of the sound system of English and its connection to the English spelling system is necessary in order to provide some understanding of the problems and difficulties our students face. This appendix attempts to provide that minimum, but without including much that does not relate directly or indirectly to a teacher's needs.

### **The sound system**

Certainly, there is a relationship between the English sound system and the English spelling system. However, the relationship between sound and spelling is neither straightforward nor obvious. If it were, many of us would spell more accurately than we do. What is obvious is that the sounds of English are not the same as the letters of English.

Note: Although it is obvious in an intellectual sense that sounds and letters are not the same thing, most students working through this appendix will on occasion make errors through mistaking sounds for letters.

The patterning found in the sound system of English is a reflection of the physiology of the vocal tract. The patterns of the English sound system make sense in terms of how sounds are made (and, particularly, for vowels, how sounds are perceived).

The basic principle involved is modification of the air flow. When making a sound air moves through the vocal cords in larynx, through the throat, and on out through the mouth or nose. As it moves, the air flow is modified through vibrating the vocal cords, by opening (or not opening) the velum to let part of the flow go out through the nose, and by constricting the air flow partially or completely in the mouth.

Once the English sound system is understood, it becomes easier to make sense out of the spelling system of English and it becomes possible to make some sense out of the problems all students have learning to spell and out of the problems speakers of other languages have in learning to pronounce English.

## Transcriptions

In this book, sounds are always found transcribed (not spelled!) between two slashes. For example, the *four sounds* of the word *things* would be transcribed between two slashes as /θɪŋz/. The six letters of the spelling *things* do not correspond one-to-one to the four sounds in the word; in the transcription /θɪŋz/, each symbol corresponds to one *sound*.

A transcription is a representation of sounds—not an alternate spelling system. Transcriptions are done by listening to the sounds in a word. Not all of the letters in certain words correspond to sounds; some letters indicate not sounds but information about the word formation system.

Note 1: Sometimes students try to "transcribe" not by listening and writing down symbols for the sounds but by looking at the spelling and writing down symbols for the letters. This writing one symbol for another symbol is not a transcription nor does it produce the right answer.

Note 2: The process of writing a letter in one language for a letter in another language is called transliteration. Something written in the Greek alphabet could be transliterated into the English alphabet by replacing each one of the Greek letters by one of the letters of the English alphabet. Notice this process has no direct connection with the sounds of either language.

Note 3: No answers are given for the transcription exercises. The regional and dialectal variation in English is such that the answers for the transcription exercises often vary, not just from region to region, but also from student to student.

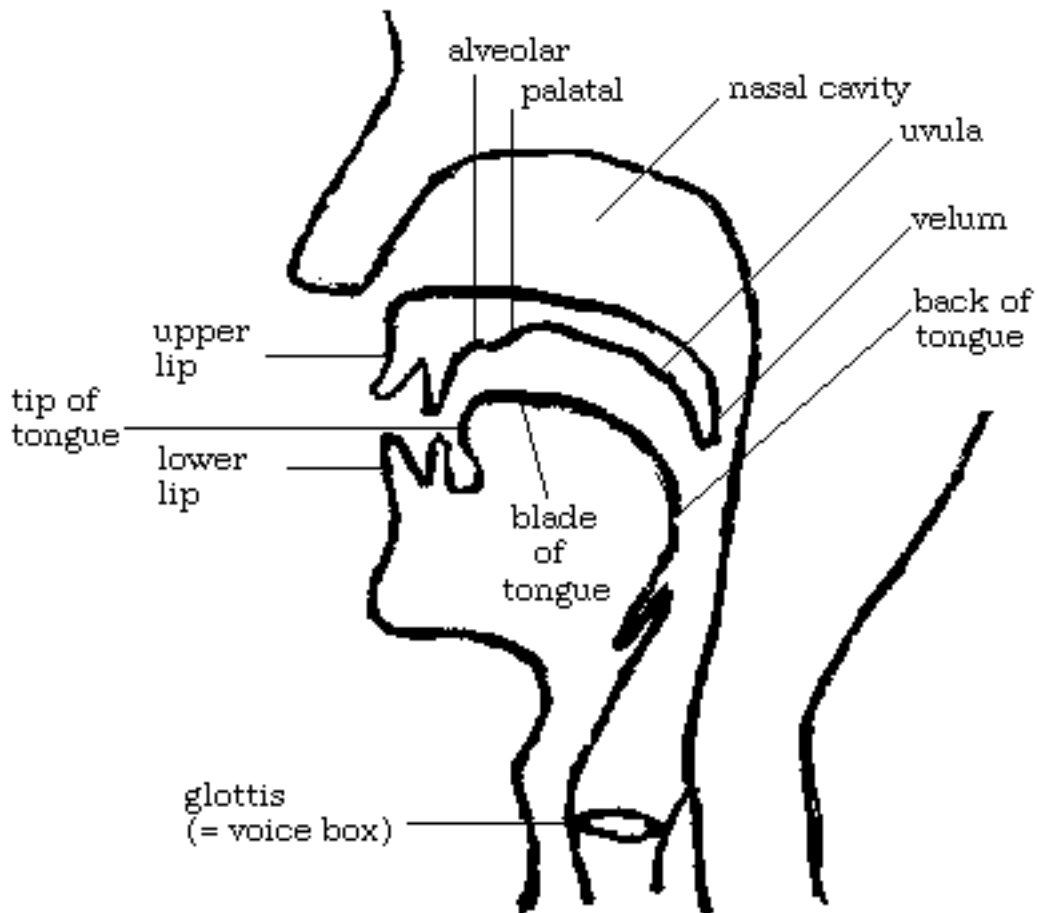
## Minimal pairs

*Minimal pairs* are pairs of words which are nearly identical in sound, having only one sound contrast between them. Thus, *Pete* /piyt/ and *pit* /pɪt/ are minimal pairs not because of the spellings but because of the sounds (shown in the transcriptions). Notice that the contrast in sounds between the two words is carried in the difference between the vowels /iy/ and /ɪ/.

## Consonants

Consonants are described in terms of three dimensions: whether or not the vocal cords are vibrating—*voicing*; where the sound is being made—*the place of articulation*; and

how the sound is being made—the *manner of articulation*. All three are really just descriptions of what happens as to the flow of air as a consonant is produced.



**Diagram of the vocal tract  
showing the places of articulation**

**Voicing.** If the vocal cords are vibrating when the air flow passes through the larynx (in the voice box), the sound is described as voiced; if not, the consonant is described as voiceless.

It is possible to hear the difference between voiced and voiceless consonants. Cover your ears and pronounce a long, drawn-out /z/; the vibration in your ears, head, and so on results from the vibration of the vocal cords. Now, still covering your ears pronounce a long, drawn-out /s/. There is no parallel vibration; this sound is voiceless.

**Place of articulation.** Consonants are made by constricting the air flow as it moves through the vocal tract—through the throat and mouth. The place of articulation is the place where this constriction of the air flow occurs. The horizontal row of labels across the top of the consonant chart lists the places in the mouth at which the air flow is constricted in forming various English consonants. The labels themselves are just names of the articulators involved in the constriction. The row of labels begins with the lips at the front of the mouth and ends at the voice box. Once the names of parts of the mouth become familiar, the names of most of the terms makes sense.

<b>bilabial:</b>	<i>bi-</i> 'two' + <i>labi-</i> 'lip' + <i>-al</i> 'adjective marking suffix'. Sounds made with two lips.
<b>labiodental:</b>	<i>labio-</i> 'lip' + <i>dent-</i> 'tooth' + <i>-al</i> . Sounds made with the upper teeth and the lower lip.
<b>interdental:</b>	<i>inter-</i> 'between' + <i>dent-</i> 'tooth' + <i>-al</i> . Sounds made between the teeth.
<b>alveolar:</b>	<i>alveol-</i> + <i>-ar</i> . Sounds made at the alveolar ridge, the bumpy ridge just behind the teeth.
<b>palatal:</b>	<i>palat-</i> + <i>-al</i> . Sounds made behind the alveolar ridge.
<b>velar:</b>	<i>vel-</i> + <i>-ar</i> . Sounds made at the velum.
<b>glottal:</b>	<i>glott-</i> + <i>-al</i> . Sounds made at the voice box, that is, at the glottis.

**Manner of articulation.** The manner of articulation is the way in which the sound is produced. The various labels for manner of articulation describe how the air flow is modified. In most cases, the reason for the term is fairly obvious.

	bilabial	labio-dental	inter-dental	alveolar	palatal	velar	glottal
stops:							
voiceless	p			t		k	ʔ
voiced	b			d		g	
affricates:							
voiceless					č (tš)		
voiced					ǰ (dž)		
fricatives:							
voiceless		f	θ	s	š		h-
voiced		v	ð	z	-ž		
nasals:	m			n		-ŋ	
liquids:							
lateral				l			
retroflex				r			
semi-vowel/ consonants: (= glides)	w				y	w	

### Chart of English consonant phonemes

**stops:** If the air flow is totally constricted, that is, stopped, the consonant is described as a stop.

**fricatives:** If the air flow is constricted enough to cause friction, but not completely stopped, the consonant is described as a fricative.

All but two of the fricatives occur both before and after vowels. The /h-/ only occurs before a vowel and the /-ž/ only occurs after a vowel.

**nasals:** *nas-* 'nose' + *-al*. Nasals are characterized by air flow through the nose. Although the other two nasals occur both before and after vowels, the /-ŋ/ only occurs after a vowel.

**affricates:** *ad-* 'to; toward' + *fric-* cf. 'friction'. On the chart, the affricates have been deliberately placed between the stops and the fricatives. Notice that both the affricates can be transcribed in more than one way; that is, /č/ can also be written as /tš/ and /j/ can also be written as /dž/. The two-symbol representation best shows the phonetics: an affricate starts off as a stop and finishes as a fricative. If you were to tape record one of the affricates and then play it back slowing down the tape recorder, at some point the affricate would impressionistically break into two; that is, at some point it would sound not like one sound but two.

Note: The 'stop + fricative' character of affricates helps explain the substitutions that speakers of other languages often make when learning English; for example, the French speaker's frequent substitution of the fricative /z/ for the English affricate /dž/.

The 'stop + fricative' character of affricates also helps explain the "extra" stops that English speakers add when they first learn to transcribe the sounds of English. For example, beginners sometimes transcribe a word like *much* as /mətč/ rather than as the more consistent /məč/; here, the /t/ is the /t/ in the affricate /č/ (= /tš/). In words spelled with a *-t-* such as *witch* (transcribed as /wɪč/), the spelling makes the tendency for beginners to add an "extra" /-t-/ even stronger.

**liquids:** Although most of the terms we have run into so far seem to have some fairly transparent connection with the type of sound they label, the term *liquid* does not. Perhaps it is because they "flow"?

Anyway, there are two liquids: /l/ and /r/. The /l/ is called a *lateral*, because the air flows over the side of the tongue (*lateral* '(to the) side'). The /r/ is called a *retroflex* because during its production the tongue is bent back (*retro-* 'back' + *-flex* 'bend').

**semi-vowels/semi-consonants (glides):** As might be guessed from the variation in the terminology, the glides are half-way between vowels and consonants. The glides /y/ and /w/ have counterparts in the vowel system: the consonant /y/ has as its counterpart the vowel /i/, and the consonant /w/ has as its counterpart the vowel /u/.

This variation between /y/ and /i/ and between /w/ and /u/ shows up in the spelling system of English. The sound /ɔy/ is spelled as *-oy* in *boy* but as *-oi-* in *boil*. In a parallel way, the sound /aw/ is spelled as *-ow-* in *brown* but as *-ou-* in *found*.

The /w/ has been put in two places on the consonant chart. It is placed with the velar consonants because it involves constriction in the velar region of the mouth. It is also placed with the bilabial consonants because it has a bilabial component.

**EXERCISE 3.1. CONSONANT CHART.**

Without looking up the answer, fill in the blanks with the terms supplied. Some terms must be used more than once; one term is not used at all.

	bilabial	voiced	labiodental	interdental	lateral	
	alveolar	palatal	velar	retroflex	glottal	
	liquids	semi-vowels	affricates	nasals	fricatives	
	voiceless	voiced	stops	interdigital		
_____:						
_____:		p		t	k	ʔ
_____:		b		d	g	
_____:					č	
_____:					ǰ	
_____:						
_____:			f	θ	s	š
_____:			v	ð	z	-ž
_____:	m			n		-ŋ
_____:						
_____:				l		
_____:				r		
_____:	w				y	w

**PRACTICE TRANSCRIPTION 3.2: CONSONANTS ONLY (VOWELS GIVEN)<sup>1</sup>**

rich	ridge	sham	jam	gem
__ I __	__ I __	__ æ __	__ æ __	__ ε __
bush	rush	knot	myth	gap
__ U __	__ ə __	__ ɑ __	__ I __	__ æ __
his	hiss	hung	box	zest
__ I __	__ I __	__ ə __	__ ɑ __	__ ε __
things	that	dumb	hook	scotch
__ I __	__ æ __	__ ə __	__ U __	__ ɑ __

**PRACTICE TRANSCRIPTION 3.3: CONSONANTS ONLY (VOWELS GIVEN)**

buff	guess	witch	which	should
__ ə __	__ ε __	__ I __	__ I __	__ U __
thank	vex	shock	Butch	cup
__ æ __	__ ε __	__ ɑ __	__ U __	__ ə __
debt	ring	wring	latch	late
__ ε __	__ I __	__ I __	__ æ __	__ ey __
could	cud	this	them	thumb
__ U __	__ ə __	__ I __	__ ε __	__ ə __
jug	yes	give	zinc	pod
__ ə __	__ ε __	__ I __	__ I __	__ ɑ __

1. A transcription summary in which each phonetic symbol is listed along with an example word is found beginning on page 52.

### EXERCISE 3.4. CONSONANT CHART

Without looking up the answer, place the given consonants on the consonant chart.

	bilabial	labio-dental	inter-dental	alveolar	palatal	velar	glottal
stops:							
voiceless							
voiced							
affricates:							
voiceless							
voiced							
fricatives:							
voiceless							
voiced							
nasals:							
liquids:							
lateral							
retroflex							
semi-vowel/ consonants: (= glides)							

### Consonants:

l	p	-ʒ	t	z	r
y	w	s	š	m	f
θ	b	d	k	ʔ	g
h-	n	-ŋ	v	ð	ǰ
č					

**EXERCISE 3.5. CONSONANT CHART**

Without looking up the answer, make a consonant chart from the following: [Some items may be used more than once]

stops	voiceless	nasals	labiodental	voiced	interdental
alveolar	bilabial	affricates	palatal	fricatives	velar
glottal	liquids	retroflex	lateral		
glides (semi-vowels/consonants)					
p	t	k	b	d	g
-ŋ	l	r	č	ǰ	f
ə	s	š	h-	v	ð
-ž	y	z	m	n	w

**Aspiration.** When they occur at the beginning of a word (and in certain other positions) in English, the voiceless stops /p-, t-, k-/ and the voiceless affricate /č-/ of English are followed by "a little puff of air" called aspiration. There is no need to indicate aspiration in writing as its occurrence is for all practical purposes predictable.

Note: If you are interested in "seeing" this puff of air—*aspiration*, take a thin strip of paper and, holding it at one end, put the free end in front of your lips. Alternately pronounce the syllable /ba/ (beginning with an unaspirated consonant) and then the syllable /pa/ (beginning with an aspirated consonant). Once the paper is appropriately placed, the paper remains relatively still after the unaspirated /ba/, but it jumps quite noticeably after the aspirated /pa/.

Although when listening to English it is more than any other feature the aspiration of the voiceless consonants such as /p-/ more than any other feature that allow us to distinguish them from the voiced consonants such as /b-/, being aware of aspiration does not become that important until we attempt to learn other languages, such as Thai or Hmong. In these languages, the presence or absence of aspiration is not predictable and is important in distinguishing different words from each other.

**Clusters.** The English sound system is rich in consonant clusters. Syllables may have a two- or even three-consonant cluster before the vowel, and a two- or three-consonant cluster after the vowel.

**PRACTICE TRANSCRIPTION 3.6: CONSONANT CLUSTERS**

Note that in some of the words below you can hear the /y/ of the diphthong /yuw/.

splits	scripts	sprints	slumps	slimmed
_____	_____	_____	_____	_____
streams	strips	shouts	smelts	melds
_____	_____	_____	_____	_____

**PRACTICE TRANSCRIPTION 3.7: CONSONANT CLUSTERS**

punched	few	music	coot <sup>1</sup>	cute
_____	_____	_____	_____	_____
hooked	bushed	bridged	washed	judged
_____	_____	_____	_____	_____

The large number of clusters often presents a problem for learners of English who speak languages which have fewer clusters than English—many languages of the world. Sometimes the learner's language has both sounds in the cluster, but does not have the combination.

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1. There is no cluster in this word. It is included only as a contrast to the word *cute*, which follows. In English spelling, the /-y-/ in an initial cluster is seldom indicated. The name of the letter *u* (and the pronoun *you*) would be transcribed as /yuw/ not as /uw/.

Learners who have problems pronouncing final consonant clusters will have problems with the words in the last row of the clusters exercise. Although the spelling of the past tense marker *-ed* misleadingly suggests that all these words end with a vowel plus a consonant, listening quickly to the sounds makes it clear that this is false; they all end in consonant clusters. Notice that difficulty pronouncing these final clusters would interfere with the learner's ability to mark the past tense.

### Vowels

English is fairly rich in vowels, having at least seven short vowels and seven long vowels. The vowel sounds themselves are described in terms of tongue height and front-to-back in the mouth. The high front vowel /iy/ is pronounced about where the /y/ is pronounced, while the high back vowel /uw/ is pronounced about where the /w/ is pronounced.

There is a great deal of individual and dialectal variation in the pronunciation of vowels—something that becomes clear once learners begin to do the transcription exercises.

	front	central	back
high			
long ('tense')	iy		uw, yuw
short ('lax')	ɪ		ʊ
mid			
long ('tense')	ey		ow
short ('lax')	ɛ	ə	ɔ, ɔy <sup>1</sup>
low			
short ('lax')	æ	ɑ <sup>2</sup>	
long ('tense')		ay, aw	

### Chart of English vowel phonemes (modified IPA)

1. Being long, this vowel is thus tense.
2. A more detailed transcription would distinguish between the more mid /a/ and the more back /ɑ/; in some systems the /a/ would be considered lax, and the /ɑ/ tense.

### Short and long vowels

Short vowels and long vowels are in contrast. For our purposes, this simply means that the long vowels and the short vowels sound different and, as a consequence, are spelled different.

The pronunciation of the short (or lax) vowels is essentially the same throughout the length of the vowel. Technically, these are monophthongs—one-sound vowels. The seven short vowels are /ɪ, ɛ, ʌ, ɔ, ə, æ and ʊ/. The difference between /ɑ/ and /ɔ/ is ignored in the transcription exercises because this difference has disappeared for many speakers of English, and, in any case, the distinction is of limited relevance to English language teachers.

The pronunciation of the long (or tense<sup>1</sup>) vowels begins with one pronunciation and ends with another. Technically, these are diphthongs—two-part vowels. The eight long vowels are /ɑy, ɔy, and aw/ as well as /iy, ey, ow, uw, and yuw/. Notice that /ɑy/, for example, begins with the vowel /ɑ/ and then moves in the direction of /y/ (essentially where /iy/ is found); similarly, /aw/ begins with the vowel /ɑ/ and then moves in the direction of /w/ (essentially in the direction of /uw/). The five vowels /iy, ey, ow, uw, and yuw/ are also long vowels as well as diphthongs.

The vowel /-ə/, sometimes called a *schwa*, is an extremely common English vowel. When stress falls somewhere else in the word, other vowels may be reduced to a schwa. For instance, the /æ/ in *graph*, becomes a /ə/ in *photography*.

From a teacher's perspective, what is crucial to learn is which vowel sounds are long and which are short. The difference between the short and the long vowels is central to the English spelling system. In the English spelling system, the short vowel sounds are overwhelmingly spelled with a single letter. The long vowels are usually spelled with two letters.

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1. Tense vowels and long vowels are essentially equivalent.

**EXERCISE 3.8: VOWEL CHART**

Place the following vowels on the blank chart:

iy	U	ε	ey	ɔ	ay
aw	yuw	ɔy	ə	ow	uw
ɪ	ɑ	æ			
		front	central	back	
high					
long ('tense')					
short ('lax' )					
mid					
long ('tense')					
short ('lax')					
low					
short ('lax')					
long ('tense')					

**PRACTICE TRANSCRIPTION 3.9: VOWELS (AND CONSONANTS)**

tease	ace	chip	cheek	tike
_____	_____	_____	_____	_____
ice	peace	stood	stewed	stud
_____	_____	_____	_____	_____
lewd	led	line	coat	cod
_____	_____	_____	_____	_____

rot	rut	rude	feud	food
_____	_____	_____	_____	_____

**PRACTICE TRANSCRIPTION 3.10: VOWELS (AND CONSONANTS)**

sight	site	seat	suit	seem
_____	_____	_____	_____	_____

do	due	dew	fiend	find
_____	_____	_____	_____	_____

east	aced	eased	found	don't
_____	_____	_____	_____	_____

put	putt	pot	bond	boned
_____	_____	_____	_____	_____

dead	deal	yield	judged	wheezed
_____	_____	_____	_____	_____

**Transcription summary {from Mary Haas}**

## Consonants:

/p/	/pæt/	pat	/h/	/hæt/	hat
/t/	/tæp/	tap	/v/	/væt/	vat
/k/	/kæt/	cat	/ð/	/ðæt/	that
/tʃ/	/tʃæt/	chat	/z/	/zuw/	zoo
/b/	/bey/	bay	/ʒ/	/mɛʒər/	measure
/d/	/dey/	day	/m/	/miyt/	meat
/j/	/jey/	jay	/n/	/niyt/	neat
/g/	/gay/	guy	/ŋ/	/sɪŋ/	sing
/f/	/fɪn/	fin	/w/	/wɛt/	wet
/θ/	/θɪn/	thin	/y/	/yɛt/	yet
/s/	/sɪn/	sin	/l/	/lɛt/	let
/ʃ/	/ʃɪn/	shin	/r/	/rey/	ray

## Vowels:

/iy/	/biy/	bee	/uw/	/ʃuw/	shoe
	/biyd/	bead		/ʃuwd/	shoed
	/biyt/	beat		/ʃuwt/	shoot
/ɪ/	/bɪd/	bid	/ʊ/	/kʊd/	could
	/bɪt/	bit		/pʊt/	put
/ey/	/ley/	lay	/ow/	/gow/	go
	/leyd/	laid		/gowd/	goad
	/leyt/	late		/gowt/	goat
/ɛ/	/lɛt/	let	/ɔ/	/lɔ/	law
/æ/	/mæd/	mad		/nɔd/	nod
	/mæt/	mat		/bɔt/	bought
/ə/	/kəd/	cud	/ɔy/	/tɔy/	toy
	/kət/	cut		/tɔyd/	toyed
/ɑ/	/kad/	cod		/hɔyt/	Hoyt
	/kat/	cot	/ay/	/bay/	buy
/aw/	/baw/	bough, bow		/bayd/	bide
	/bawd/	bowed		/bayt/	bite
	/bawt/	bout, (a)bout	/yuw/	/fyuw/	few

**PRACTICE TRANSCRIPTION 3.11: VOWELS AND CONSONANTS**

cave	calf	keg	guest	tastes
_____	_____	_____	_____	_____
raged	frog	lodged	(to) use	(a) use
_____	_____	_____	_____	_____
sixths	watch	wash	cents	sense
_____	_____	_____	_____	_____
psalm	palm	whole	cough	broil
_____	_____	_____	_____	_____

**PRACTICE TRANSCRIPTION 3.12: VOWELS AND CONSONANTS**

breathe	breath	breadth	cloths	clothes
_____	_____	_____	_____	_____
streaks	pass	pus	pushed	voice
_____	_____	_____	_____	_____
asks	smash	had	sad	bumps
_____	_____	_____	_____	_____
as	jazz	coy	prints	prince
_____	_____	_____	_____	_____
kit	kite	mat	mate	fight
_____	_____	_____	_____	_____

**EXERCISE 3.13: TRANSCRIPTION**

boot	clothes	few	music	why
_____	_____	_____	_____	_____
washed	rough	bridged	fox	thumb
_____	_____	_____	_____	_____
they	wreath	hooked	bushed	cute
_____	_____	_____	_____	_____
punched	though	raised	shouts	judged
_____	_____	_____	_____	_____
streams	(to) use	(a) use	pound	write
_____	_____	_____	_____	_____

**EXERCISE 3.14: TRANSCRIPTION**

spins	spines	pans	sprains	cloud
_____	_____	_____	_____	_____
spies	eyes	crazed	traced	shout
_____	_____	_____	_____	_____
tossed	blouse	lice	comb	gems
_____	_____	_____	_____	_____
rot	rude	thought	tough	though
_____	_____	_____	_____	_____
slight	dreams	death	daze	days
_____	_____	_____	_____	_____

**PRACTICE TRANSCRIPTION 3.15: VOWELS AND CONSONANTS**

brave	laugh	peg	guys	try
_____	_____	_____	_____	_____
staged	smog	dodged	(to) close	(be) close
_____	_____	_____	_____	_____
shifts	wash	cash	tents	tense
_____	_____	_____	_____	_____
psych	walk	hole	tough	coin
_____	_____	_____	_____	_____

**PRACTICE TRANSCRIPTION 3.16: VOWELS AND CONSONANTS**

soothe	tooth	width	booth	teethe
_____	_____	_____	_____	_____
steaks	pass	putt	rushed	choice
_____	_____	_____	_____	_____
pushed	crash	glad	crude	thumps
_____	_____	_____	_____	_____
ace	base	toy	mints	mince
_____	_____	_____	_____	_____
bit	bite	fat	fate	lights
_____	_____	_____	_____	_____

**EXERCISE 3.17: TRANSCRIPTION**

foot	foods	view	mute	by
_____	_____	_____	_____	_____
wished	dough	ridge	ox	dumb
_____	_____	_____	_____	_____
them	write	written	pushed	cute
_____	_____	_____	_____	_____
bunched	through	raced	raised	budged
_____	_____	_____	_____	_____
streaks	youth	you	sound	reached
_____	_____	_____	_____	_____

**EXERCISE 3.18: TRANSCRIPTION**

spit	spite	cans	trains	loud
_____	_____	_____	_____	_____
pies	guys	blazed	spaced	trout
_____	_____	_____	_____	_____
lost	tossed	nice	tomb	combs
_____	_____	_____	_____	_____
plot	prude	throw	think	that
_____	_____	_____	_____	_____
flight	screams	debt	daze	bays
_____	_____	_____	_____	_____

