Phonetics – Perception and Articulation of Sounds

I. Phones
  A. phones = "speech sounds" (as opposed to environmental sounds)
  B. finite set of phones – every language uses some subset of them
  C. children initially perceive *entire* set, but then narrow it down to the subset which is relevant to the language they are learning
  D. why foreign accents happen – people have to train themselves to perceive and produce sounds from the other language. When they don't get it quite right, and carry some of the sounds from their native language over, they have an accent.

II. IPA (*see handout or front cover of book*)
  A. IPA = International Phonetic Alphabet
  B. Why it's useful: languages don't all use the same alphabet (Roman alphabet, Hebrew alphabet, Japanese characters, etc.)
  C. IPA is an "interlanguage" alphabet – can write any sound in any language with it
  D. Used for **segment** transcription, where a segment is an individual phone in the language. Segments are produced by coordinating a number of individual articulatory gestures such as jaw movement, lip movement, and tongue placement.
  E. Evidence for segmental representation in the brain (that is, it's not just something linguists made up one day when they were bored) – can switch segments during speech production. These are **Spoonerisms**. Example of Spoonerism: "You have **w**asted two **t**erms" → "You have **t**asted two **w**orms."
  F. There can be variation in the pronunciation of a segment which is represented by a single IPA symbol. For instance, not everyone says [s] the same ("crisp" [s] vs. "sloppy" [s]). But the variation for the pronunciation of [s] is much less than the variation between the pronunciation of [s] and the pronunciation of [t].

III. The Sound-Producing System (aka "The Body")
  A. lungs: take in air and expel during speech
  B. larynx ("voice box") and glottis (space between "vocal" folds): control certain features of speech production
      a. **voicelessness**: vocal folds apart. Ex: [p], [t], [s]. These sounds can be whispered.
      b. **voicing**: vocal folds together, vibrating. Ex: [b], [d], [z]. If you try to whisper these sounds, they end up of sounding like [p], [t], and [s].

IV. Sound Classes
  A. We can group sounds together based on some properties they share.
      a. voiced vs. voiceless
      b. vowels vs. consonants
      c. sonorous vs. obstruent (acoustic difference) – sonorous sounds are ones which are easier to sing. Ex: [m], [n], [l], [r].
      d. syllabic vs. non-syllabic. Syllable = group of phones. Syllabic sounds can be the **nucleus** of a syllable – that is, they can be a syllable on their own or be the base around which other phones are grouped.
            i. clever = cl**e** * v**e**r
            ii. aside = **a** * s**i**de

e. glides vs. non-glides. Glides = rapidly articulated vowels. Glides: **y** ([j]) (rapid "i")
    and **w** ([w]) (rapid "u"). Example words: "boy", "now", "yes", "wonderful". Also
    known as "semivowels" or "semiconsonants".

V. Consonant Articulation
A. labial – closure or near closure of lips ([b], [p], [m]). Ex: **b**op. Bilabial = closure of both lips.
B. labiodental – lower lip against upper teeth ([f], [v]). Ex: **f**ive.
C. dental – tongue placed against or near the teeth (not used in English, used in French)
D. interdental – tongue between teeth ([θ], [ð]). Ex: **th**ing, **th**is.
E. alveolar – ridge just behind upper front teeth ([t], [d], [s], [z], [l], [n]). Ex: **t**ad.
F. palatal – highest part of the mouth ([ʃ], [ʒ], [tʃ], [dʒ]). Ex: **sh**u**sh**. plea**s**ure. **ch**eap. **j**ust.
G. velar – soft area near rear roof of mouth ([k], [g], [ŋ], [w], [ʍ]). Ex: **g**e**k**o. thi**ng**.
H. pharyngeal – between uvula and pharynx (found Arabic dialects)
I. glottal – vocal folds ([h], [ʔ]). Ex: **h**aughty. Uh-oh.

VI. Manners of Articulation
A. oral - velum raised – no airflow through the nasal passages
B. nasal - velum lowered – has airflow through the nasal passages
C. stop - complete & momentary closure of the airflow through the vocal tract. ([p], [b], [t], [d], [k], [g]).
D. fricative - continuous airflow through the mouth – "creates friction". ([f], [v], [θ], [ð], [s], [z], [ʃ], [ʒ], [h]).
E. affricate - stop followed by a slow release from a certain point of articulation ([tʃ], [dʒ]).
F. aspiration – release of air after stop. Ex: ([pʰ]). **p**at ([pʰ]) vs. s**p**at ([p])
G. liquid – [l] (lateral), [r] (retroflex), [ɾ] flap (like in bu**tt**er)
H. glide – rapidly articulated *non-syllabic* syllabic segment ([y], [w], [ʍ]). bo**y**, no**w**, "ʰwhich"
I. syllabic = liquids & nasals

VII. Vowels (see vowel chart)
A. simple vowel – no change during articulation. Ex: [pɪt], [pɑt], [pɛt], [pʊt]
B. diphthongs – change during articulation. Ex: [hijt], [hɛjt], [hɑjt], [nɑw], [nuwz], [bɔj]
C. front – [i], [ɪ], [e(j)], [ɛ], [æ]
D. back – [u], [ʊ], [o(w)], [ɔ(j)], [ɑ]
E. central – [ə], [ʌ], [ɑj], [ɑw]
F. tense – [i], [e(j)], [u], [o], [ɑ], [ɑj], [ɑw]
G. lax – [ɪ], [ɛ], [æ], [ʊ], [ɔ], [ʌ], [ə]
H. round - [u], [ʊ], [o(w)], [ɔ(j)]

VIII. Processes in Speech Production – "communication vs. efficiency"
A. Your brain wants to communicate a certain message and your mouth wants to do as little
    work as possible to do this.
B. Processes of Efficiency
    1. coarticulation - sounds overlapping. Ex: [k] in **k**ey ([ki]) sounds more palatal than
       velar because [i] is a front vowel

2. assimilation – influence of one segment on another to make them more alike
   a.   nasalization – cause vowel to take on a nasal quality
        i. regressive (vowel before nasal consonant) – **a** in **can't** has nasal quality = [kʰæ̃nt] instead of [kʰænt]
        ii. progressive (vowel after nasal consonant) – **i** in Scots Gaelic "cattle" = [nĩ] instead of [ni]
   b.   voicing – cause nearby segment to take on similar **voicing feature**
        i. Ex: take on voicelessness feature = devoicing.
        ii. English: liquids and glides following voiceless stops become voiceless
            1. please = [pliz] → [pl̥iz]
            2. pure = [pjuwr] → [pj̥uwr]
   c.   place of articulation – cause nearby segment to take on similar place of articulation
        i. Ex: prefix **im/in-** (meaning "not") assimilates to place of segment it precedes
        ii. possible: *im*possible, tolerable: intolerable

C. flapping – dental or alveolar stop becomes flap
   a.   Ex: writer = [rajtər] → [rajɾər]
   b.   Ex: rider = [rajdər] → [rajɾər]
D. dissimilation – two nearby sounds becoming less alike (pretty rare)
   a.   Ex: fifths = [fɪfθs] → [fɪfts]
E. deletion – removal of a segment
   a.   Ex: suppose = [səpʰowz] → [spowz]
F. epenthesis – insertion of a segment
   a.   Ex: something = [sʌ̃mθɪŋ] → [sʌ̃mpθɪŋ]
G. methathesis – reordering of a sequence of segments
   a.   Ex: **pre**scribe → **per**scribe = [priskrajb] → [pərskrajb]
H. vowel reduction – vowel becomes ə
   a.   Ex: Canada "enunciated" = [kænada], "normal" = [kænədə]

Exercises.

1. Spelling vs. Pronunciation
    Flying foxes are full of flights of fancy and free to think of anything they like.

    a) Spelling: How many Fs are written out in the above sentence?
    b) Pronunciation: How many Fs are pronounced as [f] in the above sentence?

2. IPA Fun

    a) sprite   d) pseudoscience
    b) goblin   e) sapphire
    c) eight   f) enough

For each word above: 1) transcribe it into IPA, 2) write how many segments the word has, 3) write
whether the *first* segment is voiced or voiceless, 4) write what place of articulation the *last*
segment has, 5) write what manner of articulation the *last* segment has
Example: king
1) [kɪŋ] 2) 3 segments 3) [k] = voiceless 4) [ŋ] = velar 5) [ŋ] = nasal

3. More IPA Fun

Translate the following passage from IPA into English. (Bonus point if you can identify the
source of the passage.)

wʌn θɪŋ wʌz sərtən, θæt ðə *wajt* kɪtən hæd hæd nʌθɪŋ tuw duw wɪθ ɪt: -- ɪt wʌz ðə blæk
kɪtəns falt ɛntajərli. fɔr ðə wajt kɪtən hæd bɪn hævɪŋ ɪts fejs waʃt baj ðə owld kæt fɔr
ðə læst kwɔrrər əv æn awr (ænd bɛrɪŋ ɪt prɪri wɛl, kənsɪrərɪŋ); sow juw si θæt ɪt *kʊdənt*
hæv hæd ɛni hænd ɪn ðə mɪstʃɪf.

4. Articulatory Descriptions

A. Write the IPA segment described by the following articulatory descriptions.
Example: voiced interdental = [ð]

1) voiceless affricate
2) voiceless alveolar fricative
3) voiced labial nasal
4) voiced velar stop
5) high back rounded vowel

B. Write the articulatory description for the following IPA segments. (Just include enough
description to unambiguously pick out the sound you want.)
Example: [l] = lateral, [v] = voiced labiodental (or voiced labial fricative)

1) [w]
2) [t]
3) [æ]

5. Common Classes

What do the following sounds have in common?
Example: [m n ŋ] = nasals

1) [p b f v m w ʍ]
2) [b d g]
3) [w j ʍ]
4) [ɪ ɛ ʊ ɔ æ ʌ ə]

6. Speech Production

Identify what processes have caused the following pronunciations to result.

	Careful Speech	*Pronunciation*
Example: I see him	[aj si hɪm]	[aj siəm] (*I see'im*)

Process(es): deletion (of h), *vowel reduction* (of ɪ)

a) Jack will like you	[dʒæk wɪl lajk juw]	[dʒækl̩lajkjə] (*Jack'll like ya*)
b) All right	[al rajt]	[aajt] (*Aiight*)
c) Know what I'm saying?	[now wʌt ajm sejɪŋ]	[nowm̩sejn̩] (*Know'm sayin'?*)