Exam 2 Study Guide
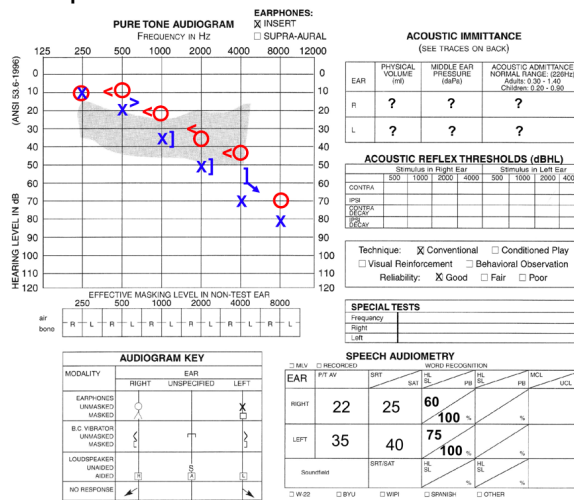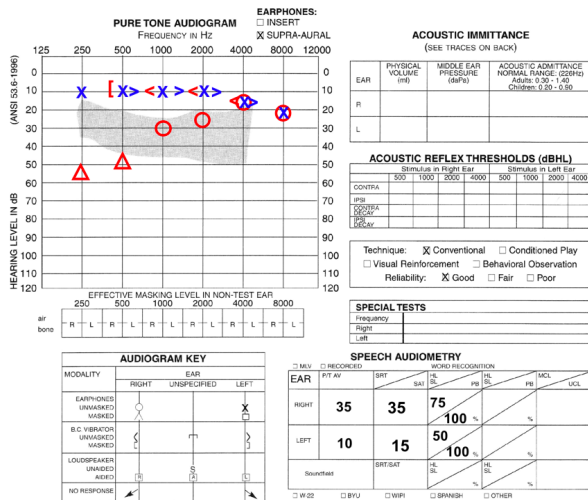
Be familiar with:

1. General anatomy of the inner ear

2. How tonotopic tuning is achieved by the basilar membrane.

3. The functional differences between outer and inner hair cells.

4. The major landmarks of the temporal bone.

5. Goals of audiologic evaluation.

6. Purpose and important questions of case history.

7. Purpose of otoscopy and some examples of abnormal findings.

8. The audiogram. Specifically, what does each axis represent and what do different symbols mean?

9. The "origin" of the audiogram. Why do we plot thresholds in dB HL instead of dB SPL?

10. The speech banana. Why is it useful?

11. The difference between air conduction and bone conduction audiometry. What does each test accomplish? What information is revealed by comparing thresholds from each test?

12. Different types of hearing loss: conductive, sensorineural, and mixed.

13. The procedure for obtaining hearing thresholds/the audiogram.

14. "Rules" for determining hearing loss type.

15. How to characterize hearing loss based on: type, configuration, and severity.

16. Audiogram interpretation. You should be able to look at and interpret an audiogram using the symbols that we have focused on up to this point in the class (unmasked air and bone conduction and "no response").

17. The concept of crossover. How and why does it occur? Why should we care about it?

18. The concept of interaural attenuation. What is IA for different transducers? Why is it important to keep these values in mind when performing audiometric testing?

19. Masking rules. What is the rationale for each rule? Be ready to identify which rules apply in specific situations.

20. The plateau method. Why do we use it as opposed to picking a single masking level for the non-test ear? Be able to explain step-by-step how it works.

21. What is undermasking? How do we know when undermasking is occurring?

22. What is the "plateau" actually telling us about which ear is participating? Why?

23. What is overmasking? How do we know if overmasking is occurring?

24. How unmasked audiograms can mislead clinicians about the type and severity of hearing loss. Think of the example of a unilaterally deaf patient from the Introduction to Masking presentation. Can you envision any other examples where the unmasked audiogram would be radically different from the masked audiogram?

25. Types of speech audiometry tests and the purpose of each test

26. The "cross-check" principle and how it applies to PTA and SRT. What could cause a lack of agreement between SRT and PTA?

27. When masking is needed for speech audiometry and how much masking is warranted (i.e., when the "rule of thumb" masking level is appropriate to use and when it is not)

28. How WRS performance-intensity functions look for different types of hearing loss and why.

29. The concept of "rollover"

30. How speech-in-noise tests work and the concept of "SNR loss"

31. Where otoacoustic emissions come from

32. The two types of OAEs used clinically and how they differ in terms of stimulus and response:
    a. DPOAEs
    b. TEOAEs

33. What a DPgram shows and how it is used to determine if DPOAEs are normal/abnormal

34. Clinical applications of OAEs and rationales for each application. For example, why are OAEs used heavily in pediatric clinics?

35. Disorders of the inner ear and audiometric "hallmarks" or characteristics of each
    a. Genetically inherited hearing loss (generally)
    b. T.O.R.C.H. complex (generally)
    c. Auditory neuropathy spectrum disorder
    d. Presbycusis
    e. Noise induced hearing loss
    f. Meniere's Disease
    g. PLF
    h. Inner Ear infection

36. For the audiograms below, please evaluate the following:
    a. Type, configuration, and severity of hearing loss
    b. Agreement between SRT and PTA
    c. What WRS scores indicate for each patient

Left audiogram (Patient 1)

EARPHONES: ☐ INSERT ☒ SUPRA-AURAL

PURE TONE AUDIOGRAM — FREQUENCY IN Hz

ACOUSTIC IMMITTANCE (SEE TRACES ON BACK)

EAR	PHYSICAL VOLUME (ml)	MIDDLE EAR PRESSURE (daPa)	ACOUSTIC ADMITTANCE NORMAL RANGE: (226Hz) Adults: 0.30 - 1.40 Children: 0.20 - 0.90
R			
L			

ACOUSTIC REFLEX THRESHOLDS (dBHL)

Technique: ☒ Conventional ☐ Conditioned Play ☐ Visual Reinforcement ☐ Behavioral Observation
Reliability: ☒ Good ☐ Fair ☐ Poor

SPEECH AUDIOMETRY

EAR	P/T AV	SRT		HL / WORD RECOGNITION		MCL / UCL
RIGHT	35	35		75 / 100 %		
LEFT	10	15		50 / 100 %		

Right audiogram (Patient 2)

EARPHONES: ☒ INSERT ☐ SUPRA-AURAL

PURE TONE AUDIOGRAM — FREQUENCY IN Hz

ACOUSTIC IMMITTANCE (SEE TRACES ON BACK)

EAR	PHYSICAL VOLUME (ml)	MIDDLE EAR PRESSURE (daPa)	ACOUSTIC ADMITTANCE NORMAL RANGE: (226Hz) Adults: 0.30 - 1.40 Children: 0.20 - 0.90
R	?	?	?
L	?	?	?

ACOUSTIC REFLEX THRESHOLDS (dBHL)

Technique: ☒ Conventional ☐ Conditioned Play ☐ Visual Reinforcement ☐ Behavioral Observation
Reliability: ☒ Good ☐ Fair ☐ Poor

SPEECH AUDIOMETRY

EAR	P/T AV	SRT		HL / WORD RECOGNITION		MCL / UCL
RIGHT	22	25		60 / 100 %		
LEFT	35	40		75 / 100 %		

37. Work through the following audiograms to determine if masking is needed according to our three rules. If so, state which thresholds need to be obtained with masking, and determine the initial masking level for each scenario.
    a. First assume that supra-aural headphones were used. Then repeat this exercise while assuming that insert earphones were used.