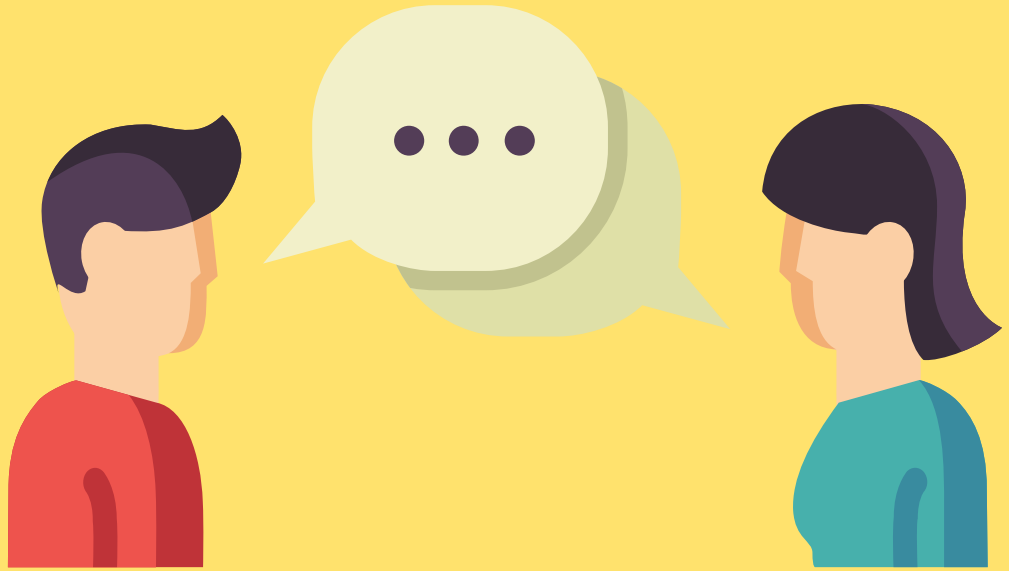
Chapter One

Listening and Hearing

Studying Sound

Contents

HEARING AND LISTENING



What is the difference between **hearing** and **listening**?

Can we train ourselves to listen?

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Exercise #1.1: Quiet Time

Try standing up from your chair without making any sound.

How was the process of listening different from how you normally hear sound?

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Talking and Writing About Sound

What type of language do we have to talk about sound?

What words do we use to describe sound?

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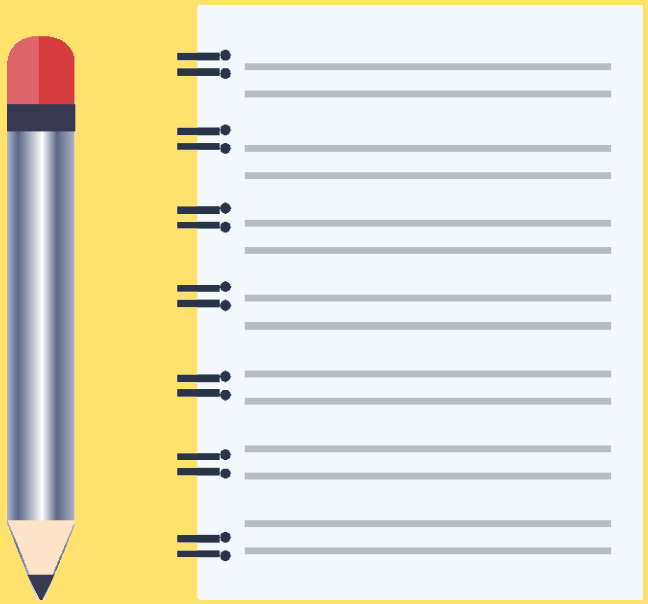
Exercise #1.2 Describing Sound



Take **5 Minutes** & sit quietly somewhere

Write down all the sounds you hear

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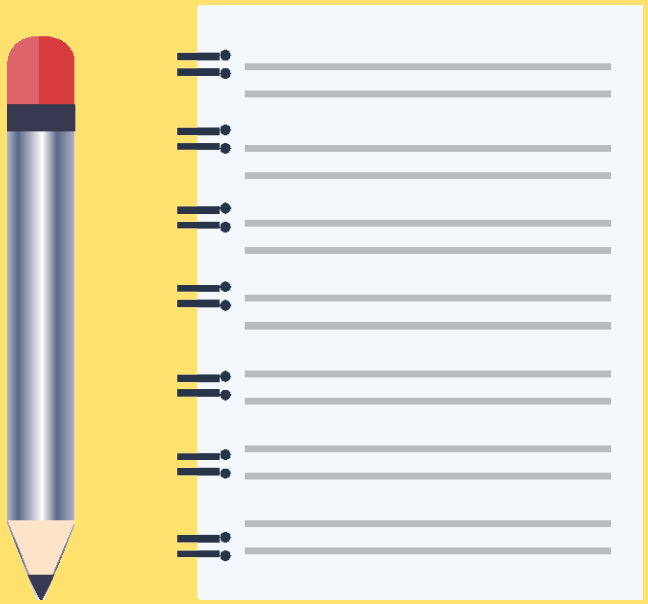
Exercise #1.2 Describing Sound Part 2



How did you describe the sound?

Causality: what made the sound?

How descriptive did you get?

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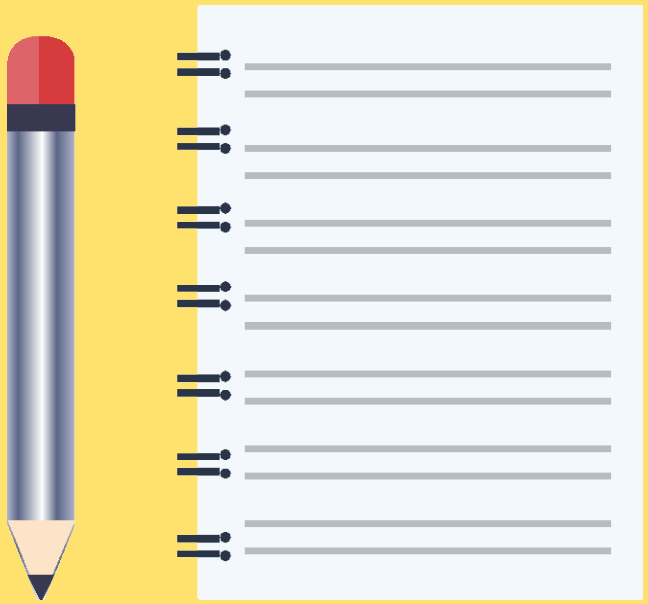
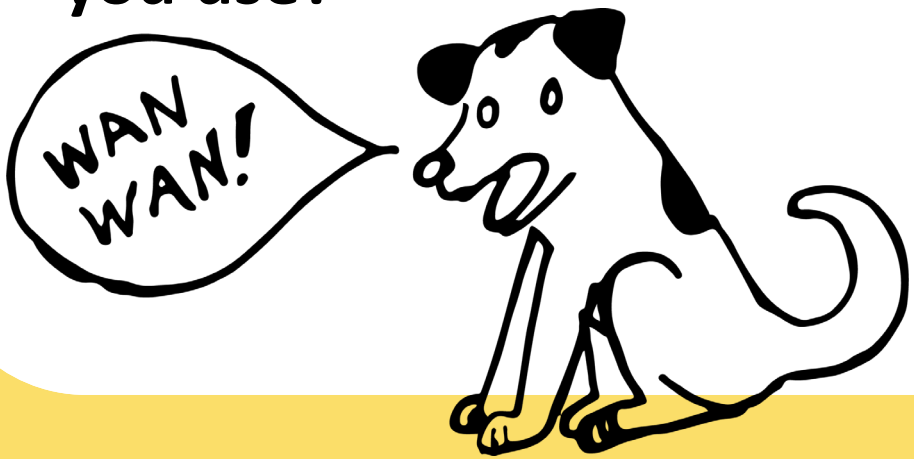
Exercise #1.2 Describing Sound Part 3



Onomatopoeia: a word formed from the description of the sound it makes

What onomatopoeia did you use?



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Exercise # 1.3 Gerald McBoingBoing

Watch the cartoon (or read the book)

How many onomatopoeia words can you think of?

Write an entire day's journal entry just in onomatopoeia

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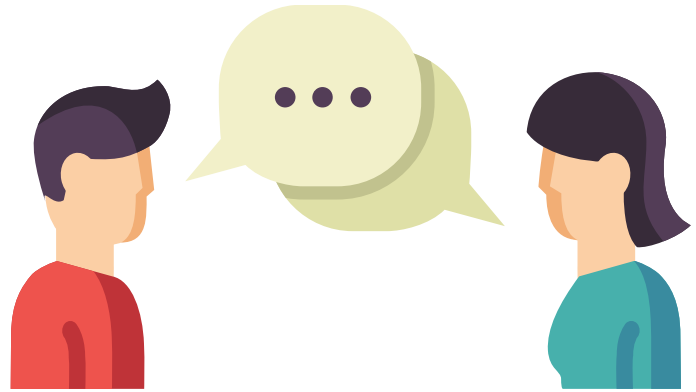
How we think about and talk about sound

Sound libraries: How do sound libraries categorize sounds?

How else might we categorize sound?

What impact does categorizing have on our creativity?



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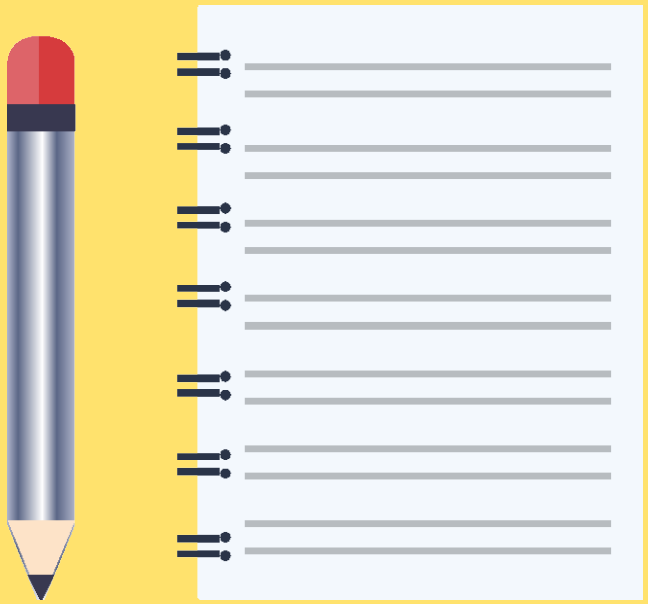
Exercise #1.4 Categorizing sound



Categorize your list of sounds in different ways, e.g.

natural --- human-made

pleasant --- unpleasant

quiet --- loud

rough --- smooth

?? --- ??

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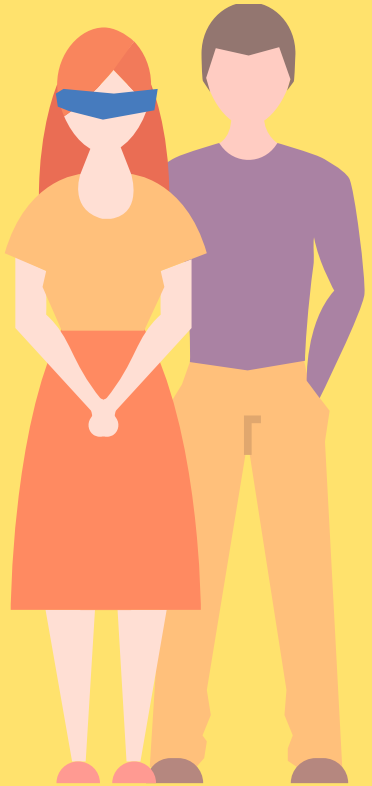
Exercise #1.5 The Sound Walk



Have someone guide you blindfolded for a short walk. Focus on the sounds you hear.

Make a sound you can repeat in different spaces (like a hand clap). How does it change in different places?

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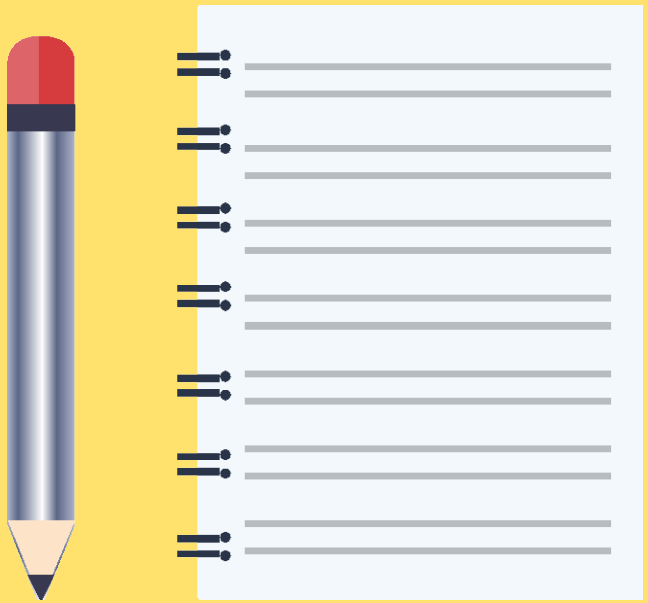
Critical Listening: The Sound walk

Hildegard Westerkamp on The World Soundscape Project on North by Northwest, CBC Radio April 15, 2018
https://www.cbc.ca/radio/ideas/how-opening-our-ears-can-open-our-minds-hildegard-westerkamp-1.3962163

Soundscapes & Acoustic Ecology



What does it mean to record our soundscape?

Should we bother preserving the sounds of our world? Why or why not?

What can we learn by listening to soundscapes?

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BONE CONDUCTION

Image: GameOnMom.com

Beethoven painting by Stieler, 1820

Sound vibrations in bones picked up by brain

Beethoven (1770 - 1827) used wooden rod to hear after losing hearing

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Exercise #1.12: Bone Conduction with Dowel

- Get 3mm (or ¼”) wooden dowel, about 40 cm long (15”).
- Plug your ears with fingers or plugs
- Bite on one end, and put the other end on something making sound.

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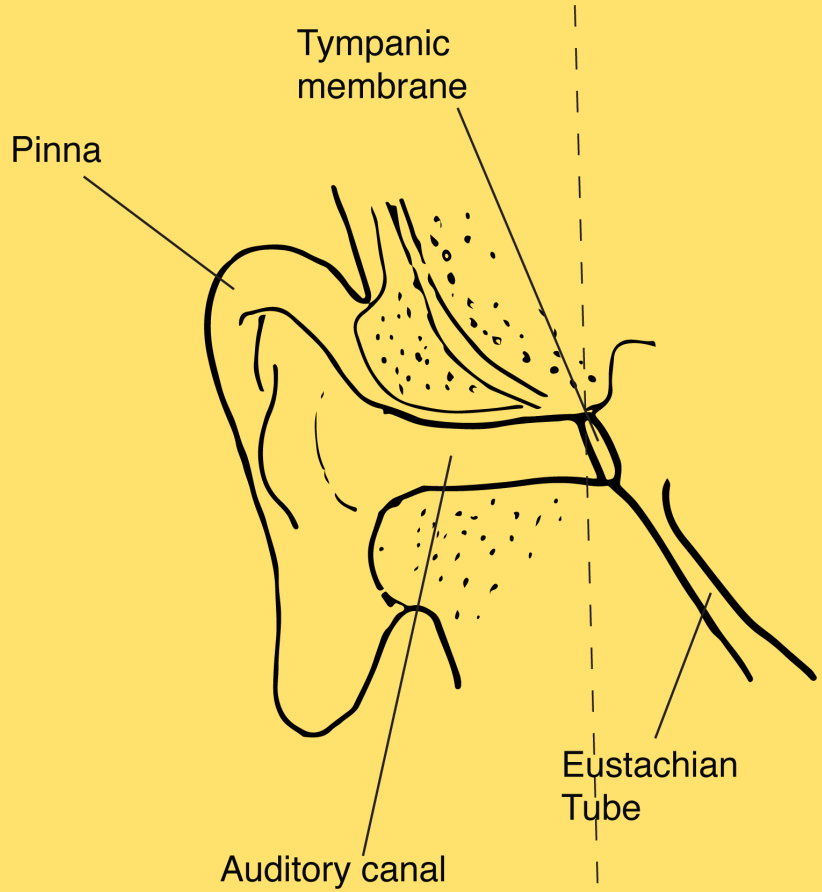
THE EAR -- Outer



Pinnae- unique - ear prints

Auditory canal

Ear drum- tympanic membrane

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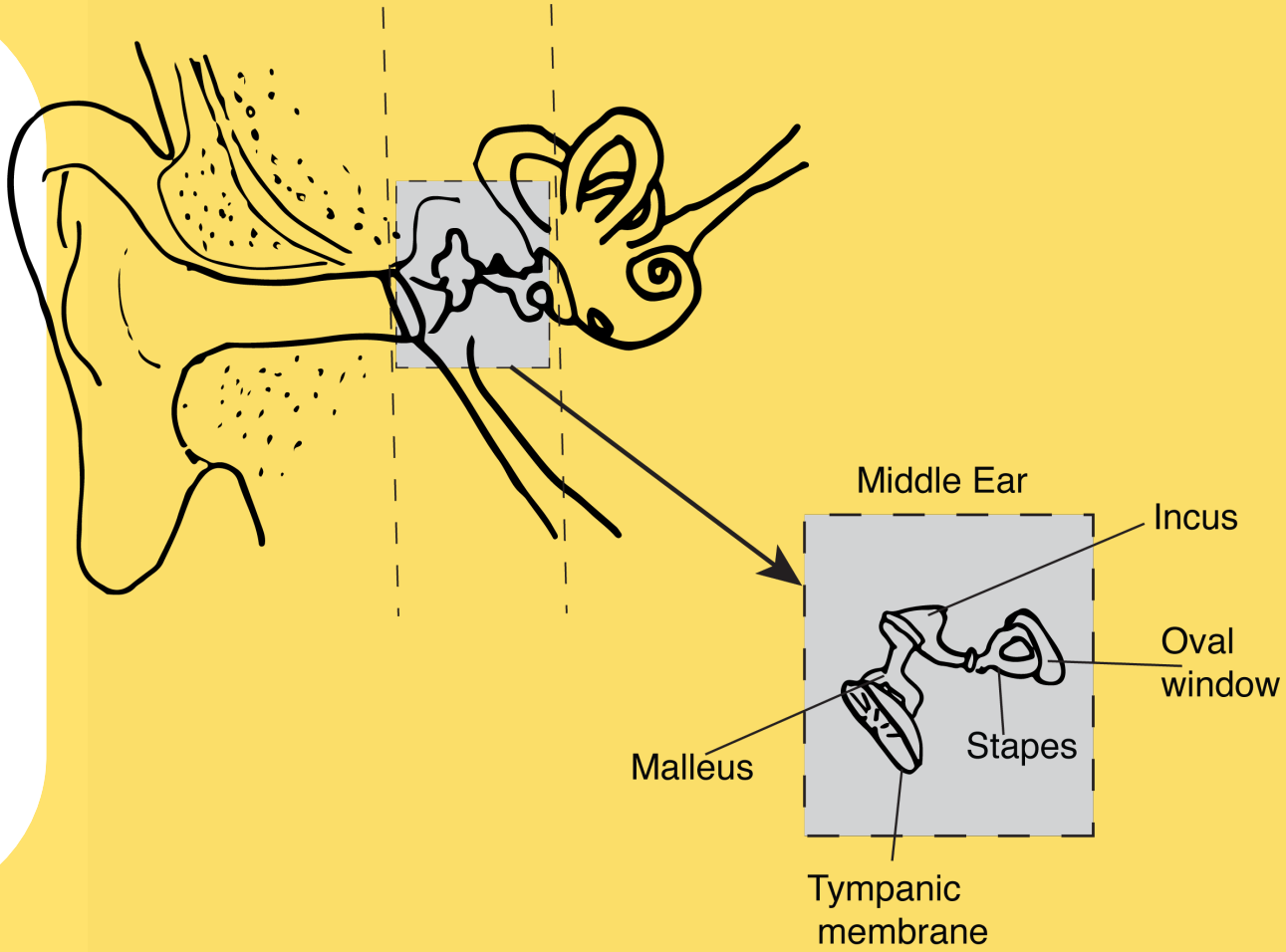
THE EAR -- Middle

- Tympanic cavity
- The Ossicles:
- Malleus (hammer)
- Incus (anvil)
- Stirrup (stapes)
- Oval Window
- Eustachian Tube – connects to throat



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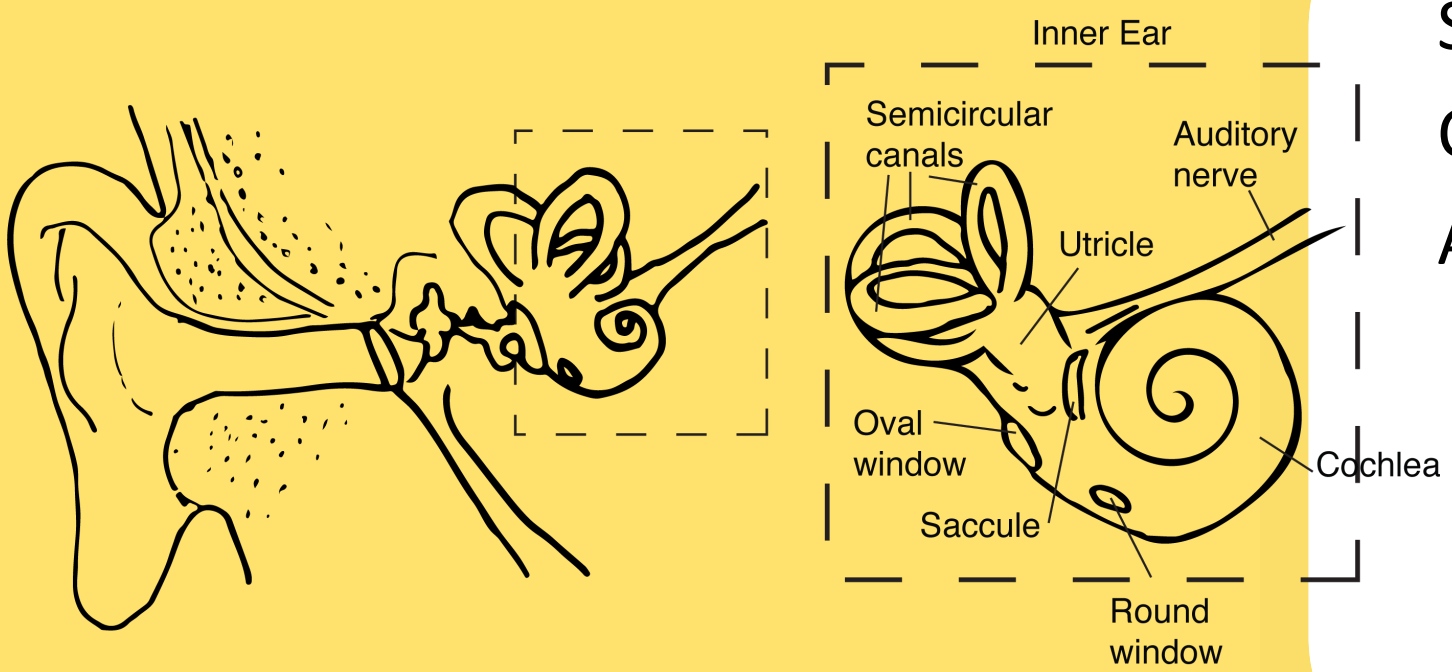
THE EAR -- Inner



- Semicircular canals
- Cochlea
- Auditory Nerve

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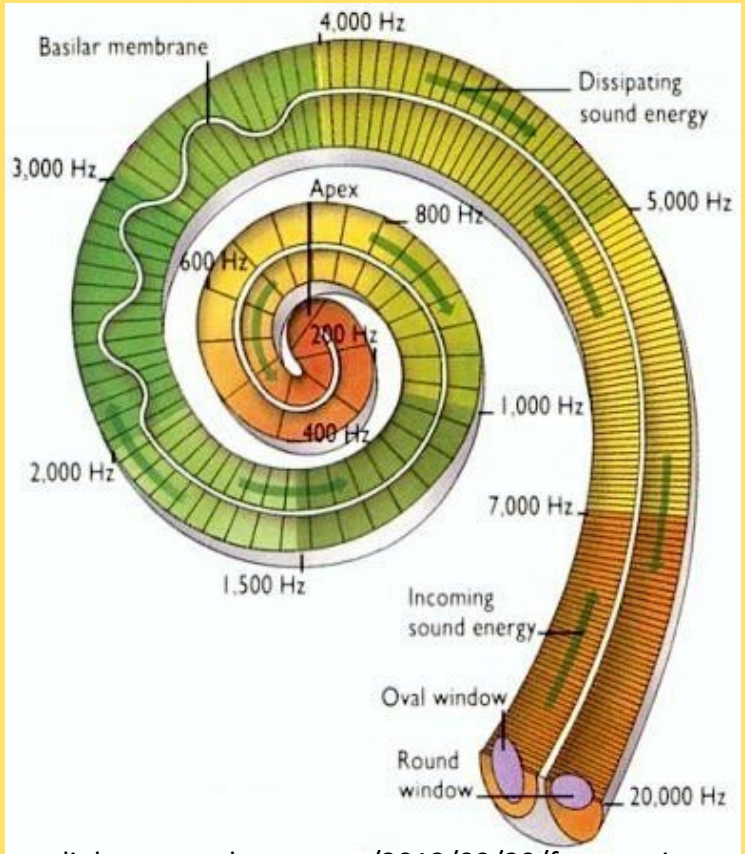
The Cochlea



https://fonoaudiologos.wordpress.com/2012/09/29/frecuencias-en-la-coclea/

- Cilia specific to frequency
- Send signal via the auditory nerve to brain

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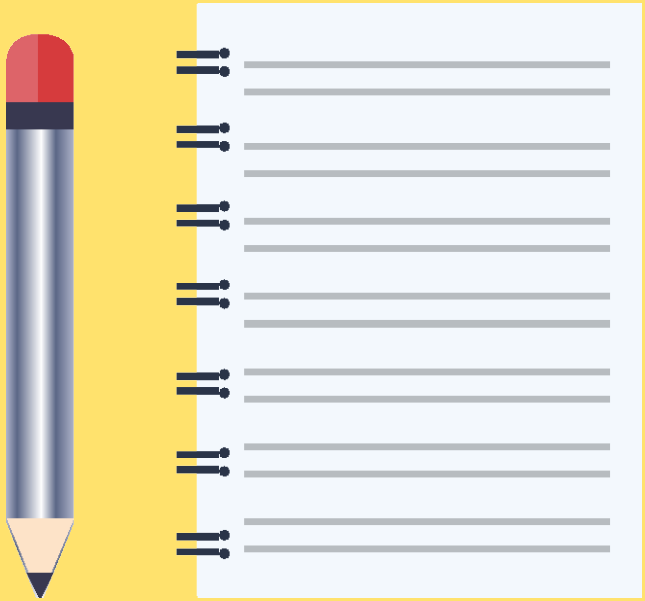
Hearing and the Senses: Exercise #1.14



Write in your journal what it must be like for a baby hearing sound from the womb. What sounds would they not be able to hear because of the muffled barrier of the womb? What sounds would they hear more loudly because of where they are?

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HUMAN HEARING ABILITY

- 20 Hz – 20 KHz
- Age-Related Hearing Loss:
  - “Mosquito” tone
- Tone Generator: *(link)

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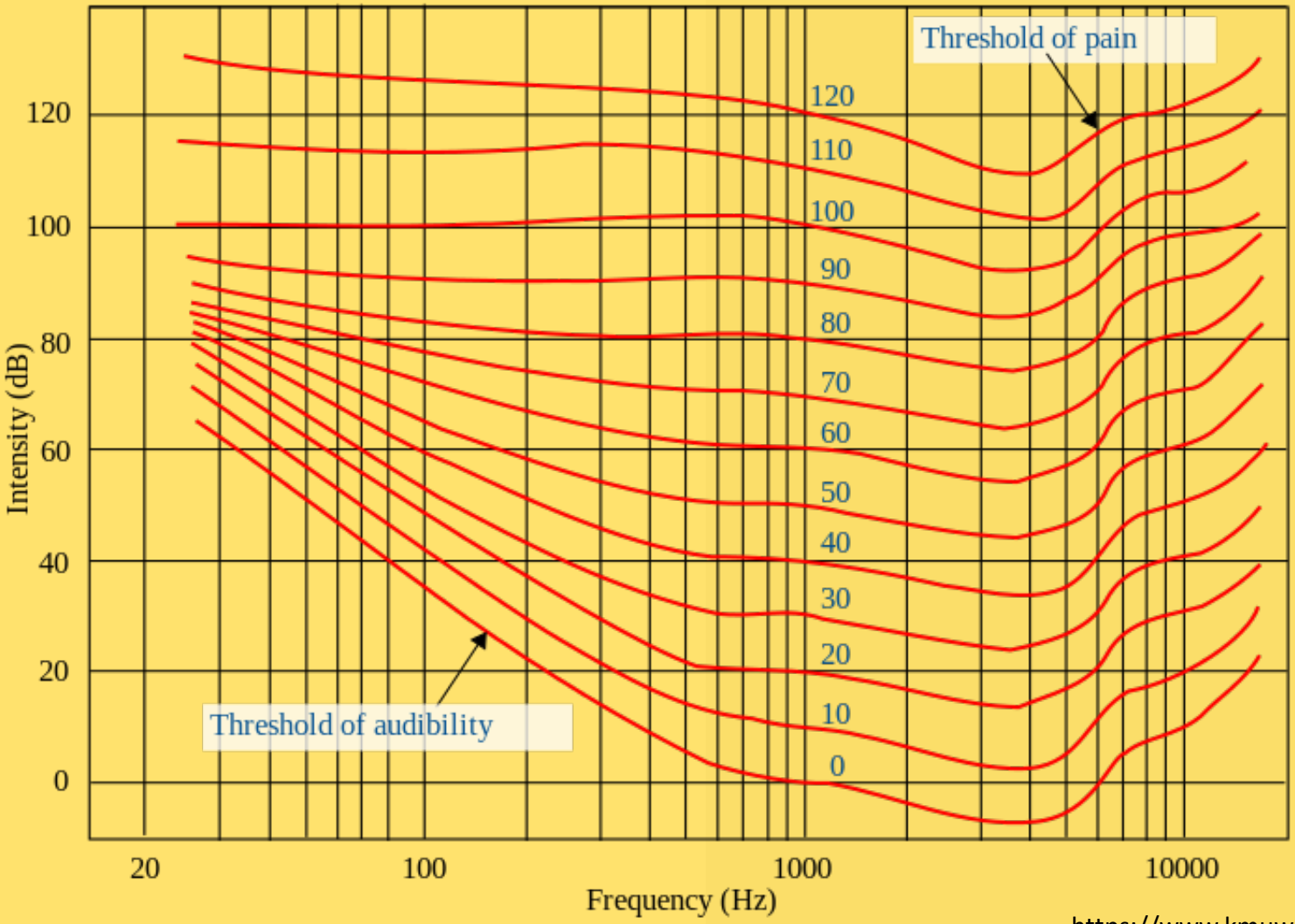
HUMAN HEARING ABILITY

- 80 dB long-term = damage
- 90 dB short-term damage
- 115 dB very short sound = permanent damage

dB Level	Examples	Permitted Exposure (Hours per Day)
10	Breathing	
20	Whisper	
30	Library	
50	Quiet Office	
60	Conversational Speech, Electric shaver	
65	Piano Practice	
70	Noisy Restaurant	
75	Alarm Clock	
80	Vacuum Cleaner	
85	Garbage Disposal / Busy Hotel Lobby	
90	Tractor / Subway	8
100	Blender, Factory Noise	2
105	Motorcycle, Orchestra	1
110	Power Saw, Heavy Truck, Power Mower	0.5
115	Uncomfortable Feeling Starts	0.25
120	Disco / Loud Bar Music / Shotgun	0
130	Cymbal Crash, Air Raid Siren	0
140	Rock Concert Front Row / Jet	0
150	Chest begins to vibrate	0
160	Eardrum bursts	0
190	Loudest Possible Sound	0

https://boomspeaker.com/noise-level-chart-db-level-chart/

Equal Loudness: Fletcher-Munson Curves



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https://www.kmuw.org/post/loudness-and-fletcher-munson-curve

Protect Your Hearing

- ✗ Noise
- ✗ Cotton buds
- ✗ Cold
- ✗ Medications

Tinnitus = sign of damage

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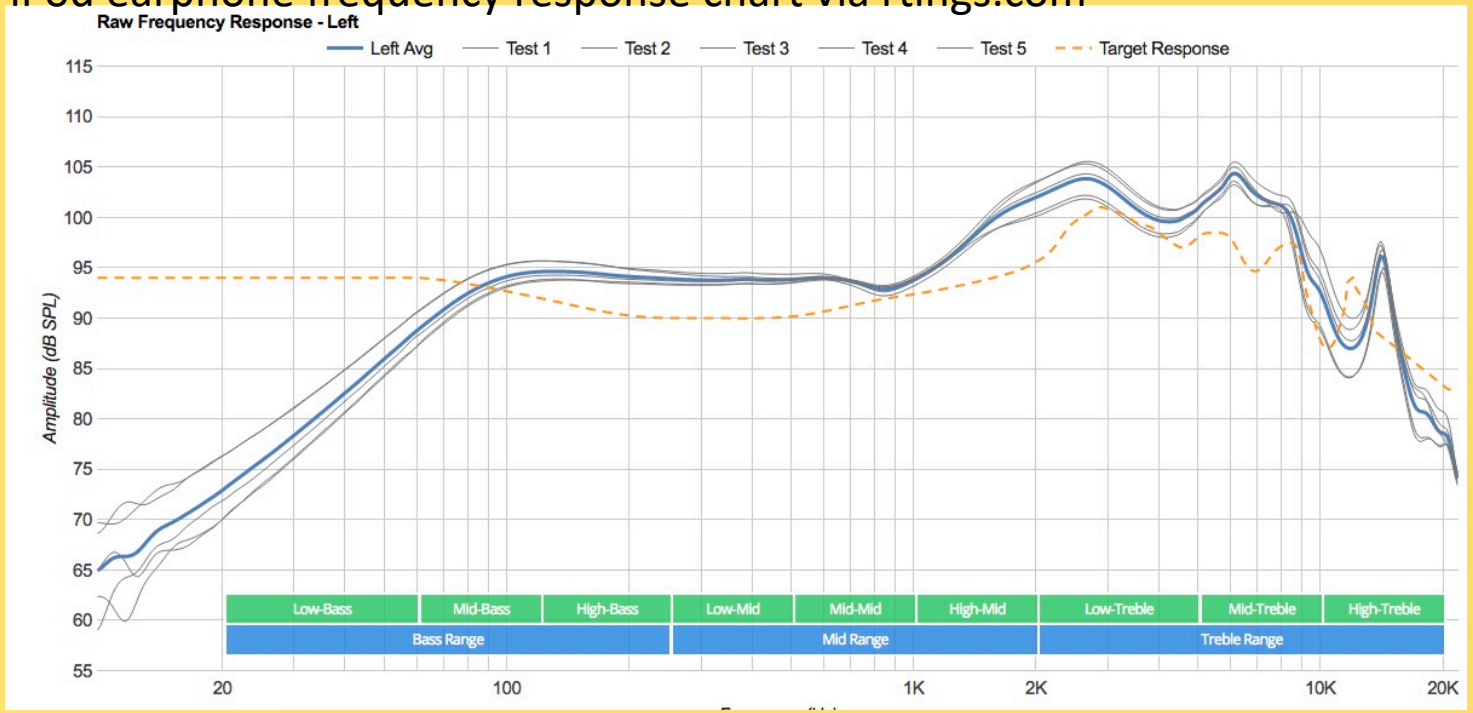
HEADPHONES: In-ear and earbuds

https://www.koss.com

convenient, cheap

Poor comfort, poor bass response

iPod earphone frequency response chart via rtings.com



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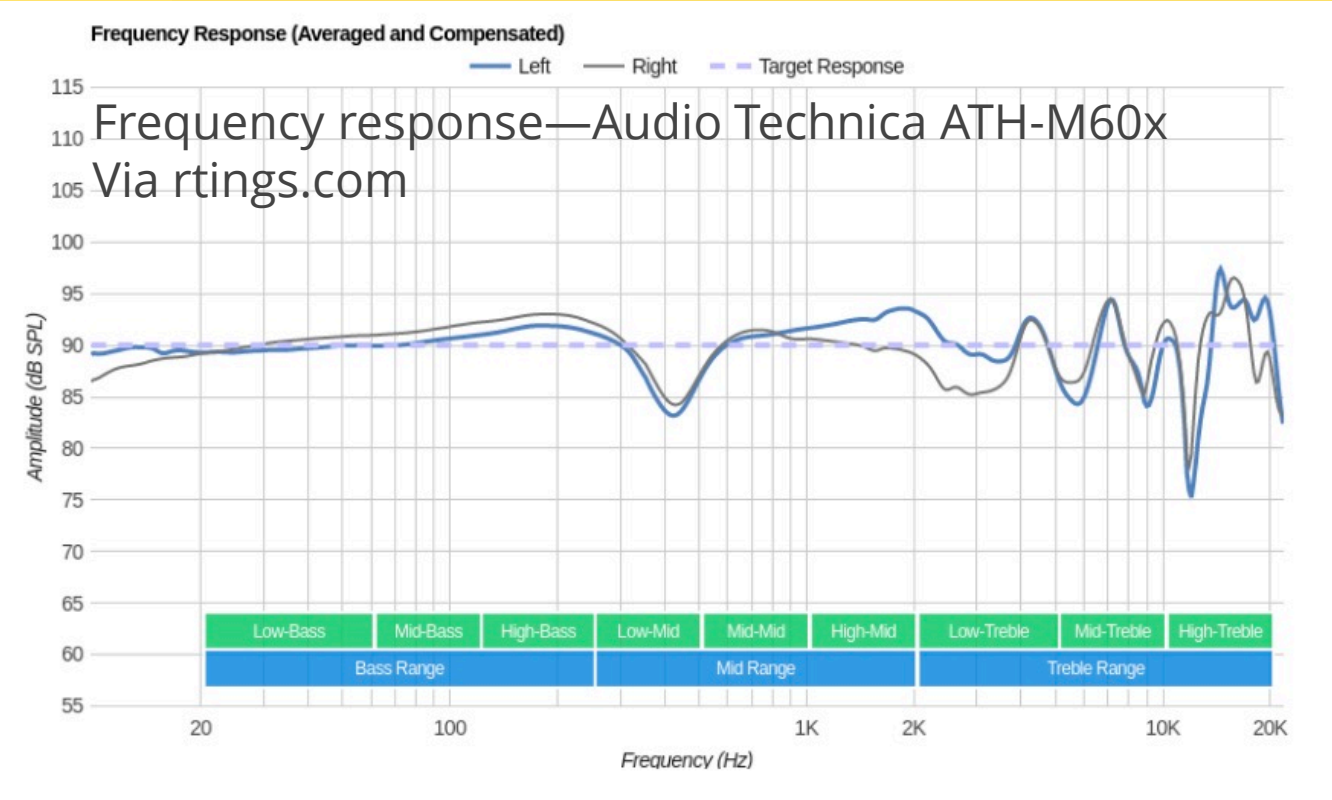
HEADPHONES: On-Ear

https://eu.audiotechnica.com

cost-effective, light/compact, portable

Slightly less bass



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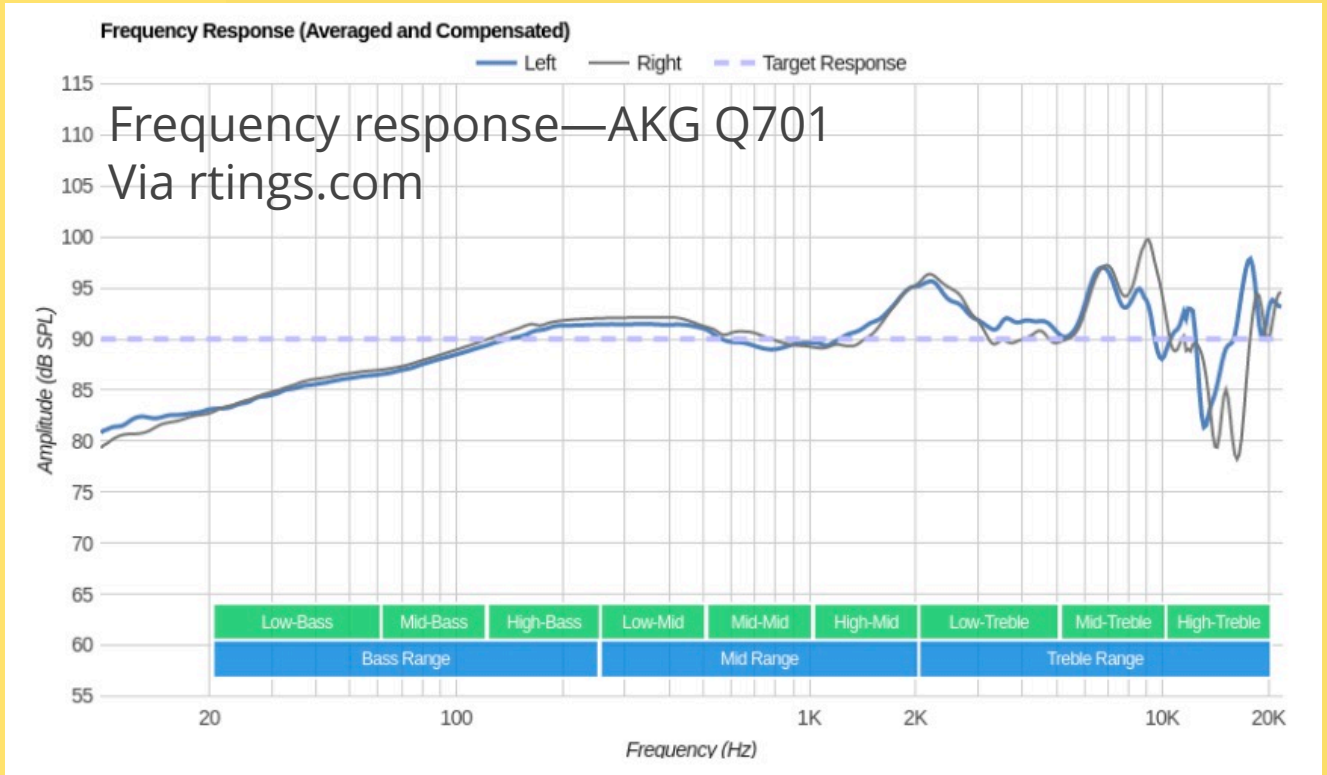
HEADPHONES: Over-Ear

https://www.akg.com

Best sound for monitoring, comfortable

bulky, more sound leakage



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