



ORGAN of  
Hearing and Balance

# The OUTER Ear

outer  
ear



*Diagram taken from  
[www.siemens-hearing.com](http://www.siemens-hearing.com)*

# The MIDDLE Ear



*Diagram taken from  
[www.siemens-hearing.com](http://www.siemens-hearing.com)*

# The INNER Ear

inner  
ear



*Diagram taken from  
[www.siemens-hearing.com](http://www.siemens-hearing.com)*

# Speech & Balance Closely Connected to Hearing



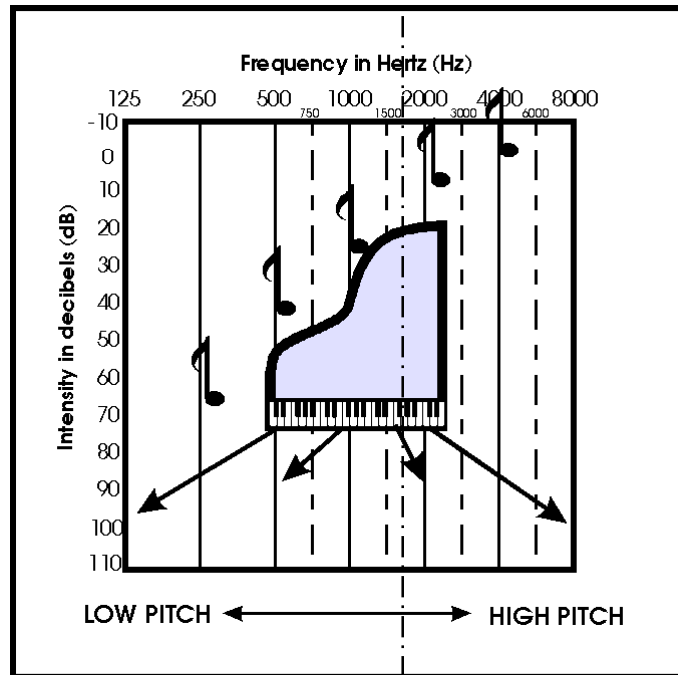
# Types of Hearing Loss and Causes



*Diagram taken from  
[www.oticon.com](http://www.oticon.com)*

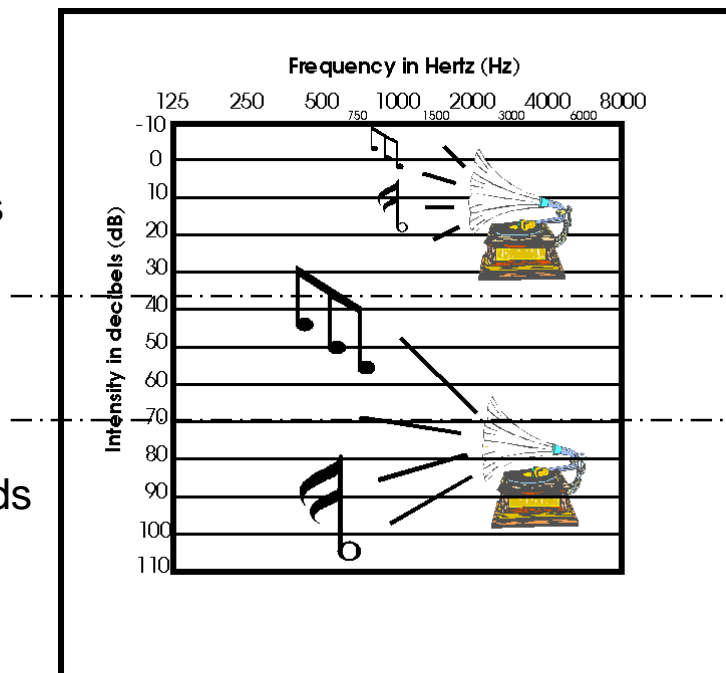
# Audiogram

Low  
{Bass}  
Sounds



High  
{Treble}  
Sounds

Soft Sounds



Loud Sounds

Diagram taken from  
[www.pacificaudiology.com](http://www.pacificaudiology.com)

# Audiogram

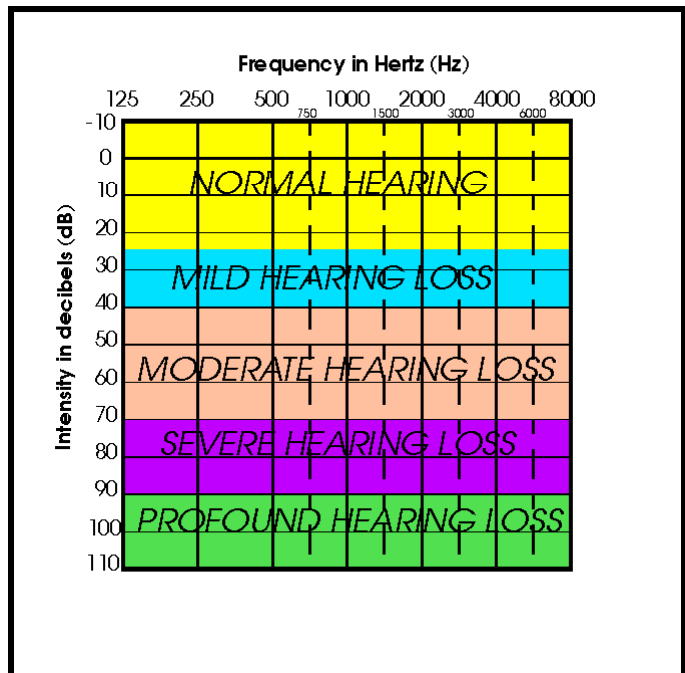
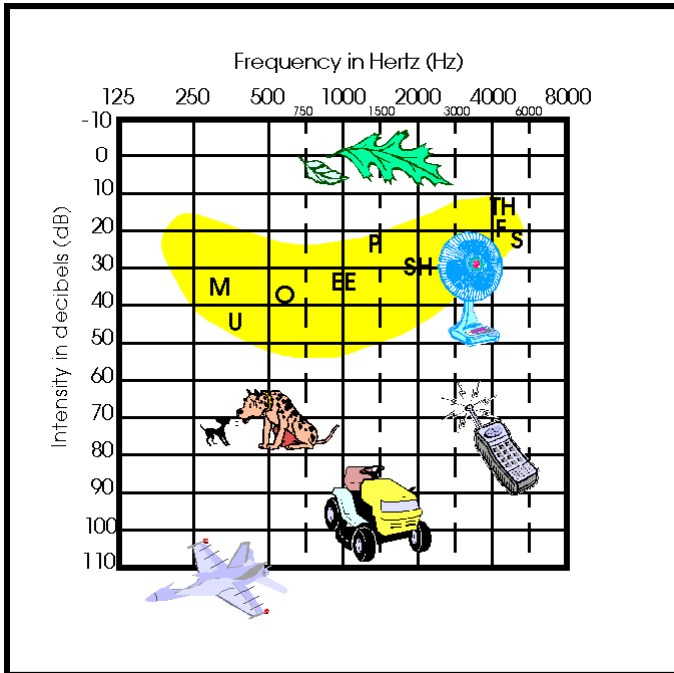
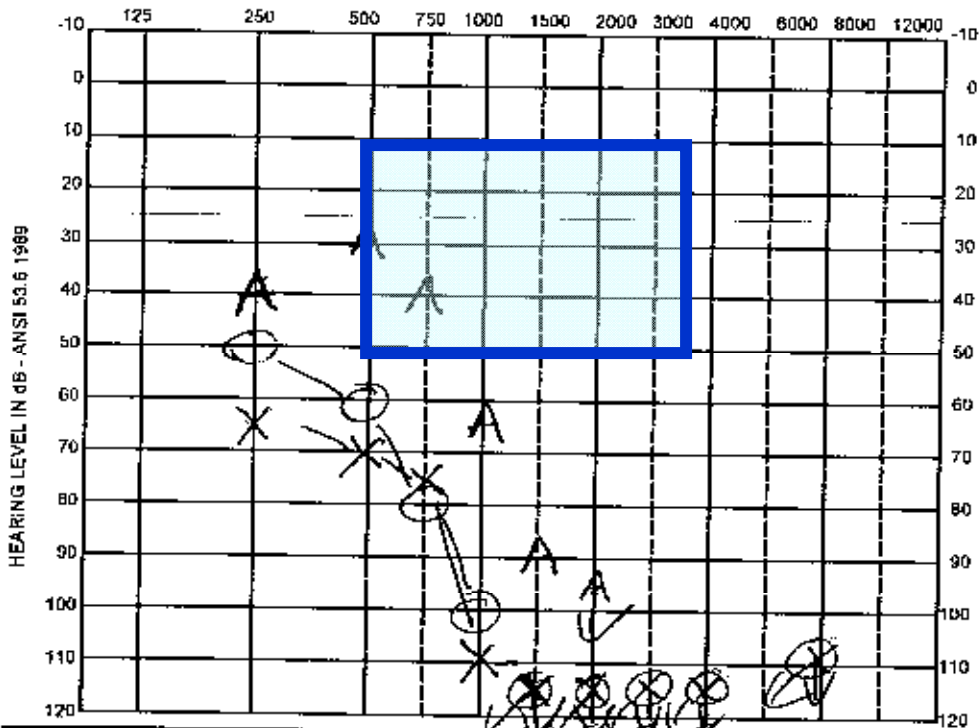


Diagram taken from  
[www.pacificaudiology.com](http://www.pacificaudiology.com)



# PURE TONE AUDIOMETRY

FREQUENCY IN HERTZ



**TEST METHOD & STIMULI**

INSERT PHONES  
 SOUND FIELD  
 PURE TONES  
 WAXBELL TONES  
 NARROW BAND NOISE  
 PLAY AUDIOMETRY  
 VRA  
 CONVENTIONAL  
 ABR - ESTIMATES

**RELIABILITY**

TEST: GOOD FAIR POOR

AUDIOMETER: GS 61

**AUDIOGRAM KEY**

AC UNMASKED (RT, LF)  
 AC MASKED  
 BC MASTOID UNMASKED  
 BC MASTOID MASKED  
 UCL  
 SOUND FIELD AIDED (S)  
 EXAMPLE OF NO RESPONSE SYMBOLS (NR)

**TYPANOMETRY**

	PRESSURE PEAK	COMPLIANCE	GRADIENT	PHYSICAL VOLUME
RIGHT				
LEFT				

**IPSI REFLEXES**

	500	1000	2000
RIGHT			
LEFT			

**SPEECH AUDIOMETRY**

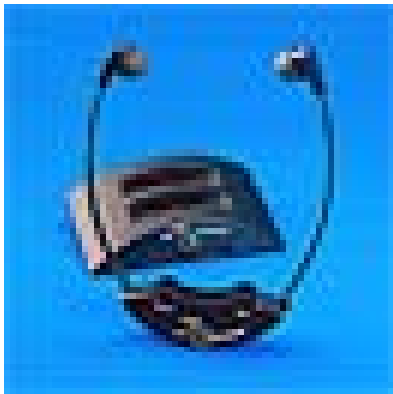
PTA - PURE TONE AVERAGE  
 SAT - SPEECH AWARENESS THRESHOLD  
 SRT - SPEECH RECEPTION THRESHOLD  
 MCL - MOST COMFORTABLE LOUDNESS  
 UCL - UNCOMFORTABLE LOUDNESS

Discrimination Word Lists: NU-6 W22 PBK WPI Ula Voice COMPBFLI CCT HINT

	PTA	SAT	SRT	MCL	DISCRIMINATION SCORE				UCL	
					MONAURAL	BINAURAL	HL	Mask		
RIGHT			80	80	62%	80%	Mask	HL	Mask	94
LEFT			90	90	16%	90%	Mask	HL	Mask	96
SOUND FIELD								HL	HL	
AIDED			NR					HL	HL	

# Technology

**Infrared System**



**TV Induction Loop**



**Closed Captioning Symbol**



**TTY Telephones**



**Vibrating Alarm Clock**

# Technology

## Hearing Aides

### In-The-Ear model

Completely in  
the Canal



**CIC**

Mini-Canal



**ITC**

Half Shell in  
the Canal



**ITC**

Full Shell in  
the Canal



**ITE**

### Behind-The-Ear model



**BTE**

*Diagram taken from  
[www.phonak.com](http://www.phonak.com)*

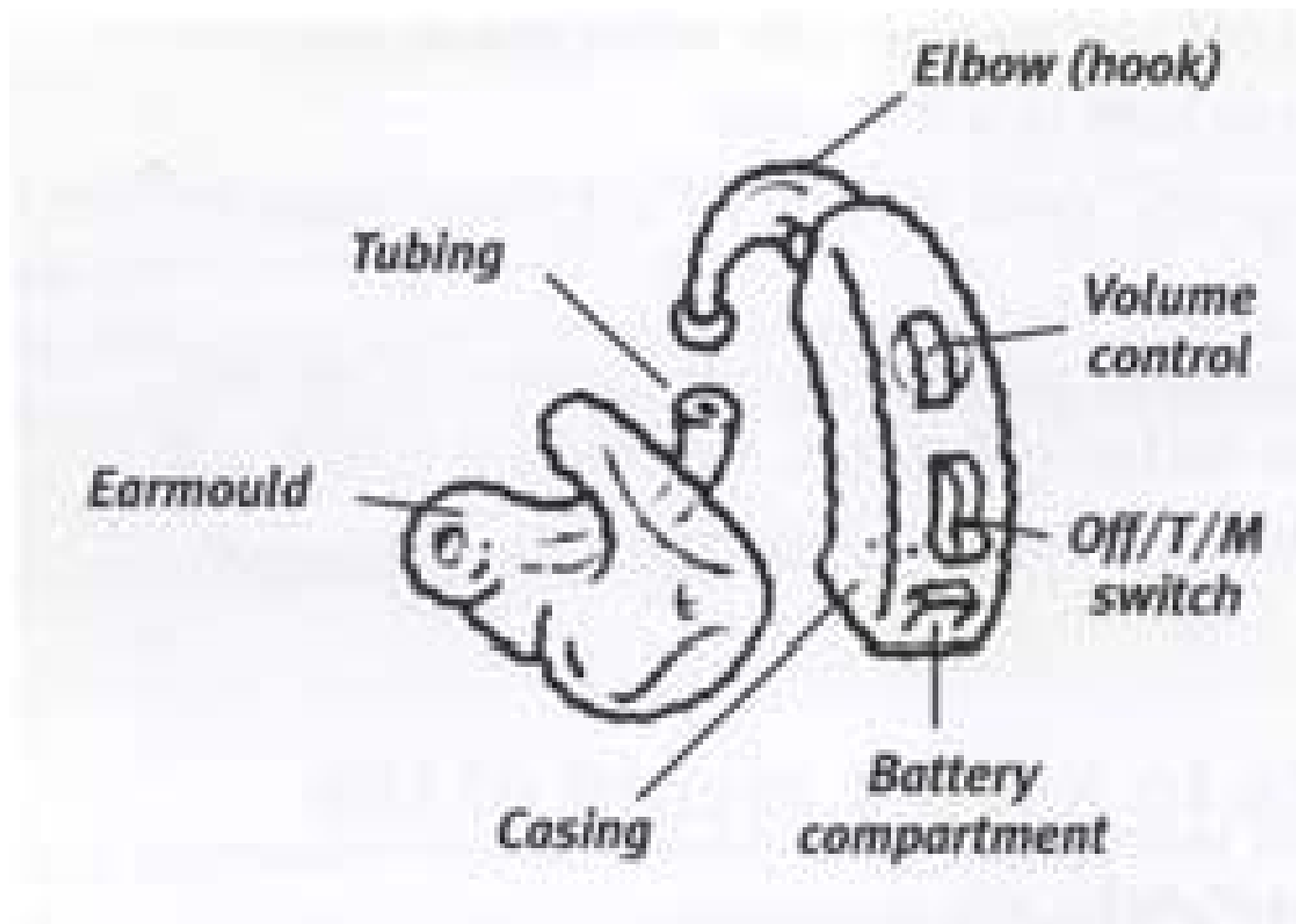


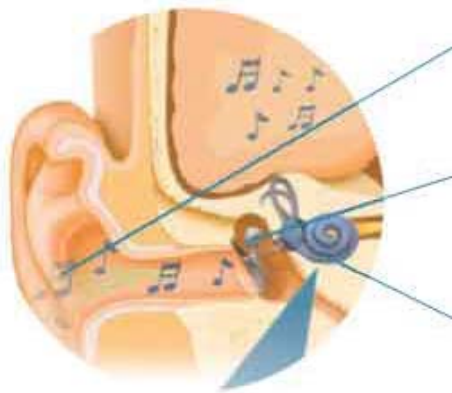
Diagram taken from  
[www.deafnessatbirth.org.uk](http://www.deafnessatbirth.org.uk)

# Technology

## Blackberry & FM System



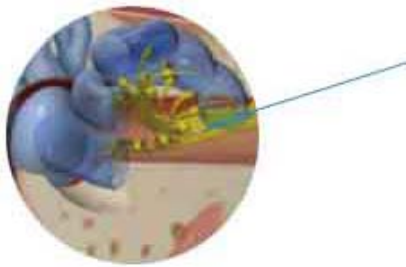
# How the normal ear hears sound



**Outer Ear**

**Middle Ear**

**Inner Ear**



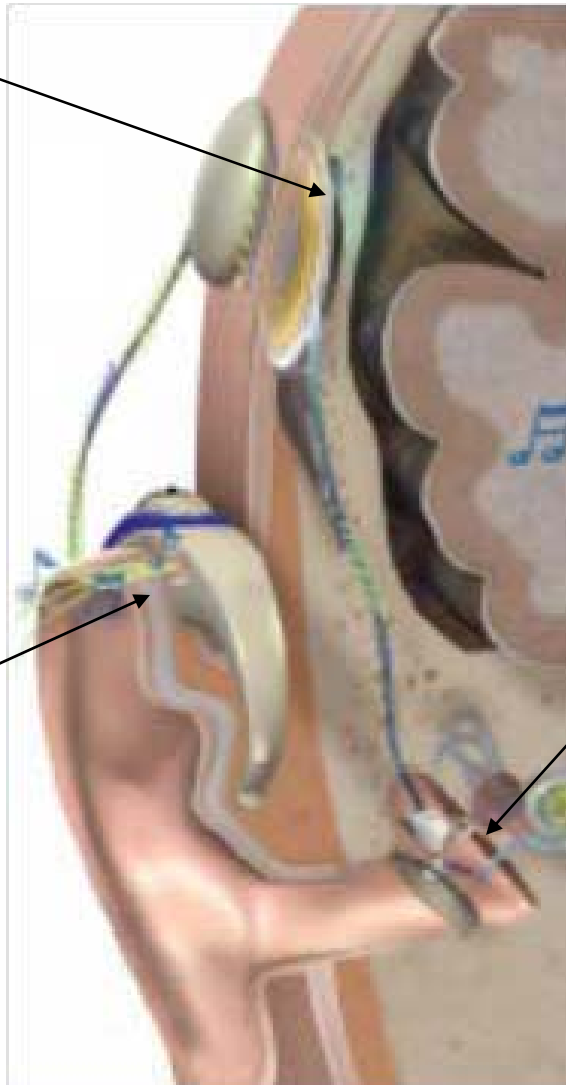
**Hearing Nerve**

Thousands of little nerve pathways transmit sound information from the hair cells up to the hearing center of the brain.

*Diagram taken from  
[www.bionicear.com](http://www.bionicear.com)*

# Hearing with a Cochlear Implant

Step Two:  
Implant



Step One:  
Sound Processor



Step Three:  
Electrode Array

*Diagram taken from  
[www.bionicear.com](http://www.bionicear.com)*

# Websites

*Utilized for this presentation*

[www.abilityhub.com](http://www.abilityhub.com)

[www.bionicear.com](http://www.bionicear.com)

[www.harriscomm.com](http://www.harriscomm.com)

[www.hearingcenteronline.com](http://www.hearingcenteronline.com)

[www.hearinglossweb.com](http://www.hearinglossweb.com)

[www.oticon.com](http://www.oticon.com)

[www.phonak.com](http://www.phonak.com)

[www.shhh.org](http://www.shhh.org)

[www.siemens-hearing.com](http://www.siemens-hearing.com)

[www.unitedtty.com](http://www.unitedtty.com)