

# An Introduction to Classroom Acoustics

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Graphics - Australian Hearing and Phonak

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## Lets set the scene

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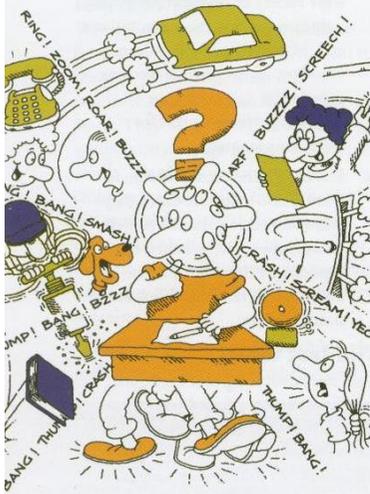
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# Factor 1: Background Noise



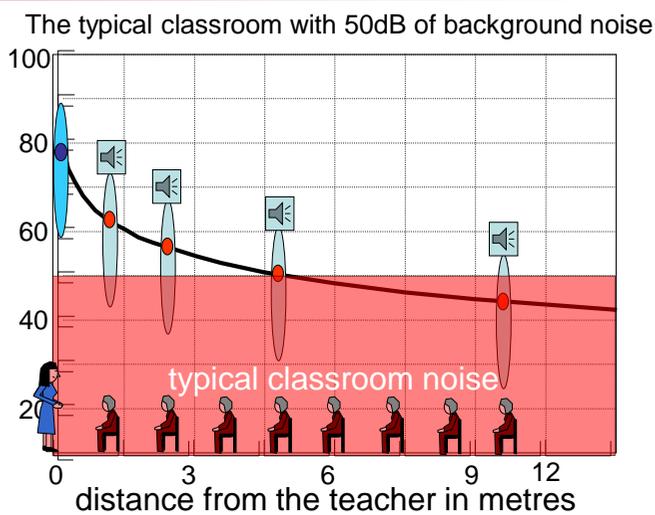
Background noise makes it harder for hearing impaired people to hear what is being said in the classroom.

Types of background noise at school:

- Internal noise (student chatter, A/C, classroom equipment, etc.)
- External noise (traffic noise, adjacent classes, corridors, etc.)

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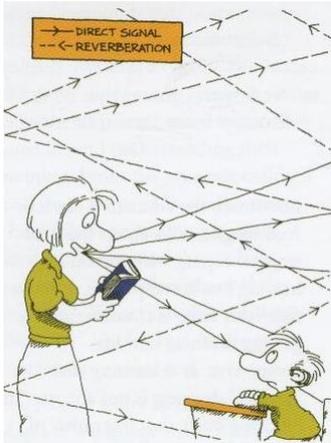
## Background noise



Printacall Communications Technology

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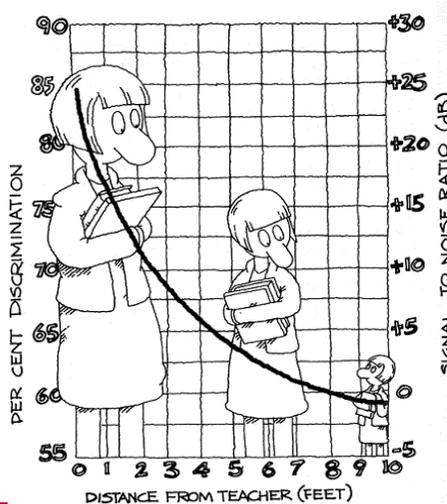
## Factor 2: Reverberation



Reverberation is the reflection or echo of sound from room surfaces. In rooms with concrete walls, high ceilings, bare windows and uncarpeted floors sounds bounce off these hard surfaces for longer. This increases the background noise level.

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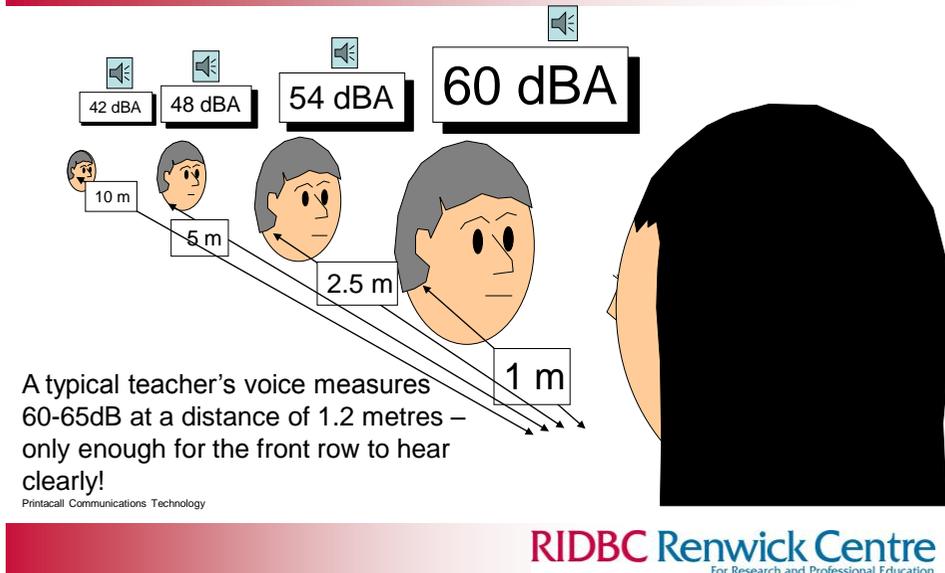
## Factor 3: Distance



The distance between the teacher and hearing impaired student directly effects the intensity level of the teacher's voice. **Greater distance equals reduced sound intensity.**

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# Distance



## Signal-to-Noise Ratio

The signal-to-noise ratio (SNR) is the difference between the intensity (volume) of the speech signal compared to the intensity (volume) of background noise.

$$\text{Speech Signal (dB)} - \text{Background noise (dB)} = \text{SNR}$$

## Lets Experiment!

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Measuring the impact of background noise and distance on how loud the signal is:

Decibel X

(free app)

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## Strategies

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The impact of these three factors can be reduced by making adjustments to the classroom environment and your teaching practice.

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## Distance

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- Halve the distance, double the intensity.
- Position students strategically: keep them within arm's reach!
- Consider where you stand and teach most often- position the classroom accordingly.

## Reverberation

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Soften all surfaces. Try:

- hanging curtains or putting paper on windows
- covering long expanses of whiteboards and blackboards with material or paper
- hanging netting from the ceiling

## Reverberation (cont)

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- laying carpet or using rugs
- lots of cushions in reading areas
- hanging pictures on the walls (no glass covers)

## Reverberation (cont)

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- gluing a piece of tennis ball on the bottom of chair and table legs
- placing dividers between classroom seating and computer areas
- keeping classroom doors closed.

## Background noise

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- Negotiate noisy and quiet times with neighbouring teachers.
- Ensure the groundsman doesn't do any mowing during class times.
- Try not to raise your voice to compensate-quieten down the class.

## More strategies

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- Don't stand with your back against a window when speaking.
- Stop, look and listen!
- The roving microphone, or tennis ball, or fairy wand, or yarning stick or.....

## More strategies

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- Create a volume control poster.
- Use the same action every time before you speak to the class.

## Teacher benefit from a quiet room...

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- Reduces vocal fatigue
- Teacher heart rate reduced
- Don't have to yell across a loud classroom



## Teacher benefit from a quiet room...

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- Lip patterns stay the same
- Vocal expression and emphasis can be used



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## Student benefit...

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- Student attention may increase.
- Student behaviour may improve.
- Students' learning outcomes may increase.



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## Questions?

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