

# Design Thinking: Protecting the Hearing of Youth

Article: *World Health Organization: Limit Headphone Time To An Hour Per Day*

1. What is the author's claim about earbud and headphone usage in young people?
  - a. What evidence did they use? Do this seem like a good source of information?

## Author's Claim

The author claims that more and more children are experiencing Noise Induced Hearing Damage due to increasing use of headphones and earbuds. Evidence came from a 2011 study in the Journal of the American Medical Association.

2. How do noises damage hearing? Explain using details of ear anatomy.

Little hairs in the cochlea help us to sense sound. When sounds are too loud or sustained for too long, they bend or fold these hairs. They can recover to an extent, but if the intensity is strong enough or sustained for long enough, the damage to the cells can become permanent, leading to hearing loss over time.

3. Why are headphones dangerous for hearing?

Think about how they are used combined with the information in the article.

Headphones and earbuds are dangerous because they are so close to your ears. Sound intensity gets lower very quickly as distance increases. Also, headphones have a lot more applications these days, so kids are using them for more hours in the day.

4. Look at the table in the article.

What is the relationship between *Noise Level* and the *Time Before Damage*? Use actual values in your answer.

With an increase of only 3 dB, the time it takes to cause damage in your ears is cut in half. For example, you can listen to an 89 dB sound for 3 hours before your hearing is damaged. By increasing it only 3 dB to 92dB, the time before your hearing is damaged is cut to 1.5 hours.

5. Explain why earbuds are worse than headphones.

Earbuds are in your ears, so they are that much closer to your eardrums and cochlea. Because intensity decreases or increases according to distance, headphones are not as bad because they are a little bit further away from your ears.

6. Write your reaction below to the Oregon Legislature banning the use of earbuds and headphones in children under 16 years of age.

Reaction

7. **Empathy** - Why should we care about the damage that is being done to young people's hearing?

8. Define the problem

a. Who or what has the problem?

Problem Statement

9. Ideate - How can we protect the hearing of children and young adults?

Brainstorm possible solutions in your notebook. Discuss in your group of choice