

STEM Sharing (15th November, 2021)

By 5A(02) Kitty Cen & 5A(05) Ella Chen

Kitty & Ella: Good morning Ms Cheng, teachers and fellow schoolmates. We are the STEM prefects this year.

Ella: Hey Kitty! What are you doing?

Kitty: Oh Ella! Would you want to try something? I'm going to have you listen to an audio clip and you've got to tell me what you hear!

→ audio https://www.youtube.com/watch?v=7X_WvGAhMIQ

Kitty: What did you hear? Yanny or Laurel?

Ella: It's absolutely Yanny!

Kitty: No! Obviously Laurel!

Ella: How come? We just listened to the same audio! It doesn't make any sense!

Kitty: Don't struggle here, I was about to read the scientific explanation just now. Let's read it together!

Ella: Let me see. The strange, hard-to-explain mystery might have to do with your age. I remember we have learnt in the biology lesson that human ears have the ability to listen to sound frequencies from 20 Hz up to 20000 Hz. And as we age, our ears are less sensitive and less able to hear high frequencies.

Kitty: It also says our brains are unconsciously choosing which frequencies in the recording to pay attention to. So if you're hearing "Laurel," you're likely picking up on the lower frequency. If you hear "Yanny," you're picking up on the higher frequency.

Ella: Ha Kitty! Didn't you just say you heard Laurel? I guess your ears are not functioning well! Is it because you use headphones too often? It's very important to protect your ears!

Kitty: Emm... It seems that the prolonged use of headphones really hinders my hearing. I reckon it's owing to the damage and killing of the sensory hair cells in my ears which are responsible for detecting sound vibrations, like the case in aging ears!

Ella: I know that the damage to sensory hair cells is irreversible. Once we **lose** those cells, they will not be replenished or replaced by new ones.

Kitty: However, with the modern development of technology and science, hearing loss can actually be saved, even for those due to the permanent impairment of sensory cells. Have you ever heard about a technique called cochlear implants?

Ella: Emmm... 'Cochlear implants'... I guess it's related to the cochlea. I mean, the structure inside the ear which plays a key role in the sense of hearing. It contains sensory hair cells to detect the vibrations and produce electrical impulses, which are then transported to the brain to produce a hearing sensation.

Kitty: Wow, you're surprisingly smart today! Indeed, cochlear implants are implants in ears which mimic the normal hair cells' function in the cochlea. The implants generate electrical impulses which are then transported to the brain through the nerves to produce a hearing sensation. This technique especially suits those who suffer from severe hearing loss. However, for those who suffer from mild or moderate hearing loss, instead of undergoing the surgery of cochlear implant, another medical device called the hearing aid would be a better choice.

Ella: Oh, I've heard about this 'hearing aid' before. Unlike a cochlear implant, neither does it require surgery or the transmission of electrical impulses. Instead, the hearing aid uses a microphone, amplifier, and speaker to make sounds louder. This can help one hear things better.

Kitty: Yes! Aren't these technologies gorgeous? The contemporary technologies together with our scientific knowledge on different human mechanisms can indeed shine hope on people with incurable diseases.

Ella: There are still many incurable diseases and impairments nowadays, but I believe with our strenuous efforts in STEM, we will be able to find out the 'panacea' one day!

Ella & Kitty: Thank you!