

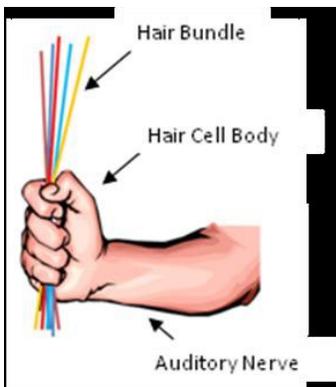
What? I can't hear you! Do you know why?

Hair Cell Model Activity

Scientists cannot always experiment on an actual system or living organism. For example, before scientists sent the first astronaut into space, they built and tested many models. A model is something that represents, but is not exactly the same as, something being studied. The tiny hair cells in the ear are too small to be seen by the unaided human eye. It is important that we do not experiment with a real person's ear and risk hearing loss. So we will be building a "model" of the hair cells of the inner ear and test the impact of sound waves on the model.

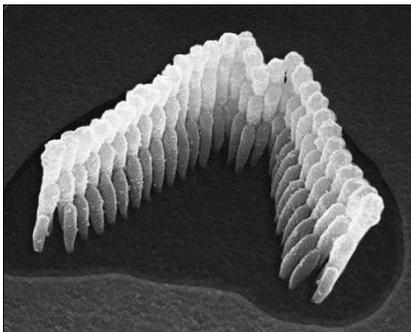
Build your model:

1. Have one student hold out a fist.
2. That student needs to hold 4-5 pipe cleaners up in that same fist as though they were a bunch of flowers. (See image below)

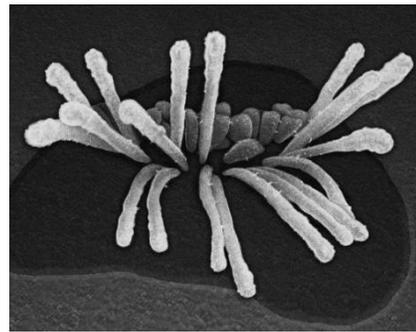


- What does the person's hand represent? _____
- What do the pipe cleaners represent? _____
- What does the person's arm represent? _____
- Do the pipe cleaners represent a healthy hair bundle? _____

Before Loud Sound



After Loud Sound



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Hair Cell Model Activity

Test your model:

1. The teacher will turn music on softly. Students gently move their hand over the top of the pipe cleaners to the rhythm of the music.
2. Moving the hand over the pipe cleaners represents the sound waves. Sound waves produce vibrations strong enough to move objects much larger than microscopic hair cells represented by the pipe cleaner model.
3. The teacher turns the volume of the music up a bit. Students move their hand a little more so that the pipe cleaners move from side to side, without damaging them.
4. The teacher will turn the music up loud enough to be slightly annoying. Students move their hands more vigorously so the pipe cleaners are pushed forcefully and some pipe cleaners start to fall from their hands and to bend over.
5. The teacher turns the music off immediately. Students stop moving their hands over the pipe cleaners.

Questions on the model:

- By looking at the two models of the hair cells, which picture does your model most look like now?
- Can your model (the pipe cleaners) be fixed?
- Remember that the bent pipe cleaners represent very tiny hair bundles. Do you think that doctors can repair those hair cells after they are broken by sounds?
- What are some sounds that would be loud enough to damage these hair cells?
- How can you protect your ears?