Sound Matching

Overview: You know that sound comes from vibration of sound waves as they travel through materials. These vibrations are picked up by the pinna (external part of the ears). Then the vibrations vibrate your tympanic membrane, which in turn vibrates the ossicles and then the cochlea. The cochlea sends information through the auditory nerve and sends it to the brain, which recognizes it as sound. In this lab, you will test your ability to sort and match different sounds.

Materials

- film canisters (10)
- beans
- rice
- sawdust (or pencil shavings)
- paperclips
- pennies
- marker
- assistant

Experiment

1. Take the caps off the canisters. Number half of them 1 to 5 and mark the others with A through E.
2. Prepare your experiment while your partner is out of the room. Fill five of the numbered containers with one of the materials. Note which canister contains each material for data records.
3. Next, fill the lettered containers. Be sure to record which container contains which material for reference.
4. When the contents have been noted and the lids all replaced, bring your partner into the room. Ask them to match the sound of the item in the first canister with one of the lettered containers. They can shake, roll, and even drop the containers, but they can't take off the lid. Note the answer they give.
5. Repeat step 4 for the rest of the numbered containers. Remember to record the responses. When the canisters have all been matched, take off the lids and see how well they did.

Sound Matching Data Table

Item/Object	Can #	Can Letter	Correct?

Reading

Objects produce distinct sounds when they vibrate. These differences can sometimes be distinguished by your ears. If your partner has good ears, listening closely and then correctly matching the contents was probably an easy task.

Now to share a little more about the cochlea: You know it ultimately receives sounds and sends signals to the brain. It is a small organ shaped like a spiral. It's filled with fluid and tiny cells which are shaped like hairs. These hair-like cells convert the vibrations from sound into signals that can travel the auditory nerve up to the brain. The tiny cells are quite sensitive. They can actually be damaged by extremely loud noises, so remember to protect them with earplugs if you will be exposed to very loud sounds.

Did you know that the tiniest bones in your body are found in your ear? They are called ossicles, and include the hammer, anvil, and stirrup. They are located just behind your eardrum and collect the vibrations that come into the ear canal and hit your ear drum. When your ear drum begins to vibrate, the tiny bones vibrate as well. This causes your cochlea to vibrate as well, and it sends a signal to your brain for it to interpret.

Exercises

1. What are the tiny bones in the ear called?
2. Name some other parts of the ear.

Answers to Exercises: Sound Matching

1. What are the tiny bones in the ear called? (ossicles: hammer, stirrup and anvil)
2. Name some other parts of the ear (pinna, ear canal, ossicles, cochlea)