Teacher's Guide

How does the ear work?

Motivation: Guessing a mystery sound. The teacher can just tape these sounds for convenience. This should be conducted in less than 5 minutes.

1. Begin the discussion with a question, "Do you know how our ears work when we hear a sound?" Try to see pupils' prior knowledge about the physiology of the ear but do not tell them if their answers are correct or not.

2. Make the pupils describe their classmates' external ear or let them draw the external part (pinna) so that the question, "Why do you think the ear is shaped that way?" can be asked. **(Science Idea: The pinna catches the sound).**

3. Ask them about the hole (ear canal) they see in their classmates' ears. Ask them, "Why is there a hole in our ears?" **(Science Ideas: The ear canal allows the passage of sound waves towards inner parts)**.

4. Distribute the eardrum model first to each group. Do not give the box to the pupils yet in order to prevent them from playing with it.

5. Afterwards, distribute the activity sheet.

6. Tell the class to position the eardrum model in an erect position as shown in the picture.

7. Tell them to make a sound by tapping the box with their fingers only. Watch the video first to show how to tap the box near the model. The video is for teachers only.

8. Afterwards, tell them to answer the questions in the answer sheet.

9. Discuss the answers afterwards. Affirm the right answers. If there are wrong answers ask another pupil and see if he or she can correct the previous answer.

10. If they have already answered 'eardrum' as the part represented by the plastic sheet, try asking the class, "What is the function of the eardrum based on this ear model?" Usually this might be too hard for grade 3

pupils. If they cannot answer it yet, proceed first to the question, "What part was represented by the pingpong ball?" and the question "What happens to this ear part when we hear a sound?"

11. Try addressing again the function of the eardrum if they cannot state it directly. Ask the question, "Which part of the eardrum model receives the sound? the plastic sheet or the pingpong ball?" If they answered plastic sheet, relate this to the parts of the ear by asking, "If the plastic sheet receives the sound in the eardrum model, which ear part receives the sound?" So affirm the response of the pupil when they answer "eardrum". Sometimes, pupils have poor communicating skills but if the teacher feels that they can express their ideas fully, the question, "What do you think is the function of the eardrum?" can be repeated. Be sure that these questions are asked only if they have answered the questions in 1a. b. and c. and in 2. a. b. c. and d. **(Science Idea: The eardrum receives the sound)**

12. Then ask the pupils, "From the eardrum, to what ear part were the vibrations transferred?" The teacher can emphasize the ear diagram in the activity sheet so that the student will be able to say that the vibrations were transferred to the earbones. If the pupils still cannot answer it, then ask the question, "If the ball moves while the plastic sheet vibrates then to what ear part were the vibrations of the eardrum transferred?" If they have answered, "to the ear bones" then ask them using the ear diagram, "Where do you think the vibrations in the earbones will be transferred to?" Or ask, " After the earbones vibrate, what is the next part where the vibrations will be transferred to? **(Science Ideas: Vibrations from the eardrum are transferred to the earbones (or the ossicles, namely, the hammer, the anvil and the stirrup). The vibrations in the earbones are transferred to the cochlea.)**

13. State that the vibrations are not transferred to the auditory nerve. Instead, state that the auditory nerve sends messages to the brain after the vibrations are received from the cochlea.

14. Encourage the use of vernacular (language used in the locality) in expressing their answers.

Possible Answers:

1. a. The plastic sheet vibrates.
   Possible pupils' answers: "*Nanginginig*" (referring to vibrations)
   b. The pingpong ball moves
   Actual tryout: "*Nanginginig*"
   c. The sound makes the plastic sheet and the pingpong ball move
   Possible pupils' answer: Sound
2. a. The eardrum
   b. The eardrum moves/ vibrates
   c. The ear bones
   d. The ear bones move/vibrate
   e. The eardrum can be damaged and not be able to vibrate. When this happens one will not be able to hear.

Physical manipulatives in teaching science

The use of physical manipulatives helps pupils construct representations of concepts and even resolve misconceptions (Krontiris-Litowitz, 2003). Incorporating manipulative models as an integral part of delivering the lesson has been shown to improve pupils' understanding of concepts with more depth, especially for complex subject matters in science (McLaurin, Halverson & Boyce, 2013).

References:

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