LAB Title: Transmitting Sound

Question/Problem: How does changing the medium from a gas to a solid affect sound waves?

Hypothesis: If I time how long I hear the sound from a tuning fork, through the air and through bone, **then**

Materials: Worksheet for gathering data
Tuning Fork
Timer

Experiment Procedure (numbered steps):

Background: In some cases, tuning forks are used as part of a hearing test (similar to the Rinne test). One test compares your perception of sound waves transmitted through air to those transmitted through solid bones. The mastoid process is one part of the bone surrounding your ears. It is located a few centimeters behind your ear. Touch two fingers just below your earlobe and move them behind your ear to locate the mastoid process.

1) Select one partner to use the tuning fork first, and the other partner to use a timer first (use a stopwatch on your computer).
2) The student with the tuning fork will activate the fork and, holding the tuning fork by the stem, immediately place it right next to his or her ear. *(**Note:** The forks should be pointed up toward the ceiling. Do NOT allow the tuning fork to touch the ear or head.)* At the moment the tuning fork is placed next to the ear, the other student should start timing. When the student with the tuning fork no longer hears any sound generated by the tuning fork, he or she should signal to the other student to stop timing. How long did the sound last? Use the row labeled “Air Transmission” ***(Student Sheet 7.1)*** to record time for the appropriate student.
3) Switch the person using the tuning fork and timer and repeat the previous step. Continue until each partner has 2 “Air Transmission” times.
4) Repeat Steps 2 and 3 to collect times for “Bone Transmission”. Instead of holding the tuning fork in the air, touch the base of the handle against the mastoid process (teacher will demonstrate). Use the row labeled “Bone Transmission” to record time for each partner.

OBSERVATIONS and DATA:

All data will be gathered on “Student Sheet 7.1”.
Look at the data you recorded on your student sheet.
Do you notice any patterns in the data? (Write those observations here)

Analysis:

Discuss the following with your group. Write your answers below each question.

a. Look back at the hypothesis your recorded. Was it correct?

b. How did the sound you perceived differ when the tuning fork was held to your mastoid process rather than next to your ear? Consider wave characteristics like amplitude, frequency and wavelength.

c. Which medium allowed you to perceive sound for a longer period of time?

d. Consider the different types of matter through which the sound waves had to travel for each test. Do you think properties of the medium affect the transmission of sound waves? Why or why not?

Conclusion (RERUNS):

NO CONCLUSION - there will be an EXIT QUESTION on Google Classroom.