**Ben Sherrill**  
**Physical Science**  
**Grade: 2-4**  
**Sounds and How They Travel**

**Objective:**  
This lab is intended to teach the students which state of matter sound travels the best through. It is a fun, hands-on activity that everyone can take part in without having too much down time. This experiment was taken from the science book that my 4th graders learn from. (*Harcourt Science Teacher's Edition*)

**QCC Standards:**  
**Standard (#12):** Describes sources of sounds and how sounds move through different kinds of matter. Compares how different sounds move through air, water, rock and similar materials.  
**Standard (#13):** Defines sound and identifies its properties. Observes that sound is produced by vibrations.

**Materials:**  
This lesson can be completed in approximately 1 class visit. I grouped the children into groups of 4, but a group of any number up to 6 would work well.

- 4 balloons (non-water balloons, 1 per group)  
- 4 tuning forks (1 per group)  
- 4 Desks (1 desk per group)  
- Water  
- Paper and pencil for each student to record observations

**Safety:**  
There isn’t too much to worry about with this experiment except that you have to give each group a balloon full of water. Be careful and stress the fact that they can’t pop the balloons or water will get everywhere. Close supervision is suggested.

**Preparation:**  
Little preparation is required. The only step that the teacher needs to do is to fill up the balloons with water.
Procedure:

Before passing any of the materials to the groups, ask the students the following question: “What type of matter does sound travel the best through?” Give them 3 choices: Air (gas), Water (liquid), or Wood (solid). Just take a simple poll to see what the students think. Then tell them that today’s experiment will solve this question. Pass the materials out to each group and tell them to start with Air. Have one student from each group hit the tuning fork on the desk, and then hold it in the air. Tell the students to write down if the sound they heard was loud, soft, or in between (or whatever word they want to use to describe it). Next, have a student from each group strike the tuning fork onto the desk and hold the bottom end onto the water balloon. Let the students take turn listening to the sound by putting their ear on the opposite side of the balloon. Once every student has had an opportunity, tell them to write down if that sound was louder or softer than the first sound. Finally, ask a student in each group to strike the tuning fork against the desk and then hold the correct end against the desk. Then have the students listen one at a time by putting their ear to the desk. Make sure there aren’t too many people touching the desk, because this could potentially make the sound weaker. Ask the students to write down if this sound was louder or weaker than the previous one. Once everyone is done, take the same poll again that you did earlier. See if any students changed their minds, and then ask some of them why. Once you have finished, explain to the students that sound travels the best through a solid (the desk), then better through a liquid (the water balloon), and the weakest through a gas (the air). I am assuming that the students already know that sounds are vibrations. Explain to them that vibrations travel when one molecule of a substance strikes the molecule next to it and so forth. Then explain that the closer the molecules are together, the better the sound will travel. Since the solids have molecules that are the closest, sound travels the best through them.

Possible questions:

Why does sound travel better through a solid?
Why are sounds harder to hear underwater?
When does a sound stop?
Can we hear sounds in space?

Assessment/Evaluation:

Ask questions in conclusion to the lesson. Ask what the student learned and how they learned it. Also, it may be useful to draw simple diagrams as shown below of how matter looks at the atomic level in order to show how close molecules are to each other.