**Sound Lab #** **Sound Vibrations Travel**

**Date: Name & Partners:**

**Purpose**: To observe that sound is made of vibrations that travel and cause movement.

**Hypothesis**: I predict that the sound vibrations of the tuning fork will affect the salt \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Materials:**

-10 X 10 plastic wrap -small yogurt container -measuring spoons

-1 ml of salt -tuning fork -250 ml of water

**Procedure**:

1. Stretch a piece of plastic wrap over the top of a yogurt cup and tie with an elastic band.
2. Sprinkle a few grains of salt onto the plastic wrap.
3. Hit the tuning fork once on the edge of your shoe. Listen. Now hold the tuning fork close to the salt without touching it. What do you hear? What do you feel? Draw a picture of what you see.
4. Hit the tuning fork two times on the edge of your shoe. Listen. Now hold the tuning fork close to the salt without touching it. What do you hear? What do you feel? Draw a picture of what you see.
5. Hit the tuning fork once on the edge of your shoe. Listen. Now hold the tuning fork close and touch the plastic wrap with the tuning fork. What do you hear? What do you feel? Draw a picture of what you see.
6. Repeat these steps but this time fill the container with water (remove the salt). Fill out the chart.
7. Complete the table, illustrate observations and explain results.
8. Refer to your original hypothesis, confirm or refute whether correct or not and why in your conclusion

**Observations**: Answer the questions in complete sentences after filling out the chart.

How can sound make the salt or water move?

What difference did it make when you hit the tuning fork on your show more than once?

What happened when you touched the side of the yogurt container with the tuning fork? Explain why this happened?

What do you think makes the sound of the tuning fork?

|  |  |  |  |
| --- | --- | --- | --- |
| Action | I heard: | I felt/saw | Picture |
| Tuning fork struck once and held close to salt (no touching) |  |  |  |
| Tuning fork struck twice and held close to salt (no touching) |  |  |  |
| Tuning fork struck once and touching plastic wrap |  |  |  |
| Tuning fork struck twice and touching plastic wrap |  |  |  |
| Tuning fork struck once and held close to water (no touching) |  |  |  |
| Tuning fork struck twice and held close to water (no touching) |  |  |  |
| Tuning fork struck once and touches container. |  |  |  |
| Tuning fork struck twice and touches container. |  |  |  |

**Conclusion**: My prediction was

**Sound Lab #** **Yogurt Cup Telephones**

**Date: Name & Partners:**

**Purpose**: To investigate how string thickness can affect how sound resonates through a telephone receiver.

**Hypothesis**: I predict that \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ the string will make sound waves \_\_\_\_\_\_\_\_\_\_\_ and more clear.

**Materials:**

-2 plastic yogurt cups with a hole in the bottom

-one 1 metre string -one 1 metre of fishing wire

-one 1 metre of hemp line -one 1 metre of dental floss

**Procedure**:

1. Thread one end of string through the hole of one of the containers. Tie a large knot at the end of the string (so that the string cannot be pulled through the hole). Repeat the same to the other end through another cup.
2. Hold one end of this telephone. Have your partner take the other end and go as far as possible until the thread is stretched tight.
3. Take turns talking and listening on the telephone. Record the results of what you hear (clear, loud, soft, muffled?).
4. Repeat each of these steps with all the types of string: hemp line, fishing wire and floss. Record the results.
5. In your observations, which material receives the most clearly. Describe the properties of each material-how does the thickness affect the volume?

**Observations**: Answer the questions in complete sentences after filling out the chart.

Can you hear your partner talk through all the different types of string?

Is it louder or quieter when the string is not tight? Why or why not?

Which material resonates the best? Why do you think that is?

**Conclusion**: My prediction was

|  |  |  |  |
| --- | --- | --- | --- |
| **Material** | **Describe properties & draw illustration** | **Describe** how loud, clear, and sound when **the string is tight** | **Describe** how loud, clear, and sound **when the string is loose** |
| **string** |  |  |  |
| **hemp line** |  |  |  |
| **floss** |  |  |  |
| **fishing line** |  |  |  |

**Sound Lab #** **Muffled Music**

**Date: Name & Partners:**

**Purpose**: To observe that some materials absorb sound better or keeps sound from travelling through certain materials.

**Hypothesis**: I predict that certain materials such as \_\_\_\_\_\_\_\_\_\_\_\_ will insulate the sound so it can not be heard and materials such as \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ will be heard because sound can pass through and be heard because it does not absorb sounds well.

**Materials:**

-tape recorder -cassette or music device

-box with a lid -variety of materials: cotton batting, cloth, torn newspaper, popcorn

**Procedure**:

1. Brainstorm a list of reasons why people sometimes try to reduce, or muffle sounds? What are some ways to muffle sounds?
2. Play music and observe properties: sound, pitch, tempo, dynamics etc.
3. Place the music device in a box surrounded by cotton batting. Put the tape recorder in the box. What do you hear outside of the box. Play the recording device. Did the cotton batting absorb the music by blocking the sound, make it sound muffled or distorted, or was it heard clearly? Fill out your chart.
4. Repeat steps for all the materials and record observations.

**Observations**: Answer the questions in complete sentences after filling out the chart.

Why do people try to reduce or muffle out sounds?

What kinds of materials would be good to use to insulate sound (keep sound from travelling through)?

Why is it important to test the sound of the music recorder prior to performing the experiment?

Which materials absorbed the sound better? Which materials did not absorb the sound well? Explain why or why not.

**Conclusion**: My prediction was

Observations:

|  |  |  |
| --- | --- | --- |
| **Describe the properties of sounds heard outside of the box** | **Describe the properties of sound inside the box (recording**) | **Explain if this material would be a good insulator (block out sound). Why or why not?** |
| cotton batting: |  |  |
| newspapers: |  |  |
| cloth: |  |  |
| popcorn: |  |  |
| Styrofoam: |  |  |

**Sound Lab #** **Sounds and Solid**

**Date: Name & Partners:**

**Purpose**: To observe that sound reflects or bounces off different surfaces (such as walls) and if it bounces back it is called an echo.

**Hypothesis**: I predict that certain surfaces like \_\_\_\_\_\_\_\_\_\_will absorb the sound and won’t be heard as clear and other surfaces, like \_\_\_\_\_\_\_\_\_ will have sounds bounce back like an echo.

**Materials:**

-2 long paper rolls -5 books -measuring spoons -cardboard -cloth

-metal cookie sheet -clock/ ticking watch -cotton batting

**Procedure**:

1. Pile the books on a table and lean the cookie sheet against the books.

2. Place 2 cardboard tubes in front of the cookie sheet as shown in the picture. Make sure the tubes are not touching each other and position them so they are about 3 cm away from the cookie sheet.

3. Put the clock or watch close to the end of one tube. This tube will now be your sound tube and the other tube will be your listening tube.

4. Put your ear near the end of the listening tube that is away from the cookie sheet. Listen for the

ticking sound. Change angles of the tubes until you can hear clearly. Use pieces of tape to mark the

placement of both tubes.

5. Now look at the angle each tube makes with the cookie sheet. What do you notice? Document in your observations.

6. Repeat the procedure by placing each item in front of the cookie sheet, adjusting tubes and noting the angle and clarity for each: cotton batten, cloth, cardboard, one solid of your choosing. Can you still hear the ticking? How loud? Soft? Clear? Muffled? Echo?

**Observations**: Answer the questions in complete sentences after filling out the chart.

Which materials insulated the sound (keep sound from absorbing through a material/ or wasn’t heard clearly)?

What difference did the position of the card board tubes make? Were certain angles hitting the surface different sounding? How?

**Conclusion**: my prediction was

|  |  |  |  |
| --- | --- | --- | --- |
| **Materials**  **(illustrate and colour each solid surface)** | **Properties of sound (Absorbed, echo or muffled, loud, soft, clear)** | **Angle of listening tubes**  **(what degree or angle did they work best )** | **Picture**  **(illustrate angle of tubes that worked best for each)** |
| Metal cookie sheet |  |  |  |
| Cotton batten |  |  |  |
| Cloth |  |  |  |
| Cardboard |  |  |  |
| Your choice: |  |  |  |

**Sound Lab #** How Can Vibrations Be Musical?

**Date: Name & Partners:**

**Purpose**: To observe how music can be made by vibrations from the body or simulate how a kazoo can work like a woodwind instrument.

**Hypothesis**: I predict that the sound vibrations of the paper will be affected by my body when I do \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Materials:**

-10 X 10 tissue paper -elastic bands

-hole punch -card board tubes

-colours (toilet paper or paper towel roll)

**Procedure**:

1. Punch a hole near the top of a cardboard tube.
2. Use an elastic band to hold the tissue paper over the end of the tube opposite of the hole.
3. Sing into the open end of the tube. Record you observations of what you hear and see. What causes those sounds?
4. The loudness of sound is called the volume. Sing louder into the tube. How does this change what you see and hear?

**Observations**: **Answer the questions in complete sentences, draw and colour illustrations to support your understanding of concepts**:

1. Explain how sound is like a wave.
2. What makes vibrations when you talk? Touch your neck, where do you feel the vibrations. Explain.
3. How did you make your kazoo sound louder and softer?
4. List and explain 2 ways you can make your kazoo sound louder and softer.
5. Describe how the kazoo is the same and different form regular instruments.

Illustrate, colour and show by using arrows and explaining by using a caption:

**Draw you kazoo from a side view: label the parts of your instrument (include the hole)**

**Illustrate your kazoo when you sing into it: the air flow using arrows, where the kazoo is vibrating to make sound**

**Conclusion**: My prediction was