PS Physics **Sound Stations Lab Activity** **Names(s)_____**

Objectives

Compare sounds created by different objects and mediums;
Determine sound intensity and duration in different mediums.

Materials

Station 1

3 wine glasses with various amounts of water

Station 2

various size tuning forks rubber mallet
stop watch 2 large beakers filled with water

Station 3

2 cups with strings between them 2 space phones

Station 4

8 jars with different amounts of water
something to strike jars with

Station 5

2 whirling sound tubes

Station 6

Boomwhackers set tuning forks (288 Hz, 320 Hz, 341.3 Hz, 384 Hz, 426.7 Hz, 480 Hz)
rubber mallet

Procedure

PLEASE FOLLOW THE DIRECTIONS CAREFULLY STEP BY STEP

Singing Glasses-Activity station #1

1. Hold the bottom of a partially filled wine glass with one hand. Wet the top rim of the glass and run your finger around the edge quickly.
2. Answer question #1.
3. Choose two glasses with different amounts of water in them and repeat the procedure. PLEASE HOLD THE BOTTOM OF THE GLASS!
4. Answer question #2 and question #3.
5. If time permits try to set up a musical scale.
6. Mix glasses up before you leave the station.

Tuning Fork-Activity Station #2

1. Strike the prongs of the large tuning fork sharply with a rubber mallet. Observe the loudness of the sound and use the stopwatch to measure the length of time it can be heard before it "dies away."
2. Answer questions #1 and #2 on activity sheet.
3. Strike the same fork again. This time hold the rod end firmly against a tabletop. Observe the loudness of the sound and use the stopwatch to measure the length of time it can be heard.
4. Answer questions #3 and #4 on the activity sheet.

5. Strike the large tuning fork sharply against a large rubber stopper. Put the tuning fork into water and observe what happens.
6. Do the above procedure again using the smaller tuning fork and observe what happens.
7. Answer question #5 on the activity sheet. If you need to repeat the process to answer the question please do so.
8. Please dry tuning fork thoroughly.

"Telephone" Sound-Activity Station #3

1. One person should hold a cup to their ear and the other partner should talk into the other cup. Make sure the string is tight but do not pull the string out of the cups!
2. Answer questions #1-#3 on the activity sheet.
3. Use the special Space Phone as you did the cups.

Sound Bottles-Activity station #4

1. Answer question #1 on the activity sheet.
2. Gently strike the side of the bottle with the metal spoon.
3. Answer question #2.
4. Experiment with where you strike the bottle. Answer question #3.
5. Strike the bottles carefully noting which bottle has the highest pitch and which has the lowest.
6. Answer questions #4 and #5.

Sound Tubes-Activity station #65

1. Take sound tube and slowly twirl it above your head.
2. Answer question #1.
3. Increase the speed of the tube.
4. Answer question #2.
5. Change the direction you spin the tube.
6. Answer question #3.
7. Change the end of the tube you are holding (hold the other end) and do all of the above steps again.
8. Answer question #4.
9. Choose the end of the tube to hold that worked the best and try lifting the tube up and down when you spin it.
10. Answer question #5.
11. Go to station #7 when told to do so, you will be sharing this station with another group.

Boomwhackers-Activity station #6

1. Remove all black caps from the ends of the Boomwhackers.
2. Whack two different tubes against your upper leg.
3. Answer question #1.
4. Repeat step 2, comparing tubes of different lengths.
5. Answer question #2.
6. Cap one end of a tube and whack again.
7. Answer question #3.
8. Strike a 288 Hz tuning fork and hold it just on the inside end of the tube marked D.

9. Answer question #4.
10. Strike the following tuning forks and hold each one just on the inside of the corresponding tube.

Tube (scale)	Tuning Fork Frequency
D	288 Hertz
E	320 Hertz
F	341. 3 Hertz
G	384 Hertz
A	426.7 Hertz
B	480 Hertz

Assessment

Activity Station #1

1. What type of sound did you produce? What did it sound like?

2. Which glass had the highest pitch sound? Did it have more or less water?

3. What do you believe caused the sound, the water, the air, or the glass?

4. Were you able to set up a musical scale? If so, how did the amount of water and pitch compare?

Activity Station #2

1. What was the relative loudness of the tuning fork, was it loud or could you barely hear it?

2. Using the stopwatch, how long does it take for the sound to die out so you can no longer hear the tuning fork?

3. What is the relative loudness now, was it loud or could you barely hear it?

4. Using the stopwatch, how long does it take for the sound to die out so you can no longer hear the tuning fork?

5. Which tuning fork spilled the most water? WHY?!

Activity Station #3

1. How is sound transferred from one cup to the other?

2. What is the medium that it is being transferred in?

3. Sound waves are what type of wave?

4. Why did the sound transmit better with the special "telephone?"

Activity Station #4

1. What will happen if you strike the bottle with a metal spoon?

2. What vibrated to make the sound you heard?

3. Where did you hit the jar to give the best sound?

4. Write a hypothesis concerning which bottle will have a higher pitch and which will have a lower pitch.

5. Was your hypothesis correct? Which bottle had the highest and which had the lowest?

Activity Station #5

1. What did it sound like? What type of sound did it make?

2. Did the sound change when you increased the speed? What did it sound like?

3. Did changing the direction change the sound?

4. Did changing the direction of the tube change the sound?

5. Write a statement explaining how best to get sound from the tubes.

Activity Station #6

1. Which tube produced a lower tone (longer or shorter of the two tubes)?

2. Why do you think the longer tubes produced lower tones?

3. How does the tone of the caped tube compare to the open tube?'

4. The tube resonates with the tuning fork, what does that tell you about the frequency of the tube?