

Musical Instruments

Question Page: Write down all of your observations and answers on this sheet.

Station A Rubber Bands

1. Describe your observations. Does the sound and pitch depend on the band size or shape or thickness? Does it depend on the tension? In what way? Be specific.
2. Now explain your observations. Why should size/shape/thickness make a difference, if any? Why should tension make a difference, if any?

Station B Glasses

3. Describe your observations. Compare a glass without any water to a glass with water. Then compare a glass with less water to a glass with more water. How is the sound/pitch different? Be specific.
4. Now explain your observations. Why should the presence of water make a difference, if any? Why should the amount of water make a difference, if any?

Station C Hanging Pipes

5. Describe your observations. Does the sound and pitch depend on the size of the pipe?
6. Now explain your observations. Why should size make a difference?

Station D Twangers

7. Describe your observations. Compare the metal strips to each other: How were the sounds/pitches different? Compare the wood strips to each other: How were the sound/pitches different? Be specific.
8. Now explain your observations. Why should some strips make a different sound than others? What really makes the difference: the total length of the strip, or the length that actually extends out beyond the block?

Station D Empty Containers

9. Describe your observations for the brown cardboard containers. What differences/patterns did you notice about the sounds/pitches produced?
10. Describe your observations for the plastic containers. What differences/patterns did you notice about the sounds/pitches produced?
11. Now explain your observations. Should depth of the container matter? Why or why not? Should width or some other shape measurement matter? Why or why not?
12. Does the tightness of the rubber sheet make a difference? Why or why not?

Follow-Up Questions

Look back over all of your answers. At each of the five stations, something made the HIGHEST pitch, and something else made the LOWEST pitch.

13. What can you find in common for most or all of the items that produced the HIGHEST pitch? Explain.
14. What can you find in common for most or all of the items that produced the LOWEST pitch? Explain.
15. Name a musical instrument or musical device (not electronic ones) that would be found in a band or orchestra and would use the same method or design as the items in...

...Station A

...Station B

...Station C

...Station D

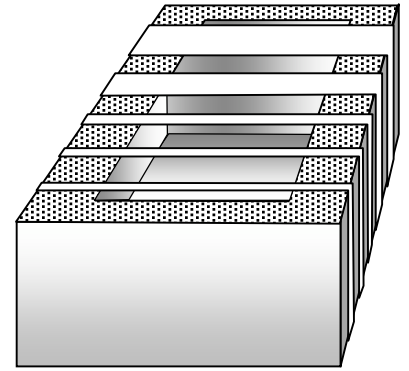
...Station E

Station **A** Rubber Bands

- Materials:**
- *four or five rubber bands of different sizes*
 - *a small clear plastic box*

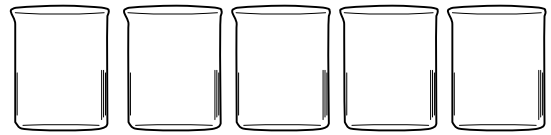
Procedure:

1. Carefully stretch the rubber bands around the box so that each band stretches across the **opening** of the box. Be careful that you do not break any of the rubber bands. And make sure each band is wrapped **evenly** around the box, so that the band is not stretched more tightly in one place than in another.
2. Pluck each of the rubber bands with your finger, one at a time. Study the sounds and pitches produced by each of the rubber bands.
3. Try changing the tension in each rubber band across the opening (make it slightly tighter or looser). Careful — don't break the bands. Pluck the bands again and notice any changes in their sounds. Look for any patterns.
4. Answer the questions on the **Question Page**.
5. Take the rubber bands off the box.



Station **B** Glasses

- Materials:**
- four or five identical glasses or beakers (all empty)
 - a faucet and sink (for getting water)
 - a wooden stick



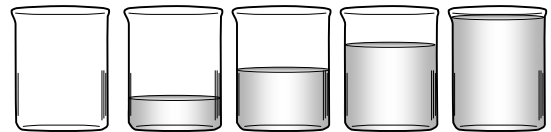
Procedure:
Part 1

1. Set up the glasses in a row on the black table top. They should not touch each other, and all of them should be completely empty (no water).
2. Tap the side of each glass gently with a pencil or wooden stick, one at a time. Study the sounds and pitches produced by each of the glasses. Notice that the sounds are slightly different.
3. While the glasses are still empty, arrange the glasses by pitch — from low pitch to high pitch, as shown in the picture at the right.



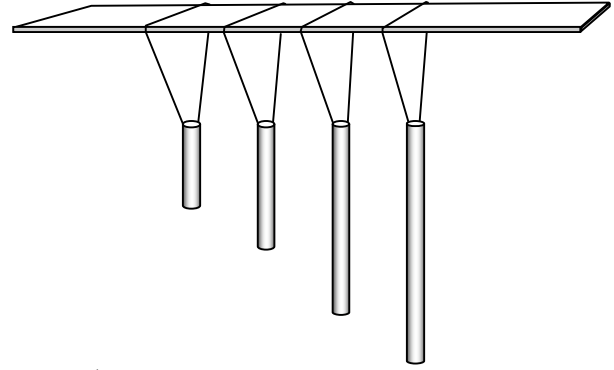
Part 2

4. Now add increasing amounts of water to the glasses as shown in the picture. Glass # 1 should be empty, and glass # 5 should be nearly full.
5. Again, tap the side of each glass gently. Study two things:
(a) how a glass with water sounds different from a glass without water, and
(b) how a glass with more water sounds different than a glass with less water.
6. Answer the questions on the **Question Page**.
7. Pour out the water so that the glasses are empty again. Clean up any spills.



Station **C** Pipes

- Materials:**
- *four pipes tied to strings*
 - *a wood stick*
 - *a metal spoon*

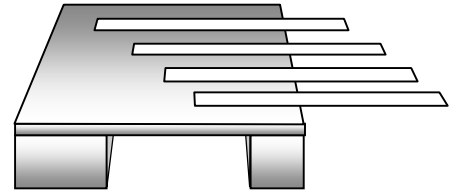


Procedure:

1. Start with only the **pipes**. Do **not** hang the pipes yet. Hold the open end of each pipe close to your mouth, and blow across the top of the opening. Listen for the sounds produced by each pipe.
2. Now hang each pipe along the stick as shown in the picture. Hold up the stick horizontally so that the pipes hang freely below the stick. Make sure the pipes are not touching anything. (Also make sure the pipes are not touching each other).
3. Use a metal spoon to gently tap the pipes, one at a time. Compare the sounds and pitches produced by each of the pipes.
4. Take the pipes off the stick and lay them out on the table ***separately*** from each other. Do not let their strings get tangled with each other.
5. Answer the questions on the **Question Page**.

Station **D** Twangers

- Materials:**
- Four strips of metal and four strips of wood fastened to a wood block.

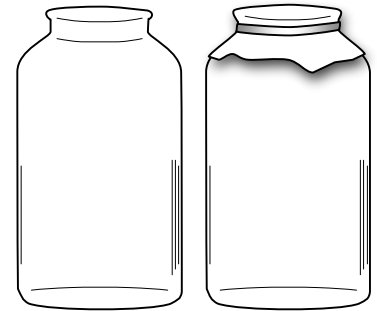


CAUTION: Some of the strips may have sharp edges.

Procedure:

1. Gently pluck the metal strips with your thumb, one at a time. (Don't bend the strips out of shape!) Compare the sounds and pitches produced by each of the metal strips.
2. Gently pluck the wood strips with your thumb, one at a time. (Don't break the strips!) Compare the sounds and pitches produced by each of the wood strips.
3. Answer the questions on the **Question Page**.

Station **E** Empty Containers



- Materials:**
- three **brown cardboard** containers with lids
 - several **plastic** containers
 - four yellow rubber sheets (cut from dishwashing gloves)
 - four or more rubber bands

Procedure with the brown cardboard containers:

1. Notice the shapes of the brown containers. Think: Do they have different diameters? different heights?
2. Make sure each brown container has its white lid attached. Gently tap the lid of each container like a drum (use your finger or a pencil eraser). Compare the sounds and pitches produced by each container.

Procedure with the plastic containers:

3. Pick up one of the plastic containers in your hand and tap it against the table top. Try this with each plastic container. Compare the sounds and pitches produced by each container.
4. Cover the opening of each container with one of the rubber sheets. Secure each sheet with a rubber band so that the rubber sheet is tight across the container opening. You will need to pull the sheet from opposite sides to make it tight and get out the wrinkles.
5. Now use a pencil eraser to tap the rubber sheet like a drum. (Do not use the point of the pencil!) Compare the sounds and pitches produced by each of the containers.
6. Choose just one of the containers, and try slightly tightening or loosening the tension in the rubber sheet on that container. (Don't pull it too tight – it will pop off!) Notice if there are any differences in the sounds produced when you change the rubber sheet tension.
7. Answer the questions on the **Question Page**.
8. Take the rubber sheets and rubber bands off the containers.

