

Monday Morning Science Blast

GLUBA

Children learn at an early age how to produce sound. At first they use their mouth and blowing on fingers and arms to make a variety of sounds. In time they learn how to form words and begin to speak. As children grow they continue to investigate sound. They discover that clanging metal objects together sounds different than banging wooden sticks together. This stimulates continued research into sound production. Sometimes well-meaning family members provide noise producing toys for children to play with. These people somehow think this is good. However, I can remember as a parent the agony that such noise makers produced as my children played with their toy, sometime for hours.

Because sound is so easy to produce and variations of sound are easy to create it is a great topic for the science classroom. There are many interesting investigations that focus on sound and its characteristics. “Gluba” is one such activity. In this activity students construct a glove tuba, or “Gluba,” and then investigate the sounds that can be produced by this simple instrument. To make a Gluba, you need a plastic straw, a short length of PVC pipe, a latex glove, masking tape, scissors and a plastic straw. To assemble the Gluba, put the pipe about 1 inch into the glove and use the rubber band to hold the glove securely to the pipe. Next, cut a small hole in the end of one of the fingers of the glove. Insert the straw into the opening and tape it securely with the masking tape. Stretch the glove out and up the base of the tube, forming a tight membrane over the end of the tube. Finally, inflate the glove by blowing air into the glove via the straw. Once there is enough air, the membrane will begin to vibrate and produce sound.

Sound is produced through vibration – when you speak, you can feel your throat vibrating. By stretching the glove over the opening of the tube, you create a membrane which vibrates when air is forced through the glove. The pitch (how high or low the sound is) depends on the number of times per second (hertz) that the membrane vibrates. More tension (stretching the glove tighter) makes the membrane vibrate at a higher frequency, producing a higher pitch. The size of the tube and the membrane also affect pitch. A larger or thicker membrane with the same tension would produce a lower frequency, resulting in a lower pitch.

There are many variables that students can alter including the tension of the glove, putting a finger or thumb over the top of the pipe as they are blowing, changing the length of the tube, varying the pressure of their breath as they blow, and using a pipe of different diameter. The important thing is that the students be encouraged to try as many variations as possible and find out how the sound produced changes. Some students may even be able to play a simple song with the Gluba.

Gluba

QUESTION: What causes sound?

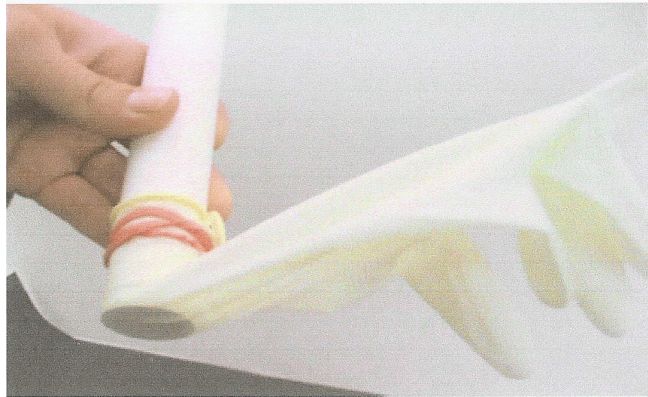
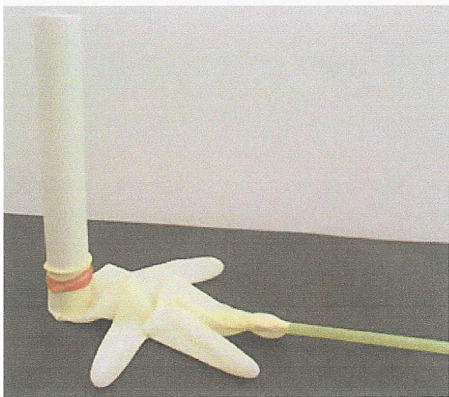
MATERIALS:

rubber band
scissors
plastic straw

masking tape
latex glove
1" PVC pipe - 6" length

PROCEDURE:

1. Place about one inch of the pipe or tube into the glove opening and attach it with a rubber band. The glove should hang freely from the pipe.
2. Cut a slit in the end of one of the glove fingers.
3. Insert a straw at least one inch into the slit and tape securely with masking tape.
4. Stretch the glove over the pipe opening and up along the side of the pipe, forming a tight membrane like the head of a drum.
5. Blow into the straw to inflate the glove. Once there is enough air in the glove, the membrane will vibrate.



QUESTIONS:

1. What causes the sound as you blow air through the glove?
2. What can you do to change the pitch of your Gluba?
3. What happens to the pitch if you stretch the glove tighter? Why?
4. What happens to the pitch if you loosen the glove? Why?
5. What happens if you put your finger over the top of the tube as you play?
6. What other variations can you think of to try? Brainstorm with a partner and try as many as possible?