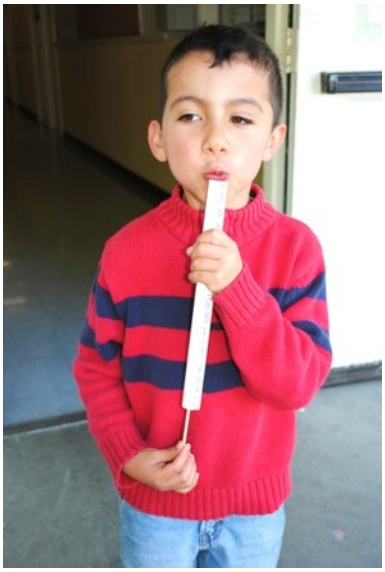
Slide Whistle

Category: Physics: Sound & Waves

Type: Make & Take

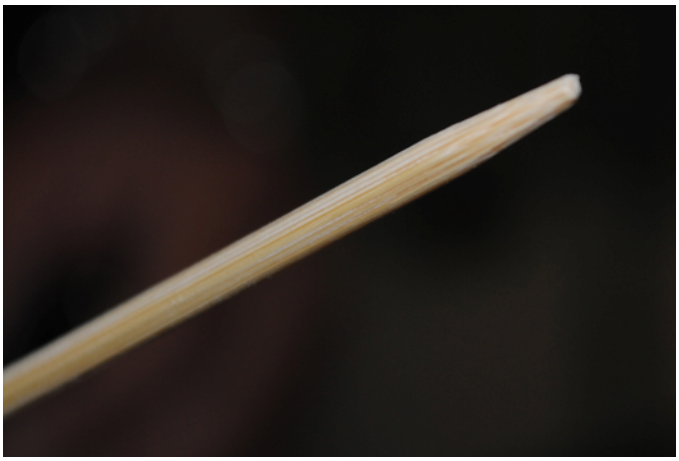


Rough Parts List:

8 to 10 “	PVC, ½”
1	Bamboo skewer
	Piece of foam
	Glue gun
	Masking tape

How To:

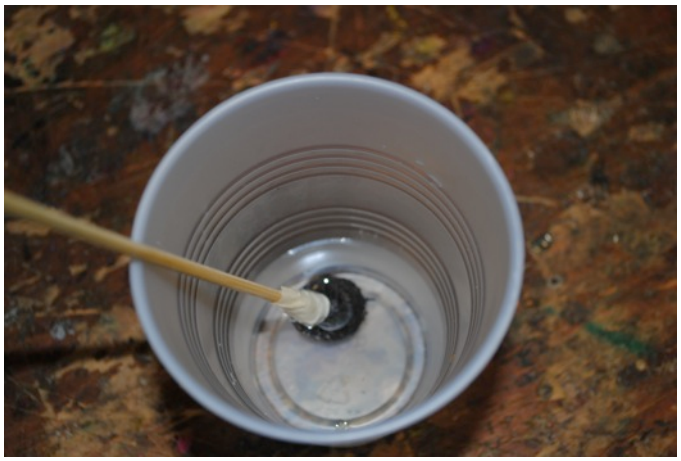
Use a PVC pipe to cut a piece of foam.



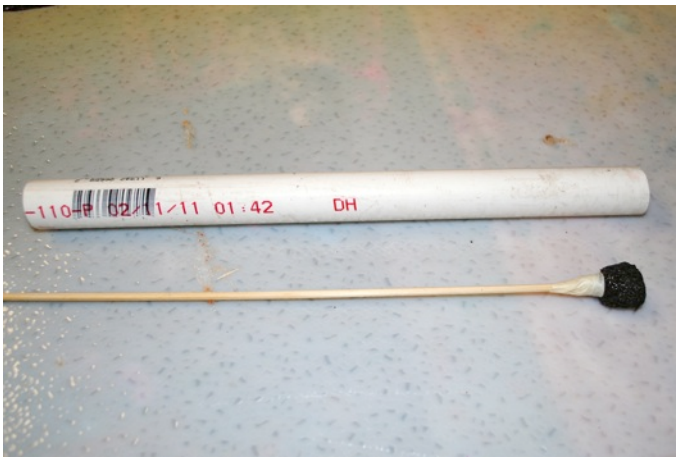
Clip the end of a bamboo skewer to dull its sharp point.

Use a glue gun to put glue on the tip of the skewer and insert it into the foam.

Tape the junction where the skewer and foam meet.



Soak the foam tip in water
before sliding it into the PVC.



To make sound, insert the foam tip into the PVC pipe and blow over the top of the PVC. When the sound is clear, move the stick to see what happens.

Fine Points:

→ This is a learned skill – don't expect it to work the first time. There are several variables to adjust:
- Lip position
- Strength of breath
- Direction of blow
- Size of hole between lips

→ The sound should come even without moving the stick. Moving the stick will just change the pitch.

Concepts Involved:

- Flutes and whistles make sound because the air itself is vibrating. As you blow, the pressure inside the tube increases then decreases over and over making a vibration.
- The frequency of the vibration is determined by the length and diameter of the tube.

Focus Questions:

1. When you pull the stick down on the slide whistle does the pitch (frequency) go up or down?
2. If you used a wider pipe of the same length, would the pitch change?

Elaboration:

Sound is created when something is vibrating. The vibrations can be changed in two ways: how fast or slow the vibration is – the pitch or frequency - and how hard it is vibrating – the volume. You can think about how to change the vibrations on the slide whistle in each of these two ways.

The slide whistle's pitch changes when you move the stick up and down. The smaller the cavity you are blowing on top of, the higher the pitch. This makes sense because a smaller chunk of air can change pressure faster than a large chunk. The faster it can change from high to low pressure and then back (and back again…) the higher the pitch will be. A long, wide tube will make the lowest pitch because it takes longer to change the pressure in all that air.

To increase the volume on the slide whistle, blow harder or faster. The volume will increase with little change in the frequency.

Links to k-8 California State Standards:

Grades k-8 Standard Set Investigation and Experimentation
Scientific progress is made by asking meaningful questions and conducting careful investigations. As a basis for understanding this concept and addressing the content in the other strands, students should develop their own questions and perform investigations.

Grade 2 Standard Set 1: Physical Sciences
The motion of objects can be observed and measured.
1.c Students know the way to change how something is moving is by giving it a push or a pull. The size of the change is related to the strength, or the amount of force, of the push or pull.
1.g. Students know sound is made by vibrating objects and can be described by its pitch and volume.

Grade 3 Standard Set 1: Physical Sciences
1.d. Students know energy can be carried from one place to another by waves, such as water waves and sound waves, by electric current, and by moving objects.

Grade 9-12 Standard Set 4: Waves
4.a Students know waves carry energy from one place to another.
4.d. Students know sound is a longitudinal wave whose speed depends on the properties of the medium in which it propagates.

Grades k-12 Mathematical Reasoning:
1.0 Students make decisions about how to approach problems:
1.1 Analyze problems by identifying relationships, distinguishing relevant from irrelevant information, sequencing and prioritizing information, and observing patterns.
1.2 Determine when and how to break a problem into simpler parts.
2.0 Students use strategies, skills, and concepts in finding solutions:
2.1 Use estimation to verify the reasonableness of calculated results.
2.2 Apply strategies and results from simpler problems to more complex problems.
2.3 Use a variety of methods, such as words, numbers, symbols, charts, graphs, tables, diagrams, and models, to explain mathematical reasoning.
2.5 Indicate the relative advantages of exact and approximate solutions to problems and give answers to a specified degree of accuracy.
3.0 Students move beyond a particular problem by generalizing to other situations:
3.1 Evaluate the reasonableness of the solution in the context of the original situation.
3.2 Note the method of deriving the solution and demonstrate a conceptual understanding of the derivation by solving similar problems.
3.3 Develop generalizations of the results obtained and apply them in other circumstances.