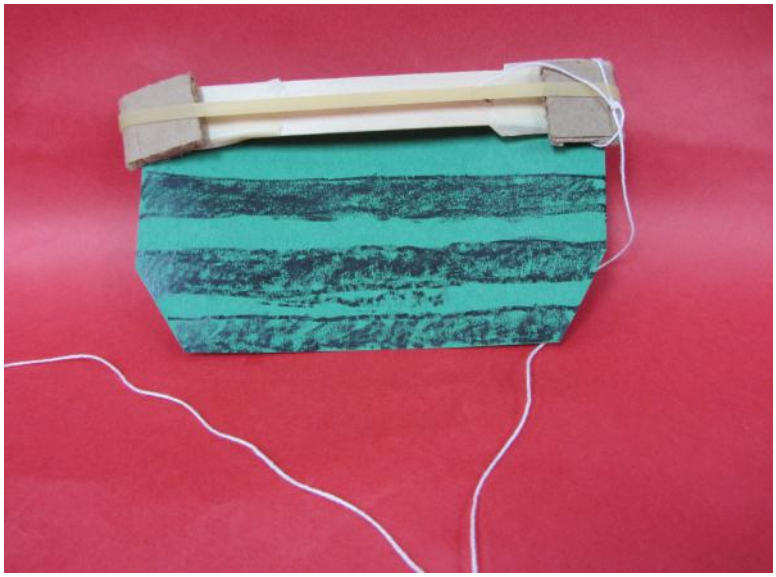
Buzzing Bee

Category: Physics; Sound & Waves

Type: Make & Take

Rough Parts List:

1	Craft stick or tongue depresser
2	Small pieces of cardboard
1	Folder
1	Rubber band
	String

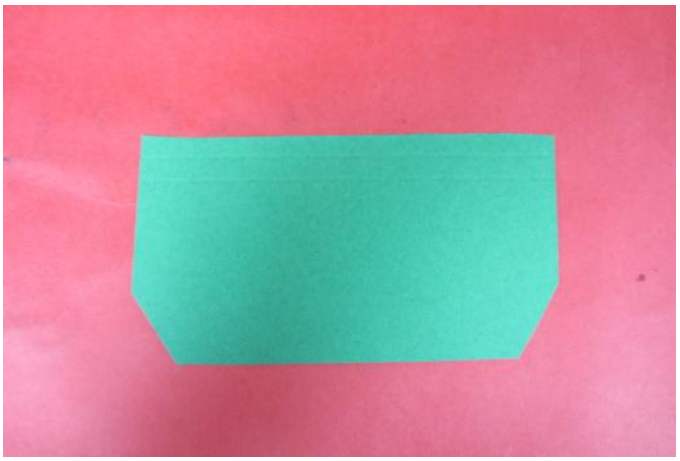


Tools List:

Masking tape
Scissors
Hot glue gun

Video: http://www.youtube.com/user/FresnoCSW/videos

How To:



Cut a piece of folder into the pictured shape. The top edge should be slightly longer than the length of the craft stick.

Lay a craft stick along the top edge of the folder.

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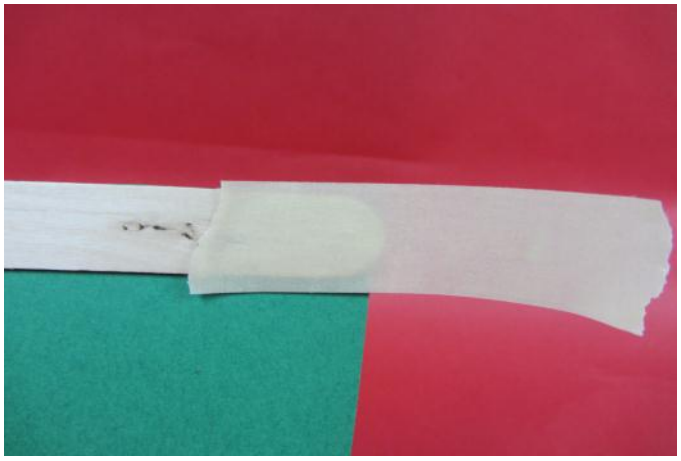
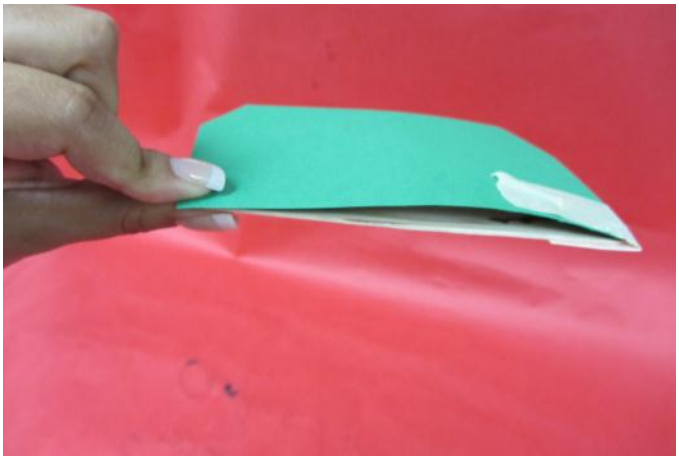
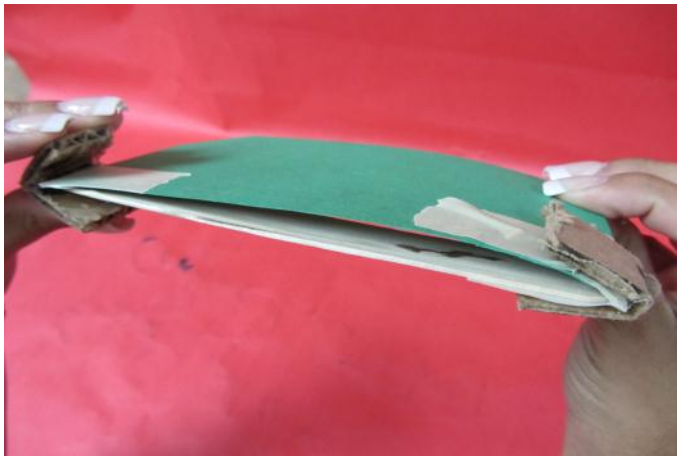


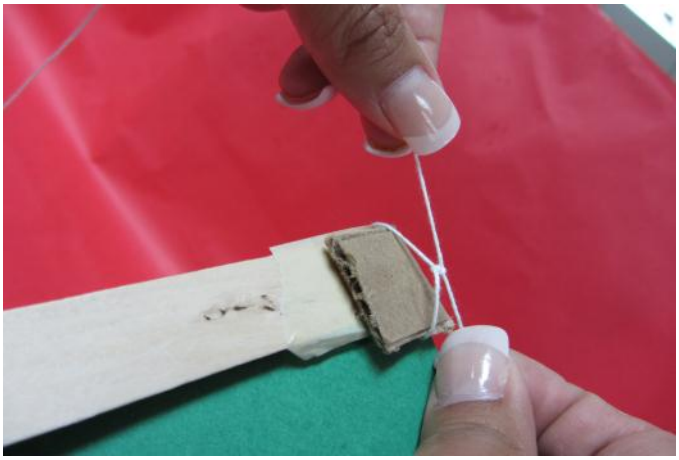
Tape one end of the popsicle stick to the edge of the folder.



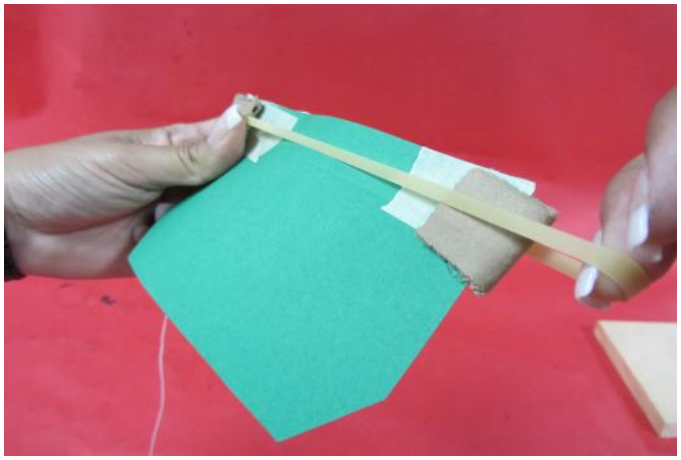
Tape together the other end of the popsicle stick and folder. Be sure to bend the folder to create a small gap between the stick and folder.



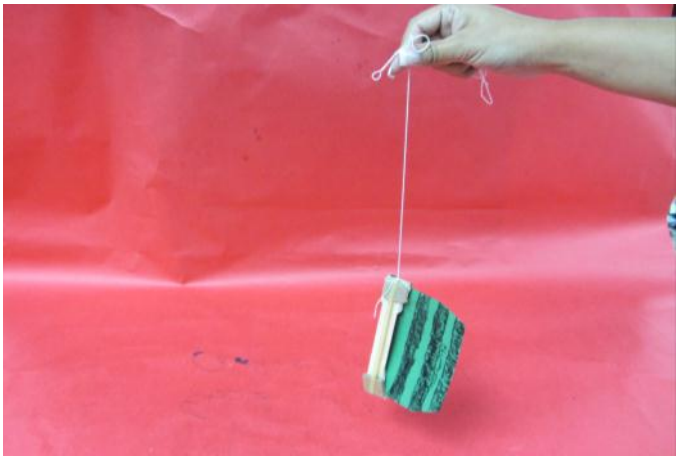
Fold the pieces of cardboard in half and glue them onto the ends of the craft stick.



Tie one end of string around the craft stick.



Wrap a rubber band around the folder and cardboard.



Decorate the bee. Hold the string in one hand and swing it in circles to create a buzzing bee!

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Fine Points:

→ If the folder is not bent to create a gap, the buzzing bee may not create any sound.
→ Make sure there is also a small gap between the rubber band and the folder.
→ The rubber band should not be loose.
→ Make sure the string is tied on well so it doesn't go flying off and hit someone.

Concepts Involved:

- Sound is produced by vibration.
- Quick vibrations produce high notes, slow vibrations produce low notes.

Focus Questions:

1. Where is the sound coming from?
2. What happens if there is not a gap between the folder and craft stick?
3. How can you make the buzzing bee louder? Quieter?
4. Can you change the sound of the buzzing bee to create different notes?

Elaboration:

Musical instruments make sound in many different ways, but in each one something is vibrating. In this instrument, the rubber band vibrates against the folder to create sound. Sound waves travel through the air to our eardrums. The eardrums send the vibrations to the complex mechanism in the inner ear, which includes many sensitive nerves. These nerves then send a message to our brain, which tells us what sort of sound we're hearing.

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 change the vibrations on the buzzing bee in each of these two ways. Stretch the rubber band tighter and you can hear higher pitched sound. This is a trick though, since when you stretch one side tighter, the other side gets looser. You can try putting on different sized rubber bands too, or making another buzzing bee that is longer with the same sized rubber band. To make it louder – higher volume – you can spin it faster.

Links to k-12 CA Content Standards:

<u>Grades k-8 Standard Set Investigation and Experimentation:</u>
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.

<u>Grades k-12 Mathematical Reasoning:</u>
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:
1.1 Use estimation to verify the reasonableness of calculated results.
1.2 2.2 Apply strategies and results from simpler problems to more complex problems.
1.3 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

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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.

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