

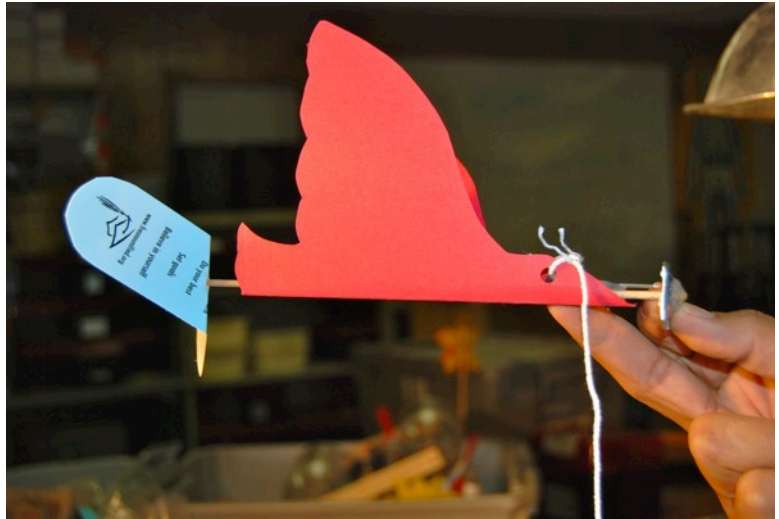
Chirping Bird

Category: Physics: Sound & Waves,
Force & Motion

Type: Make & Take

Rough Parts List:

1	Straw
1	Bamboo skewer or 1/8" dowel
1	Nail
1	Bookmark or small stiff paper
1	File folder or stiff paper
1	Stucco mesh nail -OR- bottle cap, hammer, and nail
18"	String

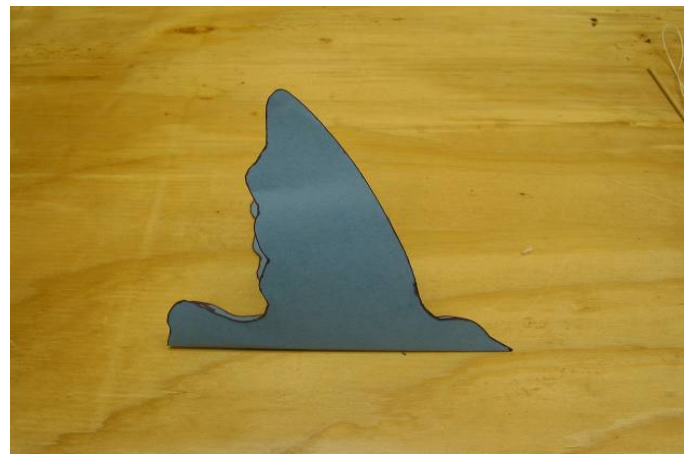
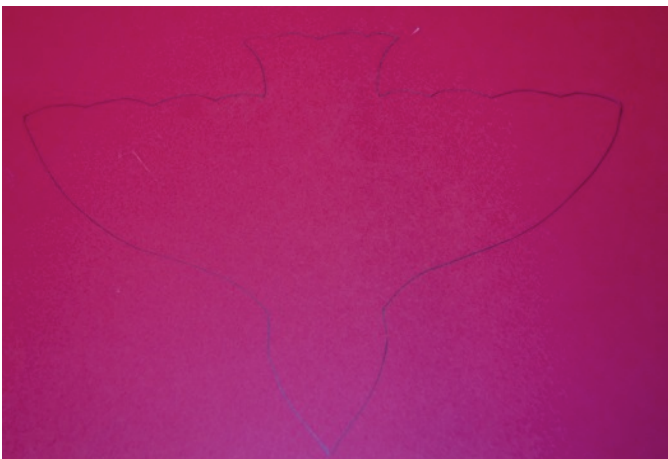


Tools:

Scissors
Nail
Glue sticks
Glue gun
Hole puncher
Pencil
Hammer

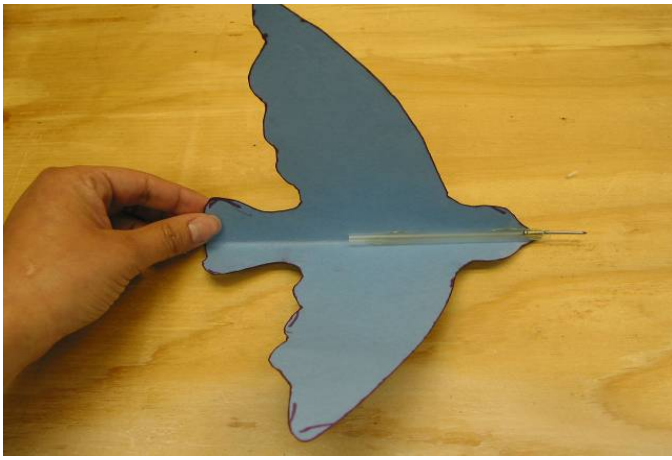
Video: <http://youtu.be/aXseGc0lr-k>

How To:



Have the students draw a bird or give them a pattern of a bird to cut out.

Cut and fold in half.



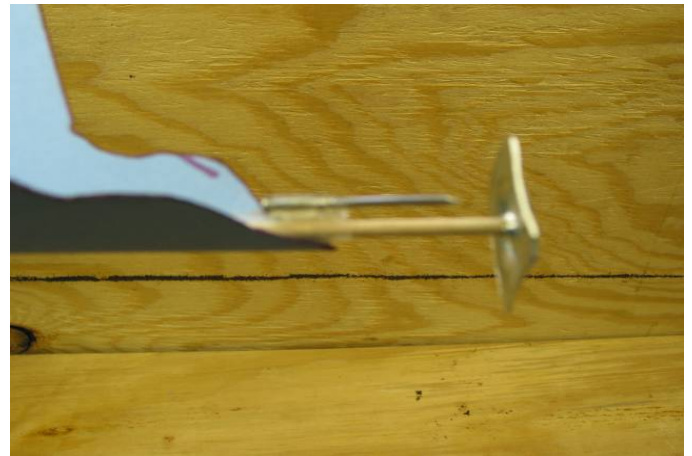
Glue a nail onto the top front edge of a straw, with the nail sticking out over the edge of the straw. Glue the straw onto the end of the bird's head with the nail sticking out past the bird.



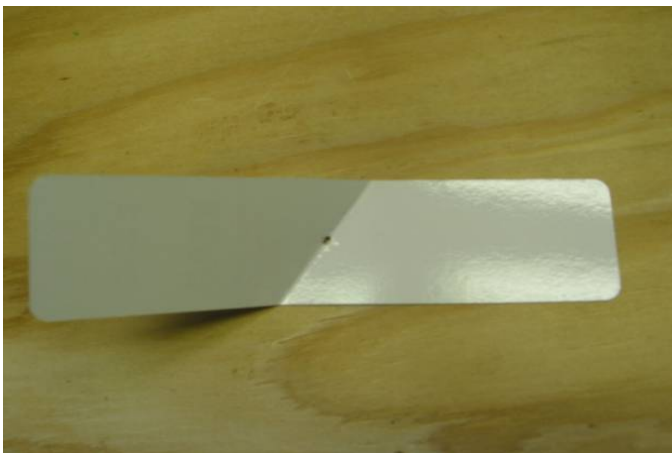
Hammer out the nail from the stucco mesh washer.



Glue the skewer to the washer.



Slide the skewer through the straw.



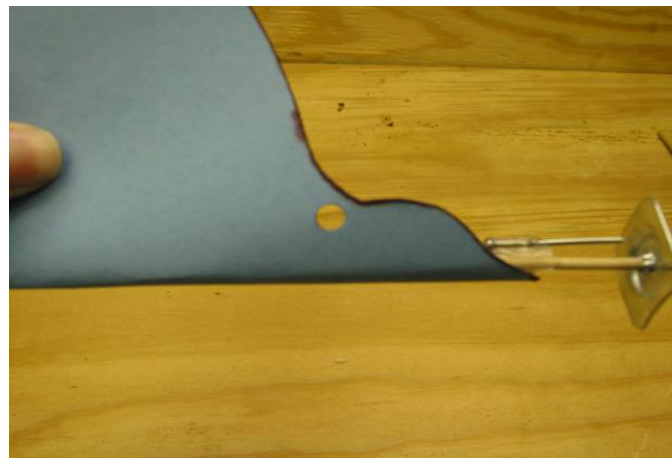
Fold the bookmark as pictured. Poke a hole through the center.



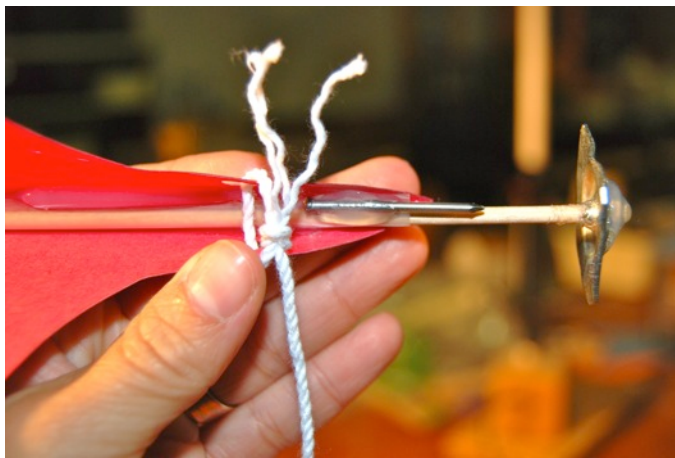
Push the free end of the dowel through the hole and glue it to the bookmark.



The tail should not be close to the edge of the bird.



Punch a hole through the front end of the bird.



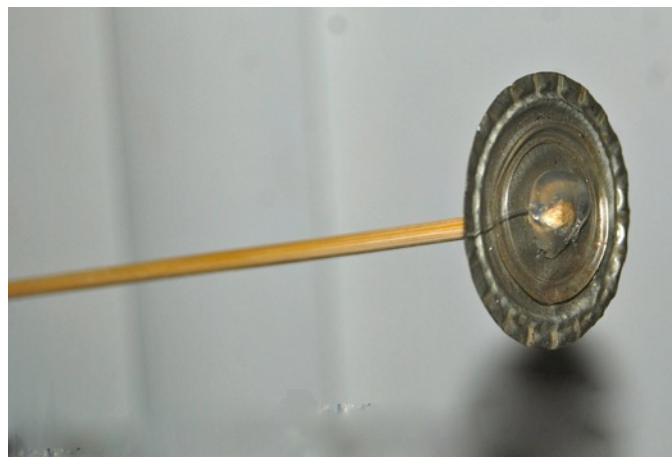
Slide string through both holes and knot it. The bird is ready for action: grab the end of the string and whirl it around fast.



To build this model using a bottle cap instead of a stucco mesh nail, hammer the bottle cap until it is flat.



Hammer a nail through the center of the cap. Wiggle the nail around to enlarge the hole.



Push the bamboo skewer through the hole and glue it into place.

Fine Points:

- If building this model with a bottle cap, be sure to punch a hole the same size as the bamboo skewer or wooden dowel to create a tight fit.
- The tip of the nail should be dragging around the washer to make a small chirping sound. If the bird doesn't make noise try a different, sharper nail, or even a large pin.
- The dowel or skewer has to turn very loosely in the straw. You can't get any glue on the middle of the dowel or skewer.

Concepts Involved:

- Sound is created when vibration occurs.

Focus Questions:

1. How does the bird make noise?
2. How could you make the bird louder?
3. What would happen if you changed the size of the bird?

Elaboration:

The sound of the chirping bird is created by the slip-stick motion of the nail scratching along the washer which is similar to the screeching of chalk on a chalkboard, a violin bow on violin strings, and tectonic plates moving beside each other. There is a period of no motion as tension builds up, then a period of great motion as the two items move from a high-energy state to a low-energy state, then a return to no motion and the slow buildup of tension. With earthquakes, one cycle takes years, decades, or millennia. With a violin, the process happens many times per second.

Links to k-12 CA Content 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.

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:
 - 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 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.

Grade 2 Standard Set 1: Physical Sciences

The motion of objects can be observed and measured.

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 (Energy & Matter):

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.