

Handout 01 “Toy propeller”

How to make a toy propeller

HOW TO MAKE A PROPELLER UNIT

Introduction

We can make improvised propeller units using plastic bottles and paper boards. As an example, I introduce how to make a propeller unit with a carbonated drink bottle, a paper clip and a bead. We can change the size and design of propellers to suit them to assorted toys.

1. Materials and tools:

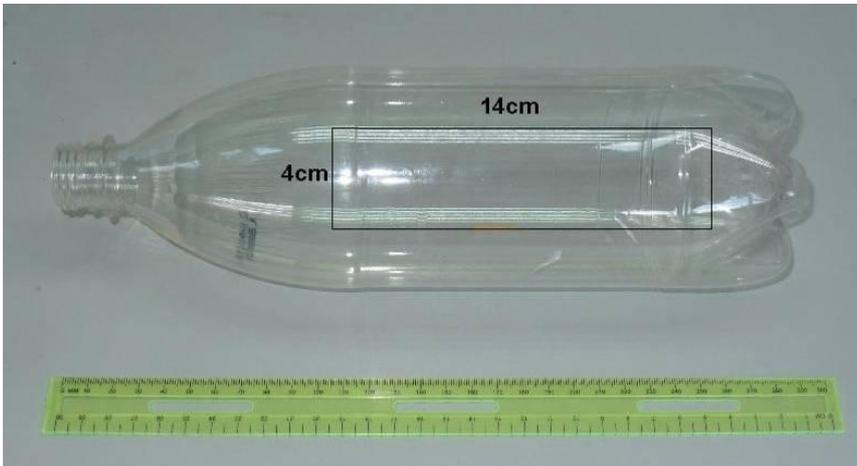
Materials

- A plastic bottle
(a 1.25L carbonated drink uniform shape bottles is most suitable)
- A 5mm diameter plastic bead
- A triangular shape paper clip
- 1cm diameter plastic disc or bowl
(cut out from a plastic bottle)

Tools

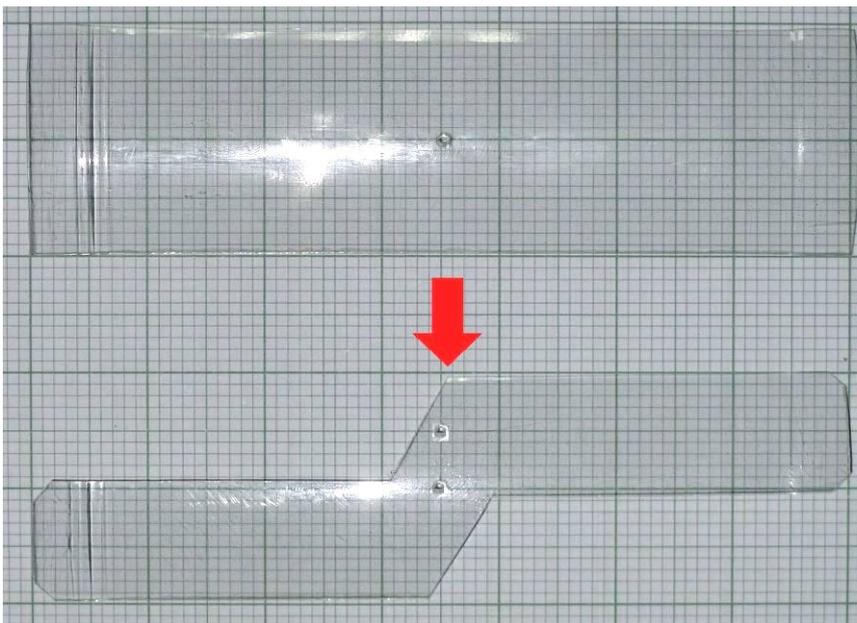
- A pair of scissors
- A pair of pliers
- A pair of compasses with a sharp needle
- A ruler
- A cutting board
- A small rubber cushion

2. Propeller blade



Cut out 14.0cm x 4.0cm plastic sheets from a bottle. The rectangular sheet has a curved surface.

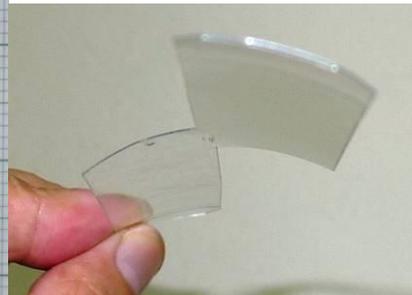
We can collect six sheets from the bottle on the picture.



Make a hole in the centre of the sheet using a compass needle.

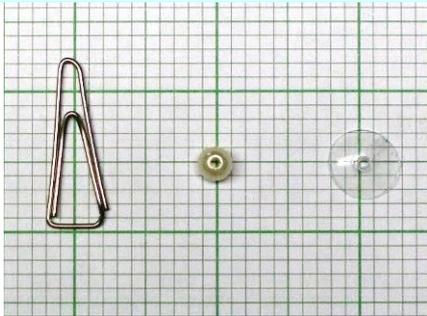
Cut the sheet into a propeller shape and make another hole near the centre like the left picture.

Trim the edges to avoid injury, when the blade hits someone.

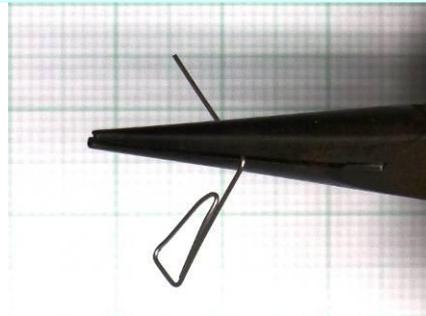


A photo from below

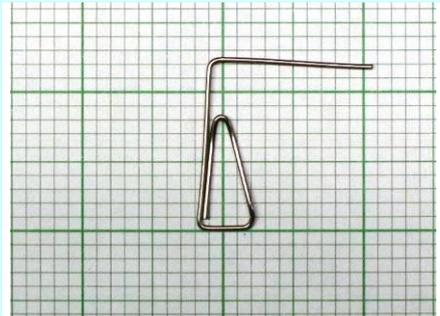
3. Propeller axis



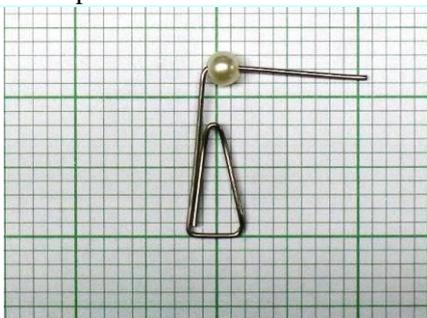
From the left side, a paper clip, a 5mm diameter bead, a 1.0cm diameter plastic bowl. Make a hole in the centre of the small bowl using a compass needle.



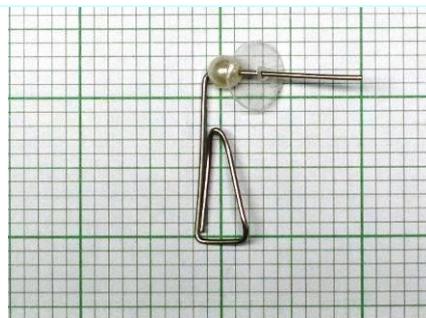
Open up the first corner of the clip and make a right angle using pliers.



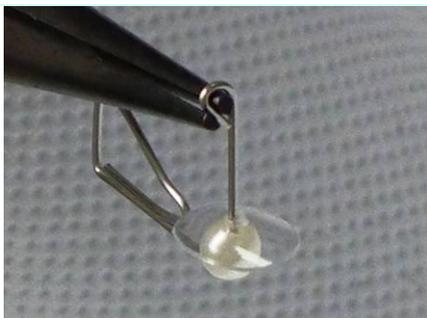
A paper clip with a right angle.



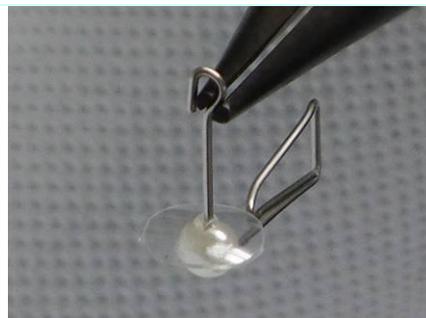
Insert the straighten wire of the clip into a 5mm diameter bead.



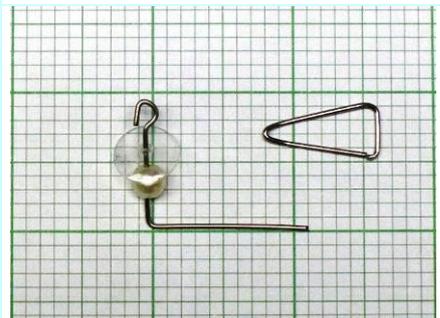
Insert the wire into the small plastic bowl.



Pinch the end of the clip using pliers and twist it like the picture above.

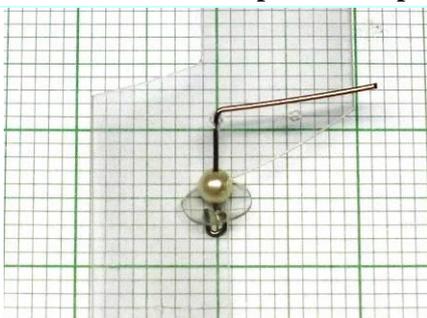


Pinch the opposite side and twist slightly to the counter direction to make a hook.

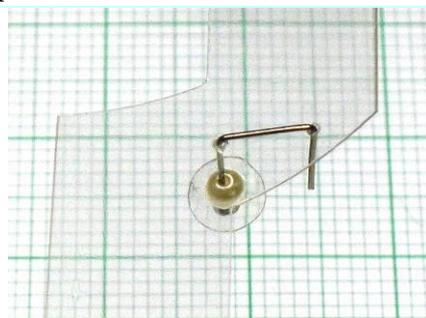


Remove the triangular part..

4. How to fix the axis part on the propeller blade



Pass the free end of the wire into the centre hole of the propeller blade.



Using pliers, fold down the free end to make it pass through another hole on the blade.



Using pliers, fold the end of the wire like the picture above to fix the axis part onto the blade.

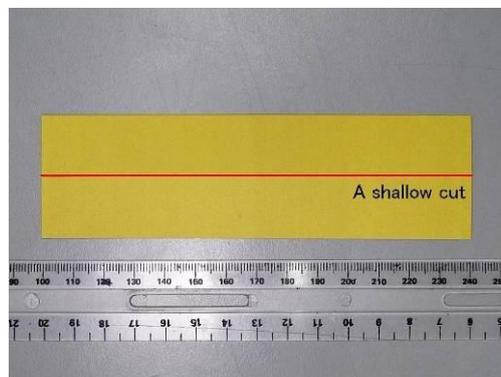
HOW TO MAKE A PAPER PROPELLER UNIT

Introduction

If you have a difficulty to find good plastic bottles to make propellers, please use uniform and flat paper board to make good propellers. Collect a sheet of paper board bigger than 4.0cm x 14.0cm. The suitable thickness is approximately 0.35 to 0.45mm. Please ask your stationery shop to select good boards. Strong paper lunch box are also suitable to make propellers. In order to reinforce the propeller we need a plastic bottle which has horizontal grooves around its circumference.



Bottles suitable to reinforce the paper propellers



4.0cm x 14.0cm paper board
Make a vertical shallow cut on its centre.

1. Materials and tools:

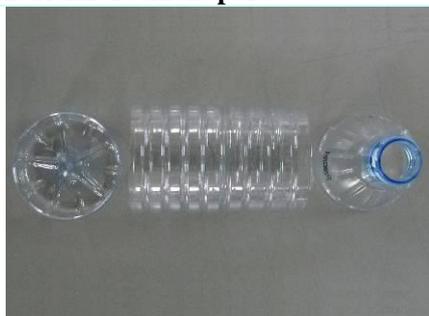
Materials

- A paper board (4.0cm x 14.0cm, 0.35 to 0.45cm thick)
- A 500 to 700 ml plastic water bottle
- A 5mm diameter plastic bead
- A triangular shape paper clip
- 1cm diameter plastic disc or bowl
(cut out from a plastic bottle)

Tools

- A pair of scissors
- A pair of pliers
- A pair of compasses with a sharp needle
- A ruler
- A cutting board
- A small rubber cushion

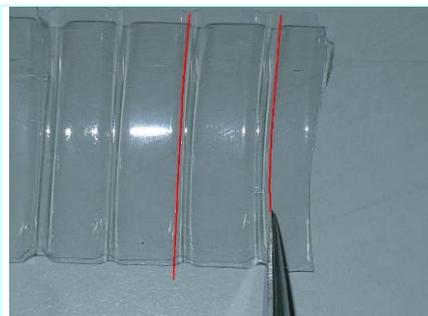
2. Reinforcement part



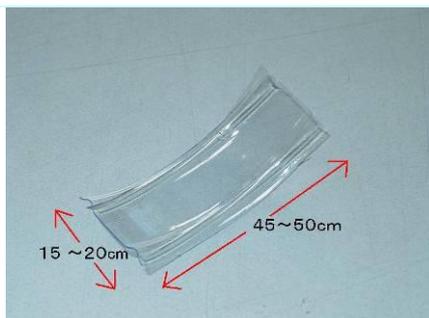
Cut out top and bottom of the bottle.



Cut the centre of the bottle vertically to make four strips like the picture above.

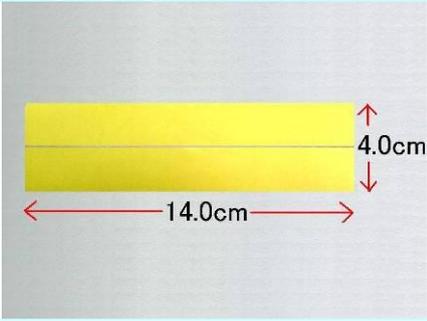


Cut the strip like the picture above to make reinforcement part of the paper propeller. The flat part has two grooves on its both sides. They are important to reinforce the blade.



A finished reinforcement part.

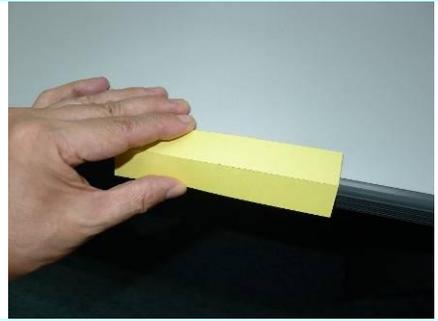
3. Paper propeller blade



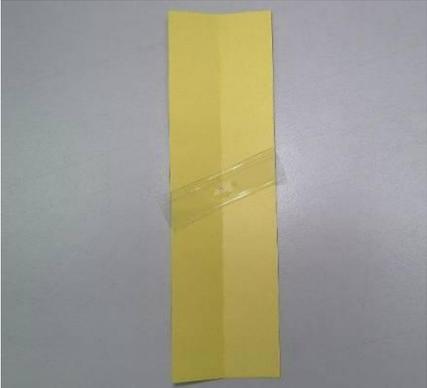
Make sure the paper board must have a vertical shallow cut in the middle of the board.



Using a ruler and a compass needle, make a small hole on the centre of the paper board.



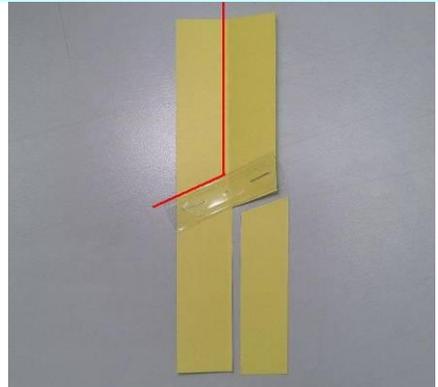
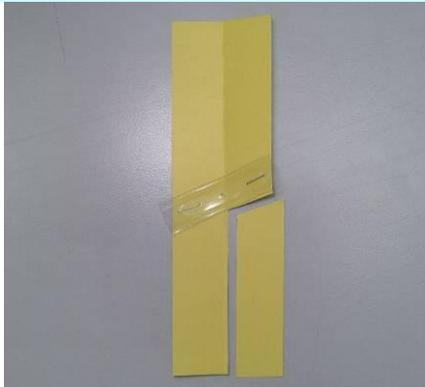
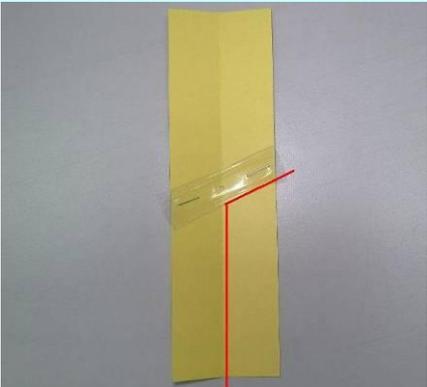
Press the paper board onto an edge of a desk. Fold it gently along the vertical cut to give it "V" shape.



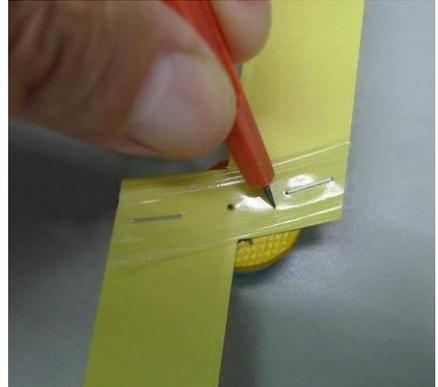
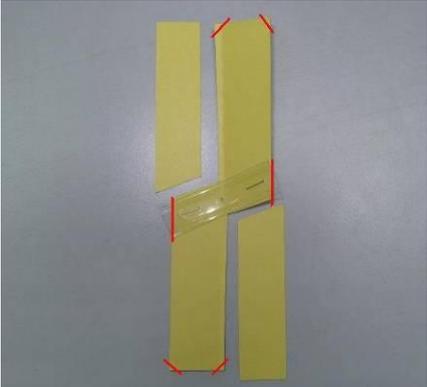
Place the board on the desk with concaved side up. Put the reinforcement part on the centre of the board. Then tilt the reinforcement part like the picture above.



Staple the reinforcement part with two staples.



Cut the board along the red lines.

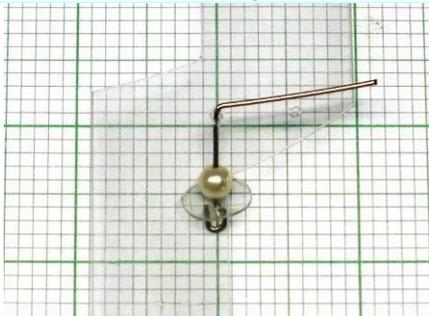


Make a hole in the centre of the reinforcement part and another hole about 1cm left of the hole.

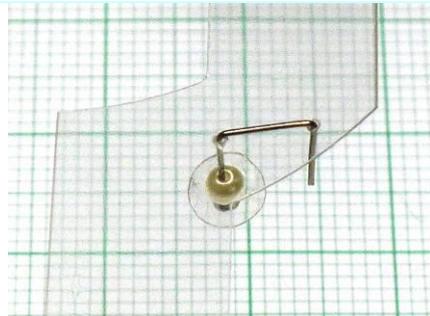
4. Propeller axis (please read “HOW TO MAKE A PROPELLER UNIT”)

5. How to fix the axis part on the propeller blade

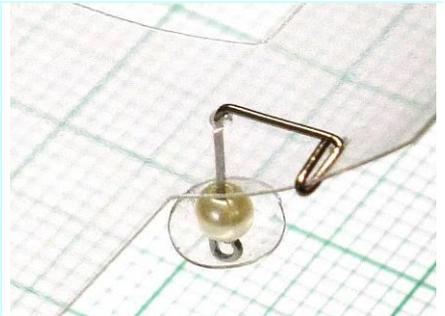
(The photos below have images of transparent plastic propeller blade. Fix the axis part on paper blade exactly similar to the following instruction.)



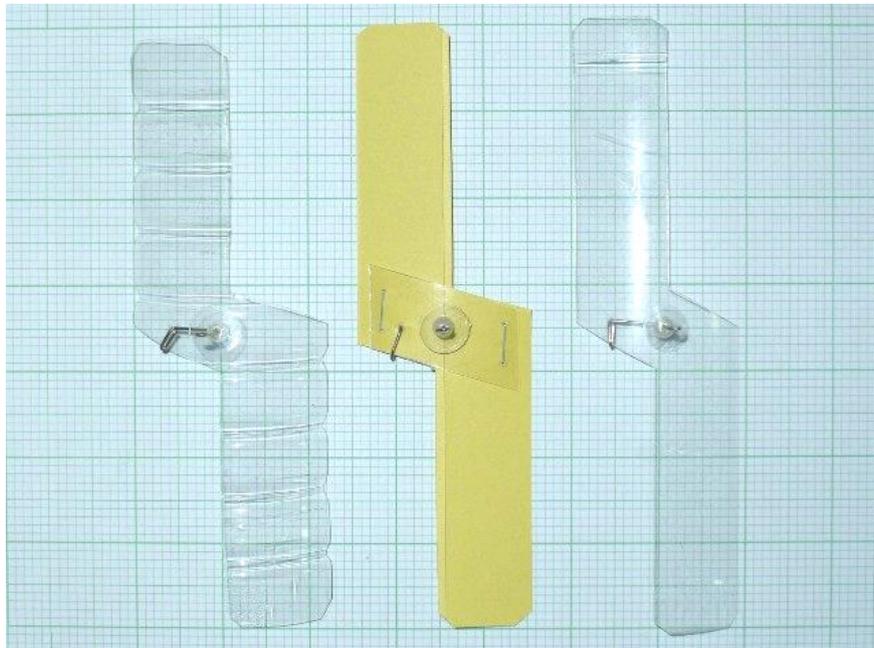
Pass the free end of the wire into the centre hole of the propeller blade.



Using pliers, fold down the free end to make it pass through another hole on the blade.



Using pliers, fold the end of the wire like the picture above to fix the axis part onto the blade.



Propeller samples

PAPER PROPELLER TEMPLATE

(to make a simple helicopter, a wind car and a straw kite)

