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PERMANENT ROTO-COPTER
(A variation of the toy helicopter)

Introduction

At any schools Roto-copter is one of the most popular low-cost science activities. We can also use a simple arm extension to drop the copter from higher place; we call it Roto-copter dropper. In order to provide safe and fun science activities we modified the toy to make it suit the dropper. But usually we can enjoy the copter only few seconds. Can we make a copter which keeps on rotating? Some science centre websites show copter samples which keep on rotating using thin string. But it is difficult to avoid super-twisting or untwisting of the string with everyday materials. Therefore, we gave up using string and tried applying a different rotation axis and an axis holder, namely, a bamboo skewer and a thin plastic straw. Please read how to make a "Permanent Roto-copter" from next page.


Indonesian teachers playing with the Roto-copters and the droppers.
(at RECSAM science lab 2 on 29th Oct 2013)

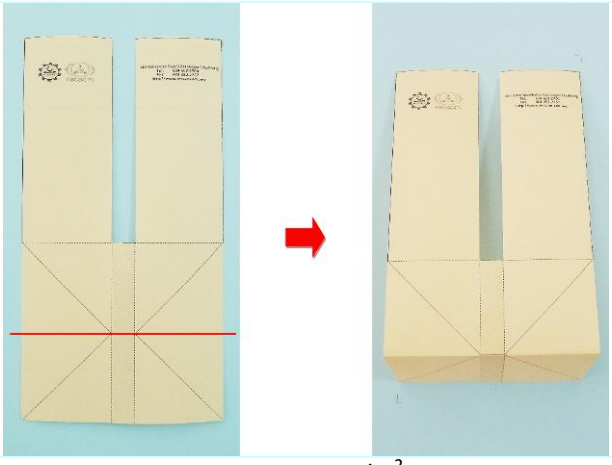
Explaining how to make an old version copter.
(at SEAMEO Hall on 18th Mar 2015)

The string was super-twisted or untwisted.

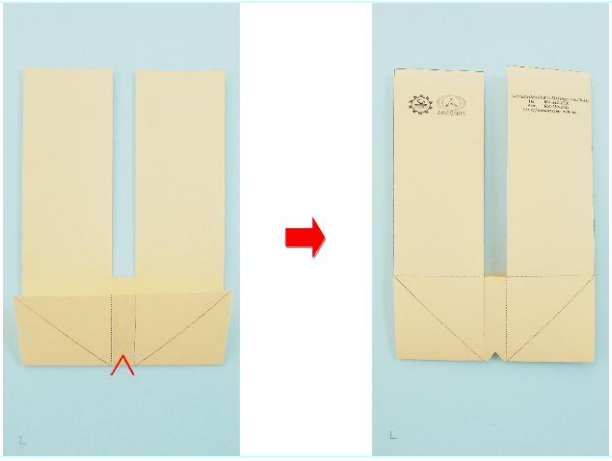
Materials and tools

Materials	Tools
Copter pattern sheets (6 copters on a sheet), 4.0 mm in diameter plastic straws, 5.0 - 6.0 mm in diameter plastic straws, and bamboo skewers	A cutting mat, a cutter, a pair of scissors, a ruler double-sided sticky tape (18 mm in width), insulation tape (18 mm in width), and sticky tape

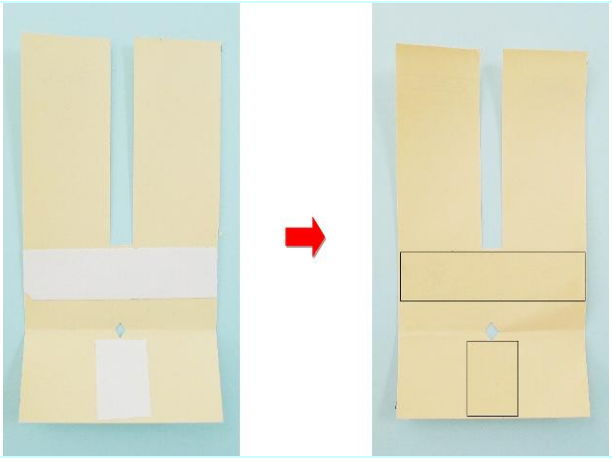
1. How to make a Permanent Roto-copter



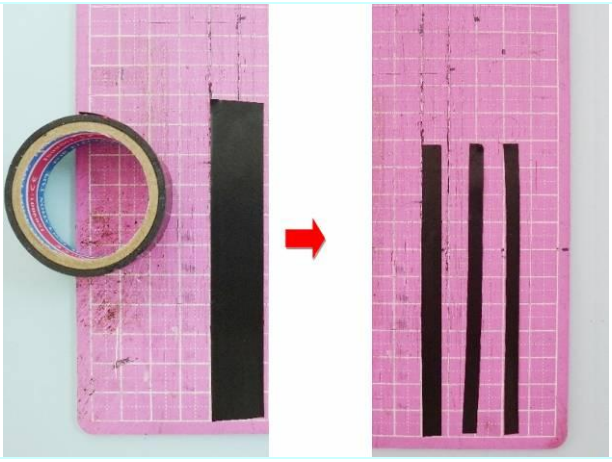
Print out patterns on a 70 - 80 g/m^2 A4 paper and cut out 6 modified copter patterns. Give a mountain fold along the red line.



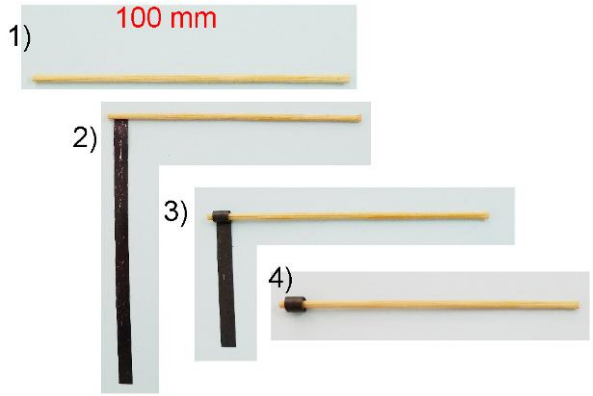
Give an “A” shape cut along the red line.



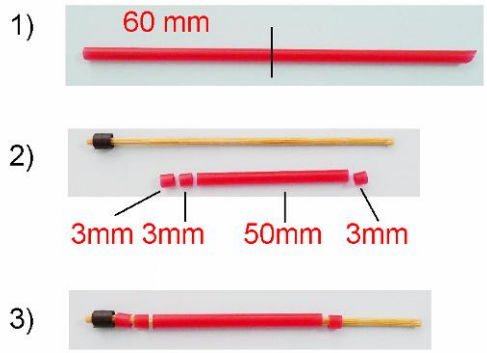
Turn the pattern sheet and paste double-sided sticky tape (18 mm in width) like the photo above. Remove the sticker release paper (white paper).



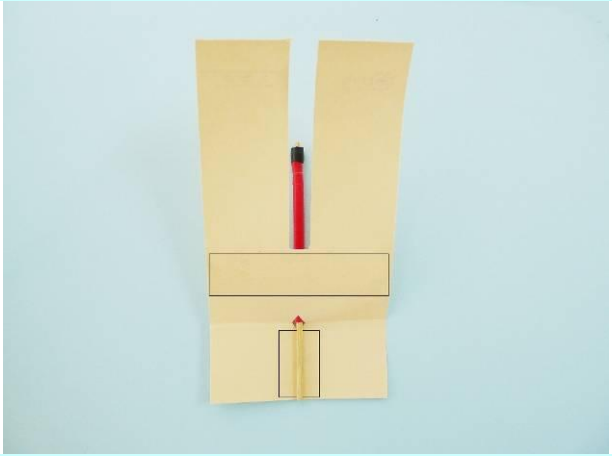
Paste 100 mm x 18 mm insulation tape strip on a cutting mat. Slice the tape to make three thin strips.



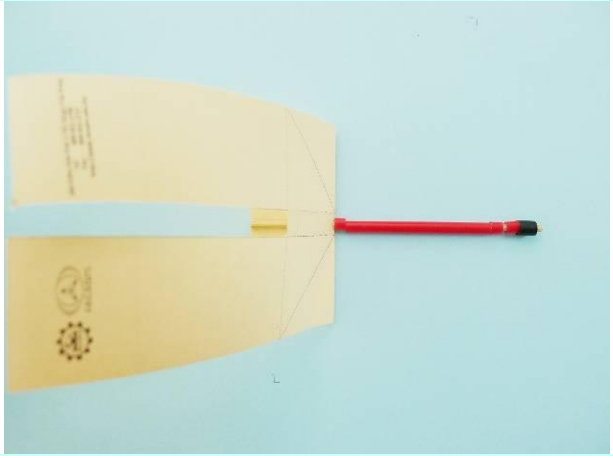
Cut a bamboo skewer into 100 mm. On one of the ends of the skewer wrap up one of the tape strips.



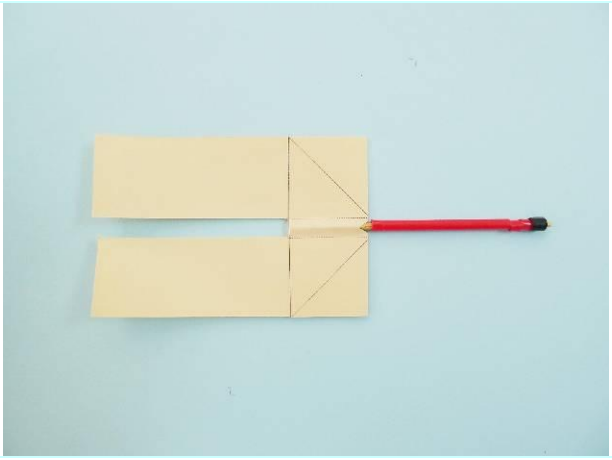
Cut a thin plastic straw (4.0 mm in diameter) into 60 mm. Then cut it into three 3 mm parts and a 50 mm part. (Please do not worry about a 1 mm length of the straw.) Pass the skewer through straws (two 3 mm parts, then the 50 mm part and the third 3 mm part).



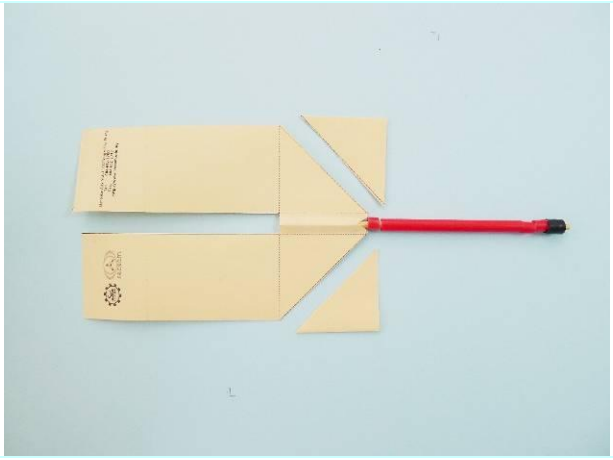
Insert bare end of the skewer into the hole at the bottom of the modified copter.

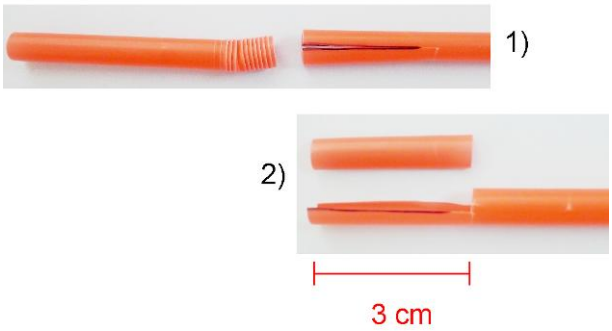


Sandwich the skewer with the copter.

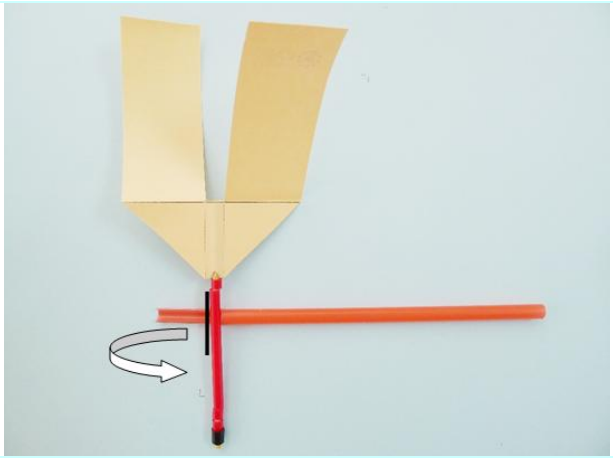


Cut off the triangular shapes.

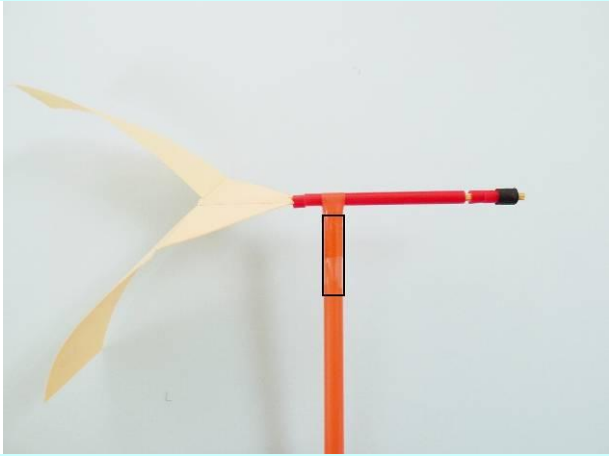
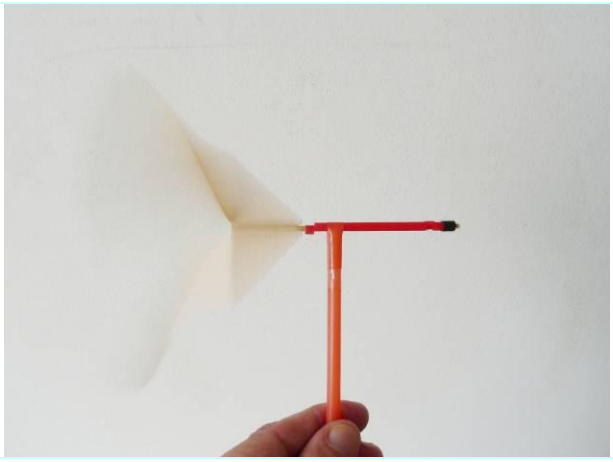




Collect a 5.0 - 6.0 diameter straw (a thick straw). The above photo shows how to cut the straw in order to make 3 cm long gutter.



Place the copter's thin 50 mm straw at the border of the gutter and tubular shape of the thick straw. Fold the gutter part along black line to meet the right side of the thick straw.

	
Apply sticky tape onto the thick straw top to fix the copter firmly.	Face the copter toward wind! Now you have a permanent Roto-copter