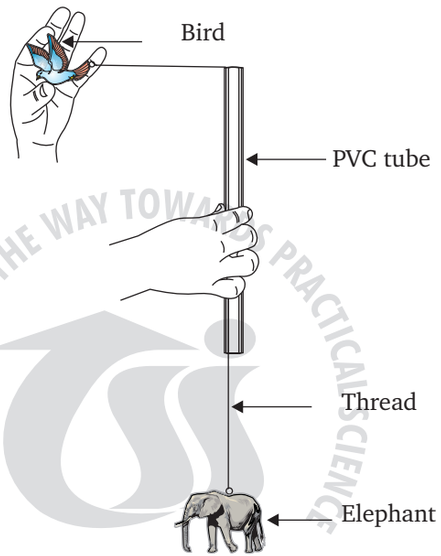
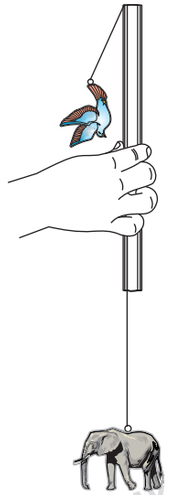
CENTRIFUGAL FORCE - KIT I

Bird lifts elephant

Assembly :

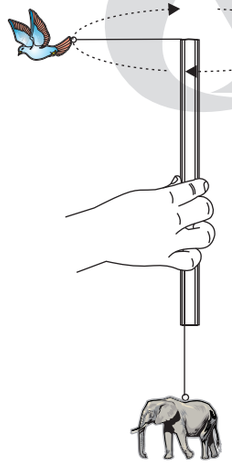


Consists of a bird and elephant figures cut in a plywood. These two are tied together using a thread to the hooks fixed to each of them. Before connecting them, the thread is passed through a PVC tube of convenient length and diameter (as shown in diagram)

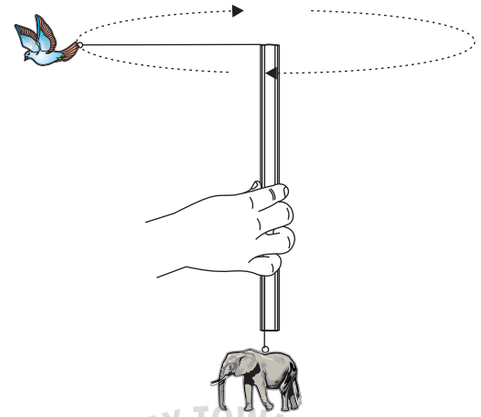


To do and observe

Step 1 : Hold the PVC tube in your hand and position the bird as shown in diagram.

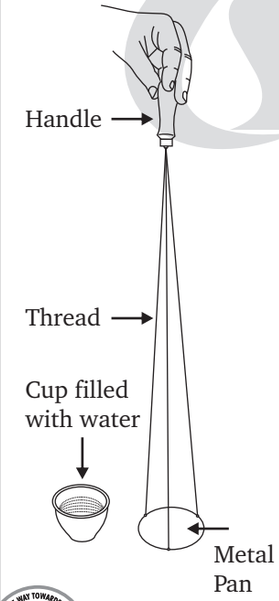


Step 2 : Now start rotating the bird by giving jerks to the tube in horizontal plane
As rotation starts you will notice the bird moves away from the tube by executing uniform circular motion. Simultaneously the elephant which is at the other end will be lifted up.

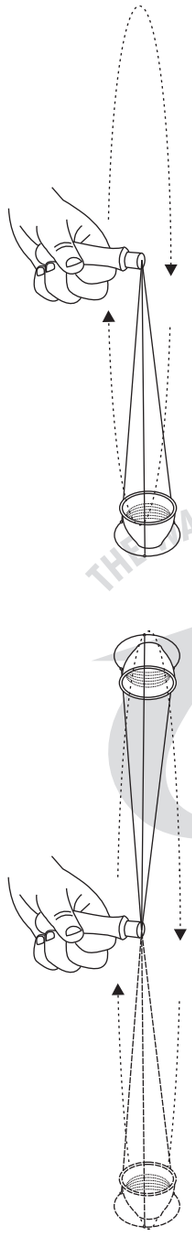


CENTRIFUGAL FORCE - KIT I

Water does not spill from cup even when it is upside down



Assembly B :
Consists of a metal pan of about 85 mm diameter. It has 3 holes at equal distance near the edge. 3 threads of about 60 cm length are connected to the holes of the pan. The free ends of the all the 3 threads are inserted inside a wooden handle and tied together firmly at the other end of the handle. A plastic cup is provided with the kit to perform experiment.



To do and observe :

Fill the cup completely with water. Place it in the metal pan. Hold the wooden handle in your hand firmly. Now whirl the pan in verticle plane. If you do it fast, you will notice that the water remain trapped in the cup & cup in the pan even when the cup is upside down.

What is going on :

In both cases, when you rotate the drill machine, the respective assemblies will execute uniform circular motion. In uniform circular motion there is centripetal force, which acts towards the centre along the radius. Its magnitude is given by

$$f = \frac{mv^2}{r}$$

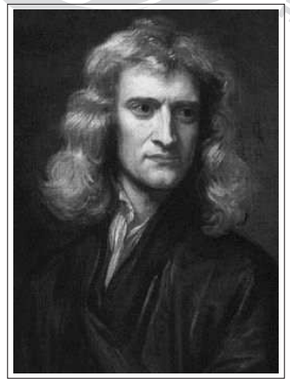
where m = mass of rotating body

v = velocity

r = radius

as we rotate a body, `v' the tangential velocity increases, hence the radius of the mass element tries to increase. Therefore the bird is pulled away from the centre of the circular path. Since the bird is connected to the elephant by means of thread, as the bird moves away from the tube, the elephant will be lifted. For the same reasons in second case water does not spill.

(Centrifugal force is fictitious force in vocabulary it is said that it balances centripetal force, hence the title.)



Sir Issac Newton

TARANG SCIENTIFIC INSTRUMENTS

THE WAY TOWARDS PRACTICAL SCIENCE

CENTRIFUGAL FORCE KIT I

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