Annedroids Experiment

Make Your Own Gear Shifter

What you need:

A grown up for help	Push pins or tacks	White glue
Corrugated cardboard*	Scissors or box cutter	
Fine-tipped marker	Ruler	

*has wavy ridges inside – A box made of corrugated cardboard will give you enough.

How to do it:

1. Ask a grown up for help.

2. Carefully use the scissors or knife to cut out a square of cardboard about 20cm (8in) on each side. This will be your base.

3. Use the ruler to measure different circular objects you can trace on the cardboard (e.g. bottle caps, cups, lid). Try to find four things that have these different diameters (the distance across the centre of the circle): 2.5cm (1in), 3cm (1.5in), 5cm (2in), and 7.5cm (3in).

4. Trace each object on to a sheet of cardboard. DO NOT use the base for this.

Annedroids Experiment

5. Get your grownup to carefully help you cut out the 4 different sizes of circle.

6. Now, cut three straight strips about 30cm (12in) long and 5mm (1/2in) wide.

7. This next part is fiddly – you'll need to be patient. Peel the flat layer of cardboard OFF one side of each of the tree strips you've just cut. If some of the flat cardboard stays behind, pick it off.

8. Now, wrap the strips around each of the cardboard circles so that the bumpy ridges are facing out. Carefully mark each strip so you can cut a length that will wrap all the way around each circle.

9. Glue each strip to its correct circle and leave overnight. Use a pin or tape to fasten the ends of the strips together.

10. Once the glue has dried (the next day), remove any tape or tacks you may have used to hold the strip in case. Carefully push a pin (or tack) through the very centre of each of your 'gears.'

11. Tack the gears to the cardboard base so that their 'teeth' (ridges of cardboard) interlock (fit into one another).

12. Gently turn the gear at either end. All of the rest of the gears should turn as well.

Annedroids Experiment

What's Happening?

When you turn one gear, energy is transferred from your hand to the gear and to any gears the first gear is touching. Carefully make a mark on each gear and then experiment to see how many times each one goes all the way around. If you connect the smallest gear to the largest, how many times do you have to turn the small one to make the large one go around once?