



# WARNING

**Keep out of reach of small children.**

For ages 6 years and over.

Read important safety advice enclosed.

Not suitable for children under 36 months due to long cord which may cause an entanglement hazard and small parts/small balls that could represent a choking hazard. This product contains small magnets. Do not ingest or inhale magnets. Attraction of magnets in the body may cause serious injury and require immediate medical care. Seek medical help immediately if magnets are swallowed or inhaled.



**For ages 6+**

Please retain packaging for future reference.

## What is Gravity?

Gravity is a force that pulls objects together.

The more massive the object, the greater the pull. The Earth, which is huge, has a very strong gravitational pull.

Gravity is a very important force. It keeps our feet firmly on the ground. Without gravity, we (and everything else) would just float around in space.

The pull of gravity gives us our weight. On the moon we would weigh less because the moon has less gravity than Earth. On Jupiter we would weigh more because it is much larger than Earth and has a greater gravitational pull.

## Defying Gravity

To overcome Earth's gravity, an object must either be lighter than air or possess a force that counteracts the downward pull of gravity.

A helium balloon, for instance, is lighter than the air that surrounds it, therefore it floats. A rocket exerts a powerful downward force called thrust to overcome gravitational pull.

## Things That Defy Gravity

Here are some things that defy gravity:

A glider uses its wings to defy gravity. The wings are a special shape that forces the passing air to lift the wing.

For this to work, the glider must be travelling forward. Gliders do not have an engine, but use the wind and rising air to help them defy gravity for long periods of time.

An aeroplane also has wings to provide lift and uses an engine to provide the forward motion required. An aeroplane will defy gravity until the engine stops.

A rocket uses thrust to defy gravity. The force, generated by the engines, pushes against the Earth, thus lifting the rocket from the ground.

A helicopter uses a fast turning rotor to provide thrust like a big electric fan pointing downward.

A parachute will help reduce the effects of gravity through wind resistance. When the parachute opens, it traps air under its canopy, thus reducing the speed at which it falls.

A hot air balloon defies gravity because the hot air inside the balloon is lighter than cold air, therefore the balloon rises. A hot air balloon pilot has to constantly heat the air inside the balloon in order to defy gravity.

If you throw a ball it will defy gravity for a short time. This is because you give the ball a form of energy called kinetic energy. The harder you throw the ball, the more kinetic energy you give it, and the higher or further it will travel.

## Gravity Defying Items In Your Kit:

### The Jumping Popper

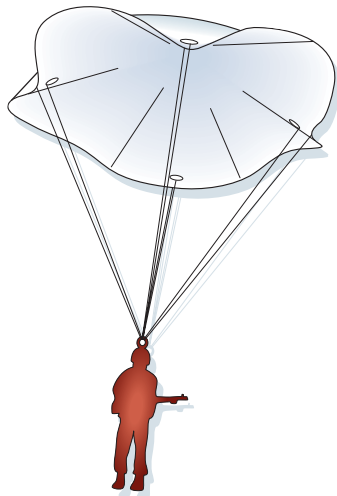
Turn the popper inside out and place it on a flat surface with the central dome uppermost. After a few seconds the popper will jump skywards.

The force of the plastic snapping back to its original shape creates the energy that makes the popper jump.



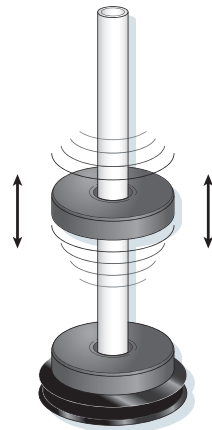
### The Parachutist

Carefully unpack the parachutist and make sure that the cords of his parachute are not tangled. Fold the parachute twice and throw it upwards with the parachutist held under the parachute. As the parachutist falls, his parachute will open and he will glide gently to earth



### The Floating Magnets

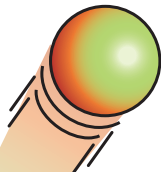
Take the two black plastic discs and 'snap' them together. Insert the white plastic rod into the hole in the centre and stand this upright on a table. Place the two magnets onto the plastic rod, one by one. If the two magnets are attracted to each other, try putting the upper one the other way up. The upper magnet should 'float' magically in the air because the like poles (such as the two North poles) of magnets repel each other, whilst the unlike poles (the North and South poles)



### The Bouncy Ball

Take the bouncy ball and throw it upwards. The ball gathers speed as it starts to fall, thus gaining more and more kinetic energy. When it hits the ground, the structure of the ball allows it to use almost all this energy to bounce back upwards.

*We hope this kit has been fun and that you have learnt something about gravity and the forces that make these toys work.*



This kit is manufactured by:

**Tree Toys Corporation (Taiwan)**

Under agreement with:

**Interplay UK Ltd**, Interplay UK Limited, Unit D, Meter House, Fieldhouse Lane, Marlow SL7 1 LW.

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