

# PINBALL MACHINE



HOW SCIENTIFIC IS A PINBALL MACHINE?

★ WRITTEN AND CREATED BY: ★



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# Marbles on a Ramp

Where's the science?

**Gravity** pulls the **marble** down. The **gravity** pulls small **marbles** and big **marbles** go the same **speed**. They equal out by the time they reach the end of the ramp. The **friction** slows the **marble** down. Different **weights** = different speeds at beginning. **Friction** makes **the marble** go slower and controls it (side to side going crazy). **Gravity** pulls the **marble** down which creates the **force**. When the **marble** goes faster its **accelerating**.

## Did You Know???

Did you know that gravity causes hot air to raise and cold air to lower. Also sledding is like marbles on a ramp. The marble would be you and the ramp would be the hill.



## Life Connection Story...

Sometimes I would make a ramp down the stairs and go down in a sleeping bag that's like marbles on a ramp. I would start at the top and go fast at the beginning then slow down. It was bumpy and marbles on a ramp can be bumpy also sometimes. It depends on what you put on it.

## Vocabulary

Speed

Force

Acceleration

Gravity

Weight

Friction

# Making a Light Bulb Light Up

## Where's the science?

When you make a pinball machine with electricity put a **switch** on it. By operating the switch you can make the **load**(light or anything running with electricity) turn on and off. A switch make an **open** and **closed circuit** if you do it correctly. The **Conductors** are the wires and other thing that connect things . The important thing about the wires is that the **Electric Current** moves through the wire. The **insulator** is the cover around the wire.

### Did You Know!?

Did you know that if you stick your tongue up against a battery you will feel something. ( don't try this at home).



### Life Connection Story...

One day I stuck my tongue up against a battery because my dad said that it felt funny and it did.

### Vocabulary

Electric Current

Insulator

Conductor

Switch

Load

Closed circuit

Open circuit

# Magnetism

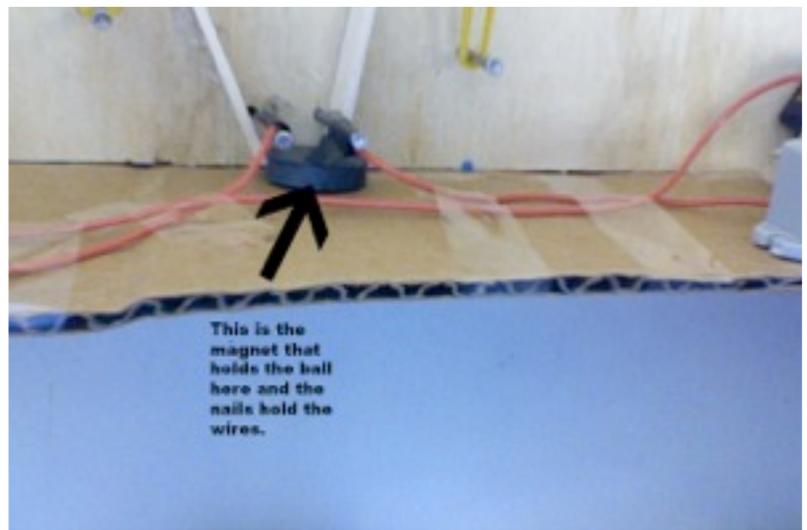
## Where's the science?

Magnets are so cool! They sometimes pull towards each other when opposite poles are next to each other. They repel each other when the same poles are next to each other.

**Magnetic Attraction** is when two metal objects come together with force. **Magnetic Fields** are the stuff that surrounds the magnet. **Magnetic pole** is where the magnet is the strongest.

### Did You Know???

Did you know that if you push two magnets together the wrong way they will push away from each other.



### Life Connection Story...

I had a toy car that was metal and that car attract magnets. So one day I took a that car and a magnet and I held the magnet above the car and the car lift up.

### Vocabulary

**Electromagnet**

**Magnetic pole**

**Magnetic field**

**Magnetic attraction**

# Newtown's First Law

Where's the science?

Something at rest will stay at rest unless acted by an unbalanced **force** acts upon it and it will go into **motion**. Something in motion will stay in motion unless acted by an unbalanced **force**. The **mass** of something makes it harder to move so the heavier the harder to move. Like when you are trying to move something like a car in a ditch you have to push and it is hard because it is super heavy.

## Did You Know?!?

Did you know that an unbalanced force is something that is in the air or ground and that thing will keep going unless something acts upon it. Lets say that you throw a ball and then gravity will force that ball down, but if there was not gravity that ball will keep going and going and would never stop.



## Life Connection Story...

I have was driving a RC car and i hit a curb and then the car stopped immediately.

## Vocabulary

Speed

Force

Acceleration

Gravity

Weight

Friction

# Newtown's Second Law

Where's the science?

**INERTIA** is something that pulls something down with **FORCE!** The **MASS** of a weight will make something fall faster or if there is not that much weight it will go slower. **ACCELERATION** is when you go fast and then you go faster like when you go sledding you go slow at the beginning and then you speed up because of **ACCELERATION**.

## Did You Know???

Did you know that inertia could make a tree fall down.



## Life Connection Story...

One time my family was moving my mom and dad's bed and it kept falling down because of inertia.

## Vocabulary

Inertia

Force

Mass

Acceleration

# Newton's Third Law

## Where's the Science

For every **action** that happens there will be a opposite **re-action**. The **mass** of something could make something go wrong. The **force** of something could go faster or slower. For example the launcher on a pinball machine depends how much speed you give it. You can make the ball go far or short with how much **force** you use

### Did You Know???

Did you know that the amount of mass can break what it is holding



### Life Connection Story...

One time I saw my brothers shoot a gun at my cousins house and it kicked back far. That is action and re-action.

### Vocabulary

Action & Reaction Motion

Mass

Force

# Glossary

**Speed-** The rate at which someone or something is able to move or operate.

**Force-** Force is when you push something you are using force.

**Acceleration-** Acceleration is when something speeds up it is accelerating.

**Gravity-** Gravity is when like a ball drops from the air it gets pulled down that is gravity at work.

**Weight-** The mass of something.

**Friction-** Friction is the rubbing of surfaces. Friction can produce heat **energy**.

**Electric Current-** The time off flow of electric charge, in the direction that a positive moving charge would take and having magnitude equal to the quantity of charge per unit time: measured in amperes.

**Open circuit-** An open circuit has a break in the conducting material of the path. Electricity cannot flow continuously in an open circuit

**Closed circuit-** A closed circuit has a complete path, which allows electricity to flow continuously.

**Load-** A load is the part of a circuit that uses electricity by giving off light, sound, heat, or increasing magnetic interaction. Light bulbs, motors, and electromagnets are examples of loads.

**Switch-** A switch is a device made of conducting material that can open and close an electric circuit.

**Conductor-** A conductor is a material that allows electricity to flow through it. Metals are examples of good conductors.

**Insulator-** Is the thing that hold the like wire together.

**Magnetic attraction-**Two objects are coming together with force.

**Magnetic field-** a magnetic field is the area of attraction and repulsion that surrounds the magnet.

**Magnetic pole-**A magnetic pole is a place on a magnet where the magnetic effect is the strongest. The two ends of a bar magnet are its poles.

**Electromagnet-**A device consisting of an iron or steel cord that is magnetized by electric current in a coil that surrounds it.

**Force-** Physical power or strength possessed by living being.

**Mass-**The amount of matter something holds.

**Acceleration-**A change in the speed or direction of an object.

**Inertia-**The property of matter by which it retains its state of rest or its velocity along a straight line so long as it is not acted upon by an external force.

**Action & Reaction-**For every action, there is an equal and opposite reaction.

**Electric circuit-**An electric circuit is a path in which electrons from a voltage or current source flow. Electric current flows in a closed path called an electric circuit.

**Motion-**The action or process of moving or of changing place or position movement.