How Scientific is a Pinball Machine?

By Jordyn Maat
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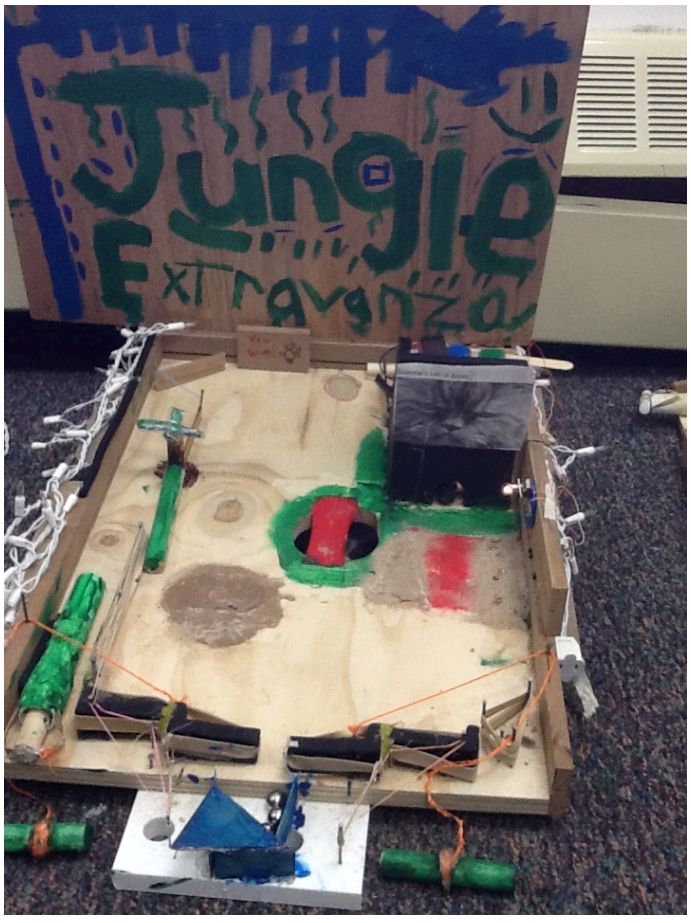

Mr Commeret's Class

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Making a Bulb Light Up

What I Learned

I learned that if you complete the circuit the bulb lights up so how you actually need two batteries one light bulb and one or two wires so first you stack the two batteries (make sure the batteries are lined up + to - then you put one wire under the bottom battery and the other one on the top battery connect the bronze part of the wires together and put the light bulb one the top battery's wire and just wait and it will light up!

The Tornado

One windy night I was in our theater room with my dad, sister, and my two brothers (My mom was in Chicago.)
We heard on channel eight (It's a weather channel) we heard about a tornado watch it was very scary my brothers and my dad went up stairs we begged them not to because our theater room has no windows but they walked upstairs anyway so me and my sister were in the theater watching channel eight and the guy on T.V. said "We're losing internet so if you still want to listen to our channel find a battery powered radio" we were scared all of a sudden the T.V. just turned off with no one doing anything to it, then my brother came in we told him we needed a battery powered radio luckily he had one so he ran up stair in his room and got his radio and came back downstairs we listened to the radio it said that now theres a tornado warning!
We were freaked out so we ran upstairs and tried to get my dad and my younger brother my younger brother wanted to stay with my dad and my dad did not want to come down stairs with us so I got my iPod and face timed my mom and first I asked her if she was okay because there was a big tornado in Chicago and my mom actually saw the tornado so next I told her that my dad wasn't coming to the theater.
Then I ran up stairs again, and my mom told my dad to go in the theater room but he still wouldn't then my mom hung up and it was a sunday and it was about 8:00 by the time my mom hung up and the tornado warning turned into a tornado watch so my dad said it was okay to go to sleep in
our bedrooms so I did and it was really windy and rainy and later I fell asleep.
The next day it was a school day my dad woke me up with two flashlights and it was pitch dark in my room and my dad said "It is was so windy outside that a tree fell down and went and cut our power cord so the power was out" so then I asked him "Why doesn't some power work we have a generator" and he said "The generator isn't working either" I had to get ready for school with a flashlight so right before me and my dad left for school someone pulled up in the driveway it was a guy to fix our generator!
My dad got out of the car to talk to him and then my dad got back in the car when the guy went in the barn in a few minutes the guy came out he fixed the generator!
After school only some of the power in our house was working but at least we had power it was a great monday and a few days later on wednesday when we were at church our power went back on it was great!

Where can you find this in my pinball machine?

All around our pinball machine.
On the top of the Science Lab of BOOM.

Electromagnets

What I Learned

- That it matters how many coils there are around the nail.
- The more coils the more paper clips you pick up there is our group did 57 coils and got 22 paper clips.
- I thought it was the most paper clips you could get but a different group got 36! I think our group did pretty good and I didn't know that the coils mattered so I learned something new!

Where can you find this in my pinball machine?

In the Science Lab of BOOM.

Newton's Laws of Motion

What I Learned

Law #1 - Law of inertia

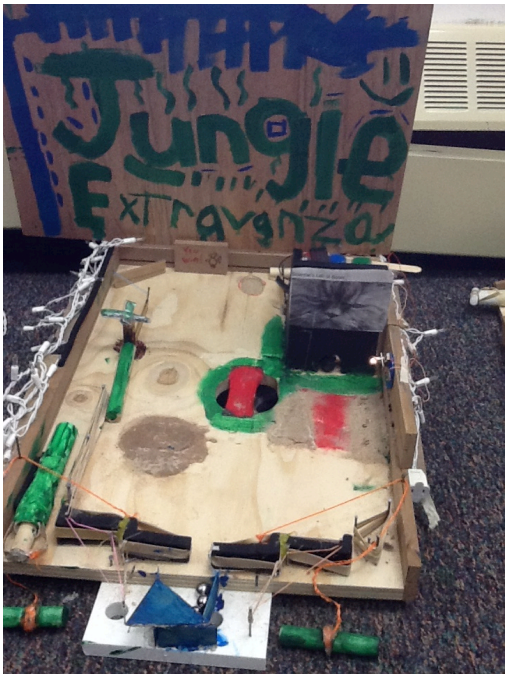
- The law of inertia is about ***friction*** and when an object wants to stay at rest it stays at rest. For Example: when you have a cup of water on top of a piece of paper the cup is at rest so when you pull the paper out the paper will come out from under the cup and the cup will stay at rest!
    - I learned about ***force*** and how ***friction*** really helps you because ***friction*** and inertia really help you otherwise you would be flying all over the place so inertia, ***force*** and ***friction*** are really helpful in life!
    - If you were to roll a bowling ball in a hallway the ***force*** of ***friction*** or someone would stop it.

Law #2 - F=ma (Force = Mass x Acceleration)

- If there,s no ***force*** then nobody would be moving and there would be a big mess everywhere!
    - I learned about ***force*** and mass and how that is also very important in life too we did a lot about ***force*** with our experiment.
    - The law of F=ma is really important that is why Newton made it!

Law #3 - Action - Reaction

- If something is in action then eventually it will be in reaction
    - I learned about Action - Reaction and for our experiment we took a large string and tied it across the room and hooked up a straw to it then we blew up a balloon and taped it to the straw and the straw and the balloon went across the string it was awesome!



Marbles on a Ramp

What I Learned

- I learned that it's more important to work as a group then to work by yourself.
- And that the more mass and gravity there is on the ball the faster it will go down but the lighter it is the slower it will go!
- It's important to know that the ball will go slower in the beginning and it gets faster as it goes!
- More Mass = Faster
- The ***friction*** on the ramp (rulers) will slow the marble down so if you ever try this experiment then you should have a steeper ramp.

Where can you find this on my pinball machine?

everywhere!
(the marble moves around and the whole pinball machine is on a slant which makes it a huge ramp)

Final Reflection

Content

The pinball machine is way more scientific then I thought, I thought a pinball machine wasn't scientific at all, but I learned a lot about a pinball machine.

What surprised me is that I didn't think that fourth grader, could build a pinball machine but I was wrong.

What I learned is that it doesn't matter how old you are we were all made by God so anyone can do whatever they want to because God will help us!

Collaboration

The joys of working in a group for me is that you know that you're not making your pinball machine alone and you have friends to help you and you also have God!

The struggle of working in a group is that your group can sometimes be bossy and say no we're going to do it my way.

Goal(s)

I hope that someday I can learn that I can't just get mad if my group doesn't let me do anything or doesn't use my ideas because your group has ideas too and if your in a group of three and theres only two jobs then you might be taking turns so you don't need to get mad!

For market day I realized that you can learn from a group just in case we work in the same groups or even different groups we need to learn how to work with people. This isn't just for market day it's also for life!

About the Author

The Author of the story How Scientific is a Pinball Machine is Jordyn Maat She was born in 2004 in Holland Michigan, this story was written Thursday, December 12, 2013 and it took Jordyn a week to write this book. It didn't take that long if you compare it to a real book, but after all Jordyn was 9 when she wrote this book so it was pretty long for her!
Jordyn Maat started school early because she learned a lot from her older sister, Taylor Maat, Jordyn was in 4th grade and she was suppose to be in 3rd grade when she wrote this book.

Jordyn Maat

Glossary

Attract - To attract means to pull toward one another. Iron and steel are objects attracted to magnets.

Battery - A Battery is an electronic device that provides electricity and that creates a power source.

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

Conductor - A conductor is a material that allows electricity to flow through!

Current Electricity - Current electricity is the flow

Electricity - Electricity is a form of energy this is found in nature (lightning, static) and can also be produced through rubbing, chemical reactions, and generators. Electricity is produced through the movement of electrical charges.

Electromagnet - An electromagnet is produced when electricity flows through a coil of wire wrapped around an icon bar. It acts like a magnet.

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

Light Bulb - A light bulb is a lamp or light source whose light is produced by the glow of a heated wire. The light bulb requires an electrical circuit to heat the wire.

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.

Magnet - A magnet is a material that has the ability to attract iron, steel, or an iron alloy.

Magnetic - A magnetic material is a substance that is attracted to a magnet and can act like a magnet.

Magnetic Field - A magnetic field is the area of attraction and repulsion that surrounds a 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 it's poles.

Magnetically Attract - If two objects magnetically attract each other, they are pulled toward each other. Iron and steel objects are magnetically attracted to magnets. When two unlike poles of magnets are placed near they are magnetically attracted.

Magnetically Repel - If two objects magnetically repel each other, they are pushed away from each other. When two like poles of magnets are placed near, they are magnetically repelled.

Open Circuit - A circuit that is not connected to the path.

Path - A Path is a part of a circuit along which electricity travels. The path is made of conducting material.

Repel - To repel means to push away from one another

Simple Circuit - A simple circuit is the circular path of electric current, from the source of energy and back. A complete circuit includes a source, path, and load.

Source - A source is the part of a circuit that pushes electric current from the conducting material along the path. Batteries are examples of a source.

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

Wire - The wire in an electrical circuit provides a path for the flow of electrons from the source (battery) to load (light bulb).