

# How Scientific is a Pinball Machine?



By: Anna Miller

Mr. Commeret's class  
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## Making a Bulb Light Up



I learned that you should have the wires also known as a path both on the positive AND the negative side. That is the easiest way to make the load light up. (Light Bulb) I also learned that you need a closed circuit to light up the load an open circuit is when the bulb does not

Where you will see this in my pinball machine...

At the top of the board there is a magnet. If you get stuck on it you get stuck you get stuck by a bear you lose!

# Thats what I learned.



## *Florida Electrocution!!!!!!/Electromagnets*

One day in Florida I got electrocuted. My mom was doing my hair and I was not very happy about that. Mom went over to get something and so I picked up a bobby pin and I put in a socket. And I was shocked that it electrocuted me. I didn't think I was going to get electrocuted and I was 6 or 7 years old so cut me some slack here!!! Please? :) Ok thank you. And then when my mom came back my was like, "I just got electrocuted!!" And mom was just like, "No you didn't." And I was getting kind of frustrated. And I said, "Mom please I DID!" "How?" I stuck a bobby pin in the electrical circuit." "Anna Grace Miller don't you ever do that again!!!" "I won't, Mom. I learned my lesson."

I learned that the more coils the more paper clips you will pick up and i know that because we got 36 paper clips.

I

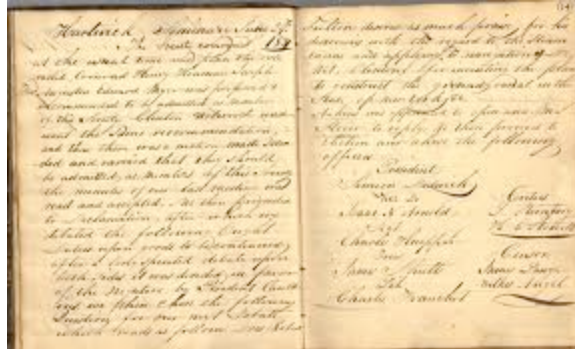
also learned that that there is a north pole and a south pole on a magnet. And that they will power each other when they are facing each other.

I also learned that electromagnets were found in animals like dolphins and pigeons.

And that the force of an electro magnet can also be produced by an electric current through the wires.

WHERE YOU ARE GOING TO SEE THIS  
IN OUR PINBALL MACHINE!!!!!!

**We are going to put one by our launcher so when you launch it it will be easier to lose and so we are going to put a magnet on the side so the ball is attracted to the magnet. And if you get stuck to the magnet you LOSE!!!!!!**



## Newton's Laws of Motion

Law #1: The law of inertia.

- An object at rest will want to remain to stay at rest unless an object or somebody forces it to move. And an object in MOTION wants to stay in motion unless someone or something stops it.
  - We rolled a bowling ball down the hallway and we had Cade stop it. So Cade was the one to stop the ball. Even though it wanted to

stay in motion it couldn't because it was forced to be stopped.

Law #2:  $F=ma$ .

- Acceleration is produced when someone is pushed by someone. So, the greater the mass of the object the more force it will take to push the object to move it.
  - The LESS the mass the less force it will take. For example, I was pushing a chair and it had not a lot of mass. When I pushed Abby on a chair then it took A LOT of force to push her across the room.

Law #3: The last of Newton's three laws of motion is...

- That for every action there is a reaction. I have a

couple of examples to show you.

- The first example is that Mr. Bouman threw a ball at my back and the ball bounced back to Mr. Bouman's hands. The action was throwing the ball and hitting my back and the reaction was it bouncing back into Mr. Bouman's hands.
- And another example is I got onto a scooter with Lena then we pushed off of each other and I fell on my face. The action is pushing off the reaction is going backwards.
- Another example is we put a clothesline across the room and a cut straw and we



tapped a blown up balloon onto the straw then we untaped it and it blew off. The action was the air coming out and the reaction was the balloon blowing across the clothesline.

Where you will see this in my pinball machine.

Well for law #1 we need it for the launcher because the ball inside is at rest and it needs to be pushed into the pinball machine. For law #2 we need it for you need it for bumpers because the more force the ball hits it with the more mass it will make and the ball will bump harder off the bumper. For #3 we need it for our flipper because for every action there is a reaction and so we need it because the bumper needs a reaction to the action and it wouldn't help if it just sat there so the action is the flipper hitting the ball the reaction is the ball flying up.



## Marbles on a Ramp

### What did I learn from the experiment?

I learned that friction would slow down the marbles. I also learned that the bigger the marble the faster the marble will go down the ramp. And the steeper the ramp is the more the gravity can pull onto the marble and pull it down even faster. And I also learned that at the beginning of the ramp the marble goes the slowest. In the middle it goes faster and at the end the force it stops it and at the moment the force is me or Landonian.

I was thinking that maybe we could have three turns and each turn we would put books under the pinball machine and that way it would be harder because gravity is grasping the ball better so it would go faster and it would be cool to see what would happen I think.



## **Final Reflection**

I do think that the pinball machine is more scientific I never really thought about how scientific it really can be. Like Electromagnets and Making a bulb etc. is really scientific. I was surprised that how much science is in a pinball machine I had no idea that it had ALL of the newton's laws of motion in a pinball machine!! I learned how important it is to actually work together in a group and how much more work you get done if you work together. One of the joys of working in a group was it was fun talking to people you don't usually talk to and get to know them a little bit better. Well sometimes we would all kind of struggle with deciding what to do because if we came up with a idea and nobody wanted to to it we would get in a big argument. In future group work I think that I should listen to other peoples ideas better and say what I think of them. I can grow better by saying I don't think that will work or please can we do this and don't argue if they say no just go with it.

## About the Author

Anna Miller is my name I have 3 people in our family not including me. I have a brother named Luke and he can be really annoying to me sometimes and can be nice. My dad is really super nice he is a teacher and he is really fun. My mom is really super nice too. She is a doctor and I have a lot of fun with her too. I have a god named Scout she is a golden retriever and she is really fuzzy! Down below is a picture of me.



## Glossary

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

**battery** - A battery is an electric cell that provides electricity or a power source for a variety of electrical devices. The battery is a source in an electrical circuit.

**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 it. Metals are examples of good conductors.

**current electricity** - Current electricity is the flow of electric charge through a wire or other conducting material.

**electricity** - Electricity is a form of energy that is found in nature (lighting, static) and can also be produced through rubbing, chemical reactions, and generators. Electricity is produced through the movement of electric charges.

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

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

**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 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 poles like poles of magnets are placed near, they are magnetically repelled.

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

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

**reflection** - Reflection is the light that bounces off a surface.

**simple circuit** - A simple circuit is a circular path of electric current, from 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 the load (light bulb).

Thank you for reading my book!!!