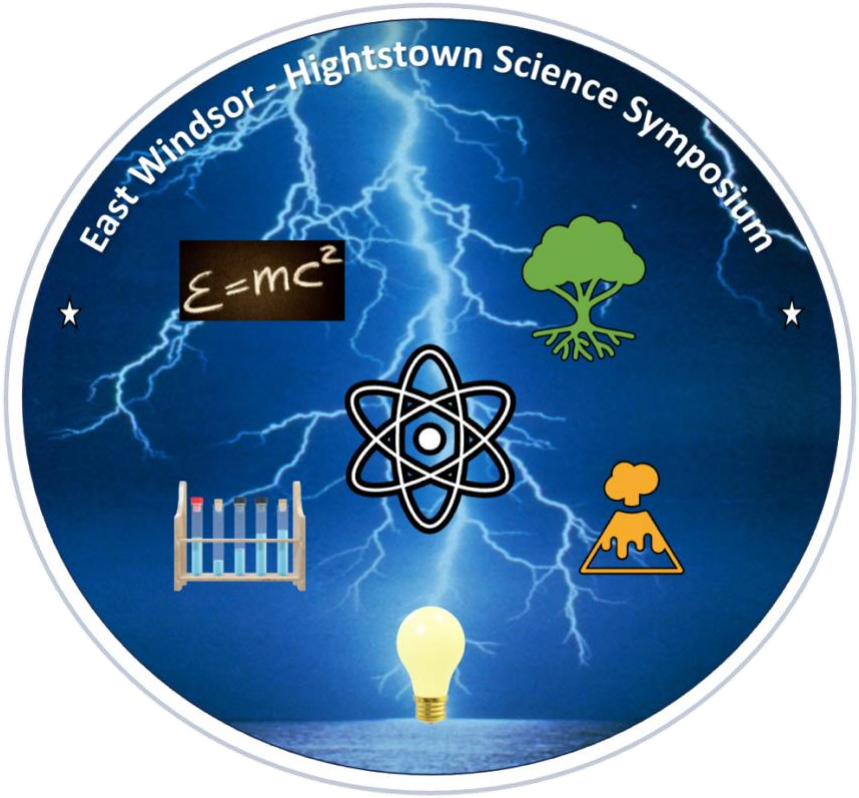

ABSTRACTS

EWH Science Symposium 2026

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Abstracts

Kinder Garten

KG- 1: Magnet Power

Title: Magnet Power!
Team: Race Buds
Submitted by: Eesiyon Baysah, Joshua Atkinson Jr

Objective: The objective is to show if a stop sign with the magnet stops the moving toy car that also has a magnet attached.

Materials and Methods: We created a ramp out of cardboard, used a shoebox to hold up the ramp, painted the road, and used popsicle sticks for the divider for the two lanes and the stop signs. We used a net to prevent the toy cars from falling off the ramp. We used two identical toy cars, created two stop signs and used lego blocks to attach the stop signs to the road. We also used a ruler as a lever to allow the toy cars to go down the ramp on both lanes at the same time.

The right lane consists of the toy car and stop sign with the magnets and the left lane consists of the toy car and stop sign without magnets.

Results: The right lane which consisted of the toy car and stop sign with the magnets attracted to the stop sign. The left lane, which consisted of the toy car and stop sign without the magnets, either fell into the net, bounced off of the stop sign or crashed onto the side of the lane.

Conclusion: This project shows that magnets can attract each other and stop a moving object. Based on the learning videos we watched, we learned that magnets have south and north poles, and magnets won't attach to materials such as plastic, wood, and cloth. Also we learned that magnets are in refrigerators, train tracks and many more.

Summary: In this project, we tested if a magnet could stop a moving toy car.

KG- 2: Dancing Color In Milk

Title: Dancing Color In Milk
Team: The Magic Milk Avengers
Submitted by: Yug Patel, Ayaan Mehta, Humza Hussaini

Goals:

This experiment is to see if we could make colors move around in milk without touching them with our hands. We wanted to see how soap makes the milk move!

Materials:

We use d a plate, whole milk, food coloring, Q-tips, and dish soap.

Methods:

First, we poured whole milk on a plate and put different drops of colors in the middle. Then, we dipped a Q-tip in dish soap and touched the colors. We held it to watch the magic happen!

Results:

When the soap touched the milk, the colors started moving, swirling, and dancing!

The colors zoomed away from the soap! It looked like a color explosion. It made beautiful rainbows on the plate.

Conclusion:

Milk has some fat in it. Soap loves fat! When the soap touches the milk, it runs around to find all the fat it can. The food coloring just goes along for the ride, and that's why it looks like it's dancing. When we try this experiment with water, the colors wouldn't dance at all because water has no fat for the soap to play with.

Grade 1

Grade1-1: Automatic Water Fountain

Title: Automatic Water Fountain
Team: Science Fairies
Submitted by: Aakanksha Pratapa, Julia Platt

Objective / Goal
Our goal was to make a water fountain without using electricity. We wanted to see how water can move by itself.

Materials and Methods
We used bottles, water, tubes, tape, and scissors. First, we put the bottles and tubes together. Then we poured water into one bottle. The water moved down and pushed air. The air pushed water up through a tube. Then the water came out like a fountain.

Results / Expected Results

Our fountain worked without electricity. The water came up through the tube and made a little fountain. We saw that water and air can push together.

Conclusion / Discussion
We learned that water can move without electricity. We also learned that air pressure can push water up. This project was fun and helped us learn about science.

Grade 2

Grade2-1: Electricity, Conductors & Insulators

Title: Electricity, Conductors & Insulators
Team Name: ElectroMinds
Submitted By: Ivaan Desai and Dhwiti Sheth

Objectives / Goals
What is electricity, conductors and insulators? Discover which materials allow electricity to pass through them (conductors) and which materials do not (insulators) by testing a simple circuit.

Materials and Methods
Materials:

- 1 AA or AAA battery
- 1 small light bulb or LED
- 2 wires with alligator clips (or simple circuit kit)
- Test objects: metal spoon, paper clip, coin, rubber band, plastic spoon, eraser, wooden pencil, pencil lead (graphite), aluminum foil, paper

Method:

- Build a simple circuit: connect one wire from the battery to the light bulb.
- Connect the second wire from the other end of the battery to the light bulb but leave a small gap—this is the spot for test objects (an open circuit).
- Place one test object in the gap so it touches both wire clips.
- Observe whether the light turns ON (electricity flows) or stays OFF (no flow).
- Record your observations in the table.

Results
We use Electricity every day and there are things that allow it flow and other things blocks it from flowing. Conductors allow electricity to flow — metals and graphite are common

conductors. Insulators block electricity — plastics, rubber, wood, and paper help keep us safe. We use conductors for wires and insulators to cover them.

Summary
Electricity is a kind of energy that makes things work — like lights, TVs, computers, and toys. It comes from tiny particles called electrons that move around. When these electrons flow, we get electricity. This project tested different materials in a simple circuit to see which ones allow electricity to flow. The results show that conductors allow electricity to pass while insulators block it.

Grade2-2: Sonic Riders

Title: Sonic Riders
Team Name: Lego Kidz
Team Members: Declan Cooley, Viswa Muntha, Lord Mars, Dhruva Divili, Alex Golieb

Goal

The goal of this project is to see how stopping and starting at the right time can help cars avoid collisions at intersections. The project uses Sonic characters to make learning fun while showing how traffic control systems work.

Method

We built small cars using LEGO Technic parts, motors, and battery packs. Each car represents a Sonic character such as Sonic, Tails, Knuckles, or Shadow. The cars move along tracks arranged in a rectangular layout with intersections where paths cross. Each car runs using its own LEGO battery-powered motor. Along the track, stop zones use electromagnets placed underneath. Push-button switches are used to activate the electromagnets, which pull a metal piece under the car
and stop it briefly, like a traffic signal.

Materials

Component	Description
LEGO Technic Parts	Beams, axles, wheels for building cars
Motors	Drive the cars
Battery Packs	Provide power to each car
Push Buttons	Activate electromagnets to stop cars
Wires	Connect switches and electromagnets
Electromagnets	Create stop zones
Metal Plate/Magnet	Attached under each car
Track Layout	Rectangular track with intersections

Results

When the stop zones are used at the right time, the cars can pass through intersections without crashing. If timing is not correct, collisions can happen.

Conclusion

This project shows how electromagnets can act like traffic signals to control movement at intersections. It helps us understand electricity, electromagnetism, motion, and timing. Similar systems are used in real-life traffic control.

Grade 3

Grade3-1: Wind Energy: Generating Electricity Using a Mini Windmill

Title: Wind Energy: Generating Electricity Using a Mini Windmill
Team: Fusion4
Submitted By: Aarna Patel, Anvy Jayaram, Ivaan Ganorkar, Nakshatra Raneesh

Objectives/Goals

This project aimed to demonstrate how wind energy can be used to generate electricity using a mini windmill. The goal was to understand how blade design and wind speed affect energy production.

Methods/Materials

A mini windmill model was constructed using cardboard blades, a small DC motor, and a stand. The blades were attached to the motor, which acts as a generator when rotated by wind. A fan was used to simulate wind at different speeds.

Three different blade designs (wide, narrow, and angled) were tested to observe which design produces the most electricity. The electricity generated was measured by connecting the motor to a small LED bulb. The brightness of the LED and the speed of blade rotation were recorded. Multiple trials were conducted to ensure accurate results.

Results

The angled blade design produced the fastest rotation and generated the most electricity, lighting the LED the brightest. Wider blades rotated more slowly, while narrow blades required higher wind speed to move efficiently.

Conclusions/Discussion

The results show that blade design plays an important role in wind energy generation. Angled blades are more efficient because they capture wind energy better and convert it into motion. This experiment demonstrates how real wind turbines generate electricity using renewable energy.

Wind energy is clean, renewable, and does not produce pollution, making it an important solution for reducing climate change.

Summary

This project demonstrates how a windmill can convert wind energy into electrical energy and highlights the importance of renewable energy sources like wind power.

Grade3-2: The Great Pacific Garbage Patch Clean Up

Title: The Great Pacific Garbage Patch Clean Up
Team: Ocean Stars
Submitted by: Arnav Saravanababu, Mithra Govindaraju

Goal: The goal of this experiment is to test ways to clean up the denser waste that is submerged under the Great Pacific Garbage Patch

Materials and methods: We are going to use a tub, fill it up with water, as well as fish toys. Our toy submarine will then be put together with a net which is then used as the clean up service.

Results: There are already a wide variety of projects happening to clean up the lighter plastic waste that is floating in the ocean. We will showcase how the submarine's ability to dive and float is unique to cleaning the denser waste that's submerged under water.

Conclusion: The reason why we think the submarine will be the best, is because it can float or dive to scoop up the denser waste. The net will let the fish pass through without getting stuck.

Grade3-3: Solar-Charged Remote-Control Car

Project Title: Solar-Charged Remote-Control Car
Team Name: Science Slays

Submitted by: Ella Roy, Siobhan Brasil

Abstract:

Objective / Goal

The goal of our project is to design and build a working remote-controlled car that demonstrates how solar energy can support transportation. Our car uses rechargeable batteries, and its battery can be recharged by energy collected from a solar panel and stored in a larger battery. We want to show that renewable energy can help reduce pollution, lower dependence on fossil fuels, and support more sustainable transportation.

Materials and Methods

Our design was inspired by a remote-control car build and then modified for our project goals. We used cardboard, wooden wheels, DC motors, gears, an adapted differential gear system, ball bearings, wires, glue, batteries, resistors, capacitors, and other simple electronic components. The front wheels are steered by a geared motor, and the rear wheels are powered by another motor connected to the differential gear system. A handheld controller and receiver repurposed from old toys control the car. To improve circuit performance, we placed resistors where needed and connected capacitors in parallel with the motors to reduce electrical fluctuations. Before final assembly, we beta tested the electronic circuit on a breadboard. A solar panel connected to a larger battery serves as the charging source for the car's rechargeable battery.

Results / Expected Results

We expect the car to move forward, backward, and turn smoothly by remote control. We also expect the solar-powered charging setup to recharge the car battery successfully. The improved electronics and differential gear system should provide more stable and efficient performance.

Conclusion / Discussion

This project demonstrates a small-scale model of cleaner transportation using renewable energy. By combining reused parts, tested circuits, and solar-powered charging, we show that engineering can create practical and environmentally friendly solutions.

Grade3-4: Float or Protect? Testing Water Safety Devices

Project: Float or Protect? Testing Water Safety Devices
Team: Super Angels
Submitted by: Aadhira and Sammy

1. **Objective / Goal**

We are going to test flotation (which device would help to keep someone above water) and protection against predators (which device would provide a barrier against an ocean predator).

2. **Materials and Methods**

The subject in this experiment will be a small doll. The doll will be in a pool of water. We will test the doll without any device or protection and with the following homemade items:

- Arm floaties (made of small balloons or bagged air)
- Inner tube (made of an inflated ring)
- Life jacket (made with bubble wrap)
- Boat or raft (made with aluminum foil etc.)

For the predator, we will use a toy shark.

We plan to test (1) flotation and (2) protection, a few times each. For flotation, we will measure how much of the doll stays above water (whole doll, head and shoulders, head, none). For protection, we will measure if the predator is able to make full / partial / or no contact with the doll. We will test each variable three times.

3. **Results / Expected Results**

We do not know which of the items will help the most with flotation or protection. But we expect that the boat or raft might be the best.

4. **Conclusion / Discussion**

At the end, we will discuss how we scored the experiments and what the results were. Based on the data, we will recommend which options are best for flotation and protection in the water. We will include some more information about water safety, too.

Grade 4

Grade4-1: Comparing the Strength of Ferrite and Neodymium Magnets at Different Temperatures

Title: Comparing the Strength of Ferrite and Neodymium Magnets at Different Temperatures
Team: Curious Bunnies

Submitted by: Niralya Tamilarasan, Aanya Shah and Meera Sriram.

Objective:

The goal of this experiment was to compare the magnetic strength of two types of magnets, ferrite and neodymium. We tested strengths of the magnets in 3 different temperatures like ambient, frozen and hot magnets.

Hypothesis:

We predicted that temperature would affect the strength of magnets. We also thought that one type of magnet might be stronger than the other.

Methods/Materials:

For this experiment we used ferrite magnets, neodymium magnets, a compass, a ruler, a bowl of ice water, a pot of boiling water, tape, and tongs.

First, we tested both magnets at room temperature. We placed a compass on the table and slowly moved each magnet toward it. We measured the distance where the compass needle started to move.

Next, we placed the magnets in ice water to make them very cold and repeated the same test. Finally, we placed the magnets in boiling hot water and tested them again to see if the compass needle would move.

Results:

The ferrite magnet showed a stronger magnetic effect than the neodymium magnet at both room temperature and freezing temperature. However, when the magnets were placed in boiling hot water, the magnetic effect of both magnets was almost gone and the compass needle barely moved.

Summary:

This experiment showed that temperature can affect the strength of magnets. The ferrite magnet was stronger than the neodymium magnet at room temperature and freezing temperature. However, very high heat weakened both magnets and almost removed their magnetic effect. This experiment helped us understand how temperature can change magnetic strength.

Grade4-2: From Atoms to Electricity

Title: From Atoms to Electricity

Team: Curious Chemists
Submitted By: Jithin Gopinath, Krishnom Nithyanandan, Shivaan Desai

Objectives/Goals: The goal of this project is to learn basic chemistry concepts such as atoms, elements, molecules, and ions. We also explore how chemical reactions can produce electricity using a simple zinc–copper battery. This demonstrates how chemical energy can be converted into electrical energy.

Methods/Materials:
1. Basic Chemistry Models
We used simple models and real-life objects to explain key concepts.

- **Atom Model:** Thermocol/cardboard structure with pompoms representing protons, neutrons, and electrons.
- **Elements:** Objects such as copper wire, iron nail, aluminum can, and pencil (carbon). LEGO versions used same-colored blocks (example: yellow for gold).
- **Molecules of Elements:** Helium balloon and sulfur. LEGO version used same-colored blocks taped together (example: two oxygen blocks for O_2).
- **Molecules of Compounds:** Baking soda, vinegar, and water. LEGO version used different-colored blocks connected.
- **Ions:** Sports drink electrolytes and lemon juice. LEGO pieces floating in water represented ions.

2. Battery Experiment
Materials:
Zinc and copper strips were placed in vinegar and connected with wires to complete a circuit. The zinc reacted with vinegar and released electrons, which traveled through the wire to the copper. Hydrogen ions (H^+) in vinegar accepted these electrons. Ions moved in the liquid while electrons moved in the wire, allowing the LED to light up.

Result:
Electrons flowed from zinc to copper, while ions moved through vinegar to maintain the reaction. When the circuit was complete, the LED turned on, proving that the chemical reaction generated electricity.

Conclusion:
This project shows that everything is made of tiny things called atoms. Atoms can stick together in different ways to make stuff like elements, compounds, and mixtures. Some reactions can make tiny electrons move and make electricity. The zinc–copper battery demonstrates how chemical energy transforms into electrical energy, just like the batteries used in common devices.

Grade4-3: Elephant Toothpaste

Title: Elephant Toothpaste
Team: Science Stars
Submitted by: Heer Patel, Mahi Patel, & Parnika Singh

Objective/goals: We aimed to establish, if increasing the quantity of the catalyst (yeast), will intensify the resulting chemical reaction converting hydrogen peroxide (H2O2) to water (H2O) & oxygen (O2).

$2H_2O_2 \rightarrow 2H_2O + O_2 + energy$

Methods/materials: To conduct the elephant toothpaste experiment, add 1 tablespoon of yeast in one bottle with 4 tablespoons of warm water and gently swirl the bottle to mix the ingredients. Repeat the same process with 2 tablespoons of yeast mixed with 8 tablespoons of warm water. Keep it aside so yeast gets activated. In a separate cup, combine ½ cup of hydrogen peroxide and 1 tablespoon of dish soap. Repeat the same step in a different cup. Add a few drops of food coloring in both bottles. Once it is ready, pour the hydrogen peroxide mixture into the bottle with yeast & mix. Step back and watch the reaction.

Conclusion: This experiment teaches us chemical reactions in a fun and visual way. It shows how a catalyst speeds up chemical reactions, converting a toxic substance into water & oxygen, daily essentials for human beings. Results: Increasing the amount of catalyst speeds up the chemical reaction that converts hydrogen peroxide into water & oxygen. This resulted in the elephant toothpaste foaming rapidly. This is an exothermic reaction, as both the foam & the bottle felt warm to touch.

Real World Application: Hydrogen peroxide is used to clean wounds. The enzyme catalase in the human body reacts with H2O2, to cause a foaming reaction that brings embedded wound debris to the surface. Medical equipment is sterilized using H2O2 vapor & metal catalyst to clean the medical tools without toxic by-products.

Grade4-4: Shake it Up – Which Buildings can Survive an Earthquake?

Title: Shake it Up – Which Buildings can Survive an Earthquake?
Team: Quake Quest
Submitted by: Vajra Vedururu, Swaraa Shah, Kavya Vyas and Pahal Sheth

Objectives / Goals
This project studied how earthquakes affect buildings and how building design can help keep people safe. Earthquakes happen when tectonic plates move and cause the ground to shake. When the shaking is strong, buildings can fall and hurt people.

The goal of this project was to find out which building designs stay the most stable during earthquake shaking. We tested how structure strength, tuned mass dampers, and base isolation can help reduce building movement.

Methods / Materials
Materials used included cardboard, newspaper, popsicle sticks, rubber bands, springs, Lego pieces, foam paper, tennis balls, wooden planks, tape, and glue.

Several building models were built using different materials and structures. An earthquake simulator was built to shake the buildings and to show how ground movement affects structures. A simple seismograph model was also built to show how earthquake vibrations can be recorded.

Each building model was placed on the simulator and tested during shaking. We recorded how the buildings moved, which designs absorbed vibrations better, and how the buildings reacted to different levels of shaking.

Results
Buildings with adequate strength and flexibility moved less and stayed standing longer during shaking.
Buildings with a tuned mass damper, a weight placed at the top of a building, swayed less than buildings without one. Buildings with base isolation absorbed the shaking better and stayed more stable.

Conclusions / Discussion
This project showed that building design makes a big difference during earthquakes. Strong structures, tuned mass dampers, and base isolation helped reduce building movement. Engineers use these ideas to design safer buildings in earthquake areas. Better building designs can help reduce damage and protect people during earthquakes.

Summary
This project tested how different building designs respond to earthquake shaking and which designs help buildings stay more stable.

Grade4-5: A Bubble Fit For Glinda

Title: A Bubble Fit For Glinda
Team: The Wizard of Drew
By: Eloise Dobinson & Ariana Akhmedovia

Goal
Which type of water makes the best bubble? We want to learn how water helps bubbles form. We will test tap water, sparkling water, and distilled water to see which one makes bubbles that last the longest.

Materials and Methods
We will use 6 cups of water (tap, sparkling, and distilled), ½ cup of dish soap, 1 tablespoon of corn syrup, ½ cup of cornstarch, and 1 tablespoon of baking powder. We also will use a tray, cotton string, two sticks, and metal washers for the wand.

First, we will mix all the ingredients and let the solution sit for 20 minutes. Next, we will make a bubble wand using sticks and string. Then, we will dip the string into the solution and pull the sticks apart to make a bubble. We will use a timer to see how long each bubble stays in the air.

Expected Results
We think distilled water will make the best bubbles. Sparkling water has gas in it, which may pop the bubbles. Tap water has minerals that might make weaker bubbles that do not last long.

Conclusion
We expect distilled water to make the best bubbles because it is pure and has no extra minerals. This helps the soap form a strong, stretchy film. Tap water has minerals that can weaken bubbles. Sparkling water has gas that can break the bubble. Soap is important because it helps form the bubble, but distilled water will help it last the longest.

Grade4-6: Watch Out for Quicksand

Title: **Watch Out for Quicksand**
Team: Josie & Lucia
Submitted By: Josephine Hayston and Lucia Vaccaro

Objective:
Our goal for this project is to investigate how quicksand works and to discover its interesting qualities.

Materials:
For this project you will need the following three materials:

- Cornstarch
- Water
- Bowl

Methods:
There are only two steps to make quicksand which are:

1. Fill the bowl about halfway with cornstarch.
2. Add water and stir until it makes a thick paste.

Results:
You will see a thick creamy like substance that will feel like a gooey texture.

Discussion:
In conclusion you have observed the qualities of quicksand.

Grade 5

Grade5-1: Eutectic Solutions: Why Some Salts Melt Ice Better Than Others

Title: Eutectic Solutions: Why Some Salts Melt Ice Better Than Others
Team: AJax
Submitted by: AJ Beers and Jaxton Zacour

Objectives
This project tested which types of salt (cooking salt, rock salt, and magnesium chloride) melt ice the fastest using eutectic solutions. We also measured how much melted water was produced in 10 minutes. We guessed magnesium chloride would melt the ice fastest because it is used on roads to melt ice and snow in winter.

Methods
We used 4 cups, each filled with 3 full-sized ice cubes. We added 1 teaspoon of cooking salt, rock salt, and magnesium chloride to three cups, leaving one as the control. We observed the cups at 2, 5, and 10 minutes. At the end we strained out the ice and salt and measured the melted water in ounces using a scale.

Results
At 2-minutes, rock salt had melted the most ice, while magnesium chloride and cooking salt were tied. The control showed almost no melting. At 5-minutes, the rock salt was still in the lead in terms of melting the ice the fastest. At 10-minutes, we found the control had 0 ounces of melted water. Cooking salt had 0.2 ounces of melted water. Rock salt and magnesium chloride both had 0.4 ounces of melted water. We had a tie between the rock salt and the magnesium chloride.

Conclusions and Summary
We were right that magnesium chloride melted ice quickly, but rock salt melted the same amount in the same time. The control melted the slowest, as expected. In this project, we tested how different salts create eutectic solutions to melt ice and compared which worked best. Our results help explain why rock salt and magnesium chloride are used on roads and sidewalks in the winter. If there is a blizzard, we would choose one of these to help melt ice faster!

Grade5-2: Reusing rockets

Title: Reusing rockets
Team: Fire Rockets
Submitted by: Devaansh Patel and Ved Hinduja

Problem :
The main part of the rocket is very expensive to build, and cannot be reused.

Objective:
Our objective for this project is to research and design a rocket that can be reused.

Methods/Materials :
For this project, we used a corklanding pad, cardboard rocket and pulley system. From our research we found that rockets need special metals so that they don't melt during reentry. Some of these metals are **Tungsten, Tantalum, Molybdenum, and Rhenium.** These metals have very high melting points, so they do not melt when they get very hot.

Using a cardboard rocket and corklanding pad, we tested whether the rocket could not survive impact after falling from different heights. To show how a rocket could land safely, we built a pulley system out of cardboard. The pulley helped us lower the rocket slowly, similar to how real rockets use fire and engines to reduce speed before landing.

Results :
The results showed that the rocket survived drops from 1, 2, and 3 feet onto the corklanding pad when using a pulley system but not when directly dropped onto the landing pad. In addition, the use of high-melting-point materials mentioned above demonstrates how rockets could be protected from extreme temperatures.

Conclusion :
Overall, this project shows that with proper materials and landing methods, rocket reusability is possible and effective.

Summary :
This project explored rocket reusability by designing a prototype that could safely land on a corklanding pad. A cardboard rocket was tested by dropping from different heights using a pulley system onto the pad, and it survived all tests. The project also examined the use of heat-resistant materials to protect rockets from extreme temperatures during reentry. Overall, the results show that reusable rockets are possible with proper materials and landing methods.

Grade5-3: Sink Or Float

Title: Sink Or Float
Team: Mad Scientists
Submitted by: Aayush Penugonda, Mikaelah Morales

Objective / Goal
The objective of this sink or float project was to investigate how the density of common objects influences whether they sink or float in water. The goal was to help learners understand buoyancy, density, mass, and volume through experimentation, timing and structured observation.

Materials and Methods
Materials included a transparent container, clean water, and various objects such as a nickel, rocks, marbles, a miniature toy duck, pebbles, etc. Each object was observed, weighed by hand comparison, and its expected behavior was recorded. Objects were gently placed into water individually, and observations were noted. Some pieces had to be retested because of the timing being off. The procedure was repeated for accuracy.

Results / Expected Results
Objects with higher density than water, including nickels, marbles, and rocks, consistently sank to the bottom. Objects with lower density, such as pinecones, a lego piece floated or partially floated. These findings matched predictions and demonstrated a clear relationship between density and buoyancy.

Conclusion / Discussion
In conclusion, the sink or float project successfully demonstrated that density determines whether an object sinks or floats in water. The activity strengthened scientific skills such as predicting, observing, recording data, and drawing conclusions. This experiment is appropriate for interesting science education and encourages curiosity and critical thinking. Understanding buoyancy through simple materials helps learners connect scientific concepts to real world experiences and everyday objects. It also supports inquiry based learning by allowing students to test ideas, observe outcomes, and reflect on results. Repeating the experiment with different liquids or object shapes could extend learning and improve understanding of density and displacement principles. Overall, this project provides a simple yet effective foundation for future scientific investigations and classroom discussions. It promotes engagement, confidence, and enjoyment while building essential scientific knowledge, while learning new stuff, some examples are buoyancy, density and the Archimedes principle.

Grade5-4: The Copper Coaster

Title: The Copper Coaster
Team: Magnetic Mayhem
Submitted by: Lucas. A, Roman. C, Jane. M

Objective:
This project's goal was to use electromagnetic propulsion to move a battery through copper coils.

Methods/Materials
The 4 materials that we are using are, magnets, copper coils, a battery(or batteries), and paper towel rolls. We are trying to attach 6 magnets to a battery to have it create an electromagnetic field, that way it slides along the coil. We are also going to shape the coils into a roller coaster. When we insert the battery into the coils, the reaction with the coil will allow it to move the battery along the coils. We are going to put paper towel rolls held up by cardboard beams that don't have any magnets attached to hold up the coils. After the initial hill we are making a smaller hill to cancel out some of the speed of gravity pulling it down.

Results
The Rayovac 1.5 volt, double A battery works better than triple A's. Bigger, and stronger magnets work better than smaller, and weaker magnets. The 14 gauge copper wire was too thick, the 18 gauge copper wire was a good thickness for it to move smoothly throughout the coil.

Conclusions/Discussions
The Rayovac 1.5 volt battery is the best battery to use. Additionally, the original small magnets were too small because the diameter of them was too small compared to the battery. Although the alkaline 1.5 volt battery had around the same speed, the Rayovac had more efficiency and went slightly quicker. The coil couldn't be coated with enamel or other materials, it needed to be a bare copper coil.

Summary
This project attempts to transport a battery with magnets attached to it, through a copper coil with no help, tracking through hills and turns.

Grade5-5: Bioplasticity

Title: Bioplasticity

Team: Nature Ninjas

Submitted by: Sree Venidhar Reddy Guntaka, Paul Singleton, Eshan Appanagaari, Varnika Appanagaari

Introduction

Plastic water bottles are a major environmental and health concern. Most are made from fossil fuels and can release microplastics into drinking water, which may harm human health over time. They also take hundreds of years to decompose, contributing to long-term pollution. This project focuses on creating a biodegradable PLA (plant-based) water bottle as a safer and more eco-friendly alternative.

Objective

The objective is to create a plant-based bottle and evaluate its ability to hold water effectively under different conditions.

Materials/Methods

Materials used include cornstarch, water, vinegar, glycerin, aluminum foil or a silicone mold, a pot, spatula, brush, and beeswax. To prepare the bottle, 16 tablespoons of water were mixed with 4 tablespoons of cornstarch, 4 teaspoons of vinegar, and 4 teaspoons of glycerin. The mixture was heated while continuously stirring until it formed a thick paste. The paste was molded into the desired bottle shape and left to dry for 2–3 days. After drying, the bottle was removed from the mold and coated inside and outside with beeswax to improve water resistance.

Results

The biodegradable bottle successfully held water for more than a day when coated with beeswax and could be reused under normal conditions without immediate leakage.

Conclusion/Discussion

PLA bottles are eco-friendly but less durable than traditional PET bottles. They perform well at room temperature, especially when thick and properly coated with beeswax. However, they are not suitable for hot liquids, as heat can weaken the coating and make the bottle soft and unstable.

Summary

This project demonstrates a sustainable alternative to plastic bottles that can reduce pollution and promote safer materials, although improvements in durability and heat resistance are needed for practical everyday use.

Grade5-6: How Do Different Drinks Affect Your Teeth?

Title: How Do Different Drinks Affect Your Teeth?
Team: Smile Scientists
Submitted by: Allison Mendoza & Leah Nordness

Objective/Goals: To discover which liquids are the best and worst for your teeth.

Methods/Materials:
Five drinks that will be used in this experiment are Orange Gatorade, Coca-Cola, Vita-Coco, milk, and orange juice. Our hypothesis, we strongly believe that Coca-Cola will affect the eggshells the most. That is because Coca-Cola has a lot of sugar and condiments like acid that can affect your teeth. For the liquid that we think will affect your teeth the least is Vita-Coco. This is because Coconut milk contains less acid than other drinks and doesn't have any sugar, unlike sodas.

To do this experiment, we will be using eggshells, which will represent our teeth. Next, we will put the egg shells into the drinks that we had just poured. Now, over the span of seven days, we will be recording what we notice about the egg shells.

- Day one: No change
- Day two: The worst were orange Gatorade and Coca-Cola. The two best were Vitacoco and milk.
- Day three: Coca-Cola is the worst, and Vita-Coco is the best.
- Day four: No changes from day three.
- Day five: Still no changes
- Day six: No changes except Vita-Coco is getting worse.
- Day seven: Coca-Cola had destroyed the eggshell, and Vita-Coco had left it largely intact.

Conclusion/Discussion:
Based on our study, our hypothesis was right. Coca-Cola made the teeth the dirtiest and most rotten. The Vita-Coco kept it the cleanest, and it didn’t decompose.

Summary:
This project helps see which drinks are healthy and not healthy for your teeth.

Grade5-7: Can Music Genres Affect Yeast Growth?

Title: Can Music Genres Affect Yeast Growth?
Team: The Sansini
Submitted by: Veda Hasini Allam and Sanya Mehra.

Objectives/Goals
This experiment aimed to determine if music genres can affect yeast growth. It also aimed to see what happens if it has an effect on yeast growth.

Methods/Materials
For this experiment, the effect of different music genres on the growth of yeast were tested. Four identical containers were prepared with equal amounts of warm water, honey, and active dry yeast to create the same starting conditions for each sample. The containers were then placed in separate areas where different music genres were played, such as Classical music, Rock, and Hip hop. We placed headphones on all the containers, so that the vibrations went into the yeast. One container was kept in a quiet environment. This allowed us to compare and contrast normal yeast growth with yeast growth that was exposed to music. The differences in yeast growth were measured by observing the amount of foam and carbon dioxide in each container. To ensure accurate testing, each container used the same amount of yeast, water, and honey. They were kept at the same temperature.

Expected Results
We expect that each container will have a different effect because of the music.

Conclusion/Discussion
Based on background research, the growth of yeast is mainly affected by temperature, the amount of sugar available, and the surrounding environment. In this experiment, different music genres were played to determine whether the genres could affect yeast growth. Little variations in the results may have been caused by small differences in temperature, sound levels, or the exact amounts of yeast, sugar, and water used in each trial. These factors could change how much foam and carbon dioxide the yeast produced.

Summary
This experiment determines if/how music genres can affect yeast growth.

Grade5-8: Eat it or Leave it? Is the Five Second Rule a Myth?

Title: Eat it or Leave it? Is the Five Second Rule a Myth?
Team name: The Five-Second-Rulers
Submitted By: Amrutha Karan, Meenakshi Sundar, Kavya Shah

Objective
This study aims to determine if the "Five Second Rule" is true or not. Some people think food is safe to eat if picked up from the floor within five seconds. Our goal is to test this idea. Our hypothesis is that it is not safe.

Methods
To test our hypothesis, we will conduct "The Bread Experiment." We will cut slices of bread into 12 equal pieces and place them on four different surfaces: bathroom floor, outdoor patio, kitchen floor, living room carpet. Each surface will have three pieces of bread. One piece will stay on the floor for 3 seconds, one for 5 seconds, one for 10 seconds. Then, we will collect the samples and swab them directly onto labelled petri dishes. We will monitor bacterial growth by looking at it every day at the same time for 72 hours and taking pictures to observe progress.

For our negative control, one of the bread pieces will not touch any surface and will also be swabbed onto a petri dish to show that the bread did not already have bacteria.

To support our hypothesis, we have performed online research using reliable sources (1,2).

Materials: Bread, petri dishes, gloves

Discussion
We think our results will show that the "Five Second Rule" is not true. We expect that the longer the bread stays on the floor, the more bacteria will grow. We also think that different surfaces will have different amounts of bacteria. We expect most bacterial growth from the bathroom-floor sample. If our results match what we expect, it will show that food is not safe to eat after it falls on the floor, even for a short time. This means the "Five Second Rule" is probably just a myth and not a safe rule to follow.

Sources:
1. *Rutgers Researchers Debunk 'Five-Second Rule': Eating Food off the Floor Isn't Safe*
2. *University of Alabama at Birmingham's News: The five-second rule: Fact or Myth?*

Grade5-9: Wind Turbine

Title: Wind Turbine
Team: Turbine Titans
Submitted by: Akshar pratapa, Aarush Penugonda

Objective/Goal:
The goal of this project was to build a small wind turbine and learn how it changes wind energy into electrical energy. We wanted to understand how moving air, or kinetic energy, can be used to produce electricity.

Materials and Methods:
We used a small DC motor, turbine blades, wires, a base, and a fan to build a working wind turbine model. The fan was used as the wind source to make the blades spin. When the blades turned, they rotated the motor, which acted like a generator. We used a multimeter to measure the amount of electricity produced by the turbine. We tested the turbine several times and recorded the voltage produced during each trial.

Results/Expected Results:
We expected the wind turbine to produce electricity when the fan blew air onto the blades. The results showed that moving air can spin the blades and generate electrical energy. The voltage readings helped us see that wind energy can be converted into usable power.

Conclusion/Discussion:
This project showed that wind turbines can convert the kinetic energy of moving air into electrical energy. It also helped us understand the importance of renewable energy and how wind power can be used in real life. Wind turbines are a clean source of energy that can help reduce pollution and save natural resources.

Grade5-10: Black Hole Simulator

Title: Black Hole Simulator
Team: Quantum Quasars
Submitted By: Tavo Lopez, Jiyaan Patel, and Harrison Kelly

Objective/Goal:

This study is aimed to demonstrate an object in space getting attracted to a black hole.

Methods/Materials:
Our project will represent how objects get absorbed into a black hole's immense gravity. A black hole works in a way that is similar to a slide. Gravity pulls you down, and once you go past a certain point, you can't stop or climb back up. In space, that "point of no return" is called the event horizon. Once anything crosses it (even light there is no coming back. To show this, we will build a "gravity well." We will use a sheet of spandex to represent the fabric of space. A heavy ball will be placed in the middle to show how a massive object like a black hole warps and curves space-time. In our demonstration, we will roll a marble across the fabric to represent a star or a planet traveling through space. It will roll along the Spandex and eventually get to the mass and halt. We have 3 variables in speed, 3 in weight of the attractor, and 3 in distance aimed away from the attractor for a total of 27 variables.

Expected Results:
We have two different ideas of what could happen. One being that if the marble is fast enough it will "escape" the pull of the black hole and not get in orbit. If the marble isn't fast enough then it will get caught in the black hole. The variables will decide what happens.

Conclusion:
We hope that our project will succeed and that we can learn something from this experiment.

This will also allow other students to understand the unique properties and behavior of black holes through our demonstration. Thank you.

Grade 6

Grade6-1: ARo: Adaptive Robotics Platform (Phase 1)

Title: ARo: Adaptive Robotics Platform (Phase 1)
Team: Adaptive Robotics Team
Members: Vibha Muntha, Sara Sudhakar
Robot: ARo

Objective

The objective of this project is to design and evaluate a foundational robotic system that demonstrates adaptive navigation using real-time sensor input. This work represents Phase 1 of a multi-year robotics initiative aimed at developing intelligent and autonomous robotic systems.

Method

ARo was built using a BBC micro:bit, RobotBit motor driver, and an ultrasonic sensor, programmed entirely in MicroPython. The system follows a sensing–processing–movement loop, where distance data is continuously evaluated to control motion. A rule-based decision model enables adaptive behavior: the robot increases speed when the path is clear, reduces speed as obstacles approach, and turns at critical distances. Three movement modes are represented using micro:bit LED patterns and distinct audio tones, providing real-time visual and auditory feedback. The robot was tested under fixed-speed and adaptive-speed conditions across multiple trials, measuring time taken and obstacle contacts.

Results

Adaptive-speed navigation resulted in smoother movement, fewer obstacle contacts, and improved efficiency compared to fixed-speed behavior. Visual and audio feedback made system behavior clearly observable.

Conclusion

This project demonstrates that simple sensor-driven logic in MicroPython can produce adaptive and observable robotic behavior. As Phase 1, it establishes a strong foundation for future development.

Phase 2 will integrate AI techniques for learning-based decision-making and multi-terrain locomotion using Strandbeest-inspired designs. Phase 3 will extend toward humanoid robotics capable of simple real-world tasks and advanced autonomous behavior.

Grade6-2: Degrees of Power - Effect of Temperature on Battery Efficiency

Title: Degrees of Power - Effect of Temperature on Battery Efficiency
Team: Battery Brainiacs
Submitted by: Reya Vyas, Amayah Baysah and Jocelyn Stiles

Objective
Study how temperature affects the voltage output and performance of batteries.

Materials/Methods

9-volt batteries	Voltmeter
Ice bin	pot of boiling water
2 Ziplock bags	Thermometer

One battery was kept at room-temperature to serve as the **control battery**. The other two batteries were placed in separate watertight bags to prevent moisture from affecting the results. One sealed battery was placed in the freezer to create a **cold temperature condition**. Second sealed battery was placed in a bowl in boiling water to create a **hot temperature condition**. After 30 minutes, the hot and cold batteries were removed. Their voltage was measured immediately and then after every 10 minutes using the voltmeter as the batteries gradually returned to room-temperature. The same voltmeter was used, and room conditions were kept constant for every measurement.

Results
All measurements were plotted on graph to observe how battery voltage changed with temperature. The heated battery produced a higher voltage than the control battery. As the battery cooled to room temperature, its voltage gradually decreased toward the control battery's voltage. The cold battery produced a lower voltage than the control battery. As the battery warmed to room-temperature, its voltage gradually increased toward the control battery's voltage.

Discussion/Conclusion
The temperature affects battery voltage because it changes the speed of chemical reactions inside the battery. Higher temperatures increase electron flow, producing higher voltage, while lower temperatures slow down reactions and reduce voltage. However, these effects are mostly temporary, and voltage stabilizes when the battery returns to room-temperature.

- **Cold temperatures** cause the battery to produce **less power**, which **can make devices run poorly or stop working**.
- **Hot temperatures** and **voltage can damage the battery, shorten lifespan, and increase the risk of leakage or failure**.

Summary
Batteries perform best at moderate temperatures because they provide stable voltage and longer battery life.

Grade6-3: Flood Warning

Title : Flood Warning

Team Name : RoboRaptors

Team Members : Abhinav, Soundarya

1. **Objective / Goal**

The goal of this project is to help people by protecting their homes, and communities from dangerous floods by creating a smart system that can detect when a flood is about to happen. This system will automatically pump water to another location when it senses rising water levels, so it can stop or reduce flooding before it causes major damage. In the future, this idea could be used to save lives and make places safer during heavy rain and storms.

2. **Materials/Methods**

For materials, we will use 2 sensors to detect the water. We will use 2 plastic boxes to hold water, and a pump and tube to connect them. We will use wires. We will cut a hole in both containers to put the tube in for the water to flow, and a pump to pull the water from one container to the other.

3. **Result**

We expect this project to be successful because the system is designed to quickly detect rising water levels and automatically pump the water without needing any human help. When tested, the sensor should send a signal as soon as the water reaches a certain point. This will help block or reduce the amount of water getting through. Overall, we expect the project to prove that a smart and automatic solution like this can help prevent flooding and keep people and places safer.

4. **Conclusion**

In conclusion, we will be making a flood detection system that makes water that is too high go to another place, so that if a flood is going to happen, it will quickly drain all the water away from the area to another safer place. We expect it to be successful because it should automatically and quickly pump the water away when it detects the water getting too high. By using these sensors, we can save people from floods.

Grade 7

Grade7-1: How Do Animals in Chernobyl Survive under High Radiation And How It Compares to Other Accidents.

Title: How Do Animals in Chernobyl Survive under High Radiation And How It Compares to Other Accidents.
Team name: Absolute Zero
Submitted by: Pardhiv Allam and Mustafa Choudry

Objective:
This project aims to provide a scientific study of the mistakes made that caused this catastrophic event and how organisms in the Chernobyl Exclusion Zone adapt under high radiation levels. This project also explores the changes in phenotypes for organisms. This study will also focus on the Fukushima disaster and compare them to the Chernobyl disaster.

Methods/Materials:
The materials for this project include a computer for research, a poster board to record information, baking soda, plastic bags, paper, and cardboard. Since the research is done on a computer, the evidence will be found on the internet and will be jotted down in the project. We will be using reliable sources that are trustworthy and certified.

Expected Results:
Our expected results are that when the baking soda is mixed with water, the Chernobyl diorama will explode, showing how the actual reactor 4 exploded to give a visual. From there, we will explain the mistakes the workers made during a small test and how the radiation spreads through the air and impacts the organisms around it over time. Other expected results include how the radiation of the Fukushima Disaster was not as much as dangerous as the other event.

Conclusion:
In conclusion, we learned the differences between two catastrophic events related to nuclear power and how they went down. Because of this, the animal's phenotypes changed with distorted bodies and smaller brain size. Their genetic variation helped those organisms stay resilient through the harmful environment.

Summary:
This project determines the science behind the Chernobyl incident and the Fukushima incident and how it went down and how organisms in the Chernobyl reactors adapt to high levels of radiation.

Grade7-2: Does Density Affect Wood Burning Efficiency?

Title: Does Density Affect Wood Burning Efficiency?
Team: Woodburners
Submitted By: Defne Dağcı, Anwita Kalakata, and Siddarth Yellambhatla

Objectives/Goals: We tested different kinds of wood to see how fast they boil water. We measured the density of each wood to see if more dense or less dense wood boils the water faster. We believe density plays a role in the speed of the boil.

Methods: We cut our wood into blocks with a miter saw (adult did the cutting). After, we recorded the measurements for each block. To calculate density, we found the mass of each wood and divided it by the volume. We averaged the densities for each type of wood. We recorded all the measurements and densities and entered them into a data table. We stacked the wood in a hashtag design. We did three tests for each wood type. We boiled 150mL of water. We timed the boil starting when the wood started burning. We stopped our timers when the water reached 100°C.

Materials: Red Oak, Pine, Water, Miter Saw, Calculator, Stainless-steel pot, Iron stand, Metric ruler, Scale, Lighter, and Fire starter.

Results: Pine took the least amount of time to boil for all three tests. Red oak took the longest to boil. Additionally, the 3rd trial of pine was denser than the other two and it took longer to boil the water than the previous ones.

Conclusions/Discussion: This supports our hypothesis that density affects the intensity of burning. The more intense the fire is, the faster the water will boil. Our results show that pine, the less dense of the two woods, took less time to boil. Furthermore, when the density of pine was higher, it also took longer to boil. In conclusion, the less dense the wood, the faster it will boil water.

Research: https://csef.usc.edu/History/2008/Projects/J1213.pdf

Grade 8

Grade8-1: AI & Robotics in Modern Warehousing

Project Title: **AI & Robotics in Modern Warehousing**
Team: **K2 Robotics**
Submitted by: **Kavish Vyas & Kush Patel**

Objective:

Show how AI and Robotics can make warehousing more efficient by streamlining monotonous and dangerous tasks. Research energy efficient bot mechanism.

Methods/Materials:

We used Optical, Distance, Bumper sensors, Pneumatics, Vex IQ robot components, pins, and touch LEDs. The robot is equipped with a 2-grip pneumatic claw and a 4-bar arm capable of lifting up-to 5 pounds. We built the bot to model core warehousing tasks like picking, sorting, shipping, autonomous navigation and inventory management.

- Used distance sensor to demonstrate **collision avoidance system**.
- Trained optical sensor to scan the packages for **detecting colors and tags**.
- Programmed the **robot to analyze the packages** and perform an output based on the color.
- Equipped bot with **AI capabilities** to generate analytics like product trends, inventory levels and shipping patterns.
- Researched pneumatics, hydraulics and electric motors for energy efficiency and precision.

Results:

The robot can identify the different color pins through an optical sensor and perform **autonomous intelligent actions**. The **collision avoidance system** with the distance sensor works as expected. Energy efficient Pneumatic components managed to perform precise actions with high accuracy.

Conclusion/Discussion:

Our project demonstrates how AI and robotics are already transforming modern warehousing, making operations more efficient and accurate. We developed a robotic system that can sort, pick, and organize different packages, simulating real warehouse tasks. Using AI-based programming, the robot detects obstacles, navigates safely, and handles objects without human intervention, like real industrial robots.

Our different mechanisms also model how sustainable energy sources such as pneumatics can be harnessed in a warehouse setting without creating severe damage to the environment.

Overall, this project highlights how combining robotics, sustainable design, and power of AI can create smarter, safer, and more efficient warehouse systems.

Grade8-2: Human Evolution Algorithm

Project Title: **Human Evolution Algorithm** (Pre-experimentation Abstract)
Team Name: **The Lineage**
Submitted By: **Aadhav Saravanababu, Saumya Hunter and Leo Annarelli**

Objectives: To develop and demonstrate an algorithm that can predict the evolution of humankind with given factors such as environmental changes, geopolitical landscape, etc.

Methods/Materials: We will use a coding platform (TBD) to build an algorithm. To build the algorithm, we researched how historical events could have played a role in the human evolution so far. Using this, we could predict how humankind would react to certain events that we predict will happen in the world. These events are found by previous research conducted by scientists. Then we turn this information into questions such as, “will an ice age happen”. By answering these questions either YES or NO, the algorithm will be piecing together hand-designed adaptations per our research, creating a future human. The point of the question-based system is that we can find multiple outcomes in the future based on different sets of series of events. To fortify this claim that we can predict how humans will look like, we will also put previous events to see if the algorithm will come up with the present-day human. As well as this, we will survey people around us by making them fill out the future human algorithm, to see what human species is most likely believed to happen.

Expected Results/ Conclusion:

We expect the algorithm would correctly predict how the present human form would look like when we inputted events from the past, while also predicting how the future human would evolve with features required for the future depending on the future events. Examples include bigger lungs, near-sightedness, better filtration in the respiratory system, or bigger legs.

Grade8-3: Soil Moisture Detection System

Title: **Soil Moisture Detection System**
Team: **Hydro Springs**
Names: **Kasyap, Vihaan, Dhanush, Abhiram**

Goals/Objectives: Our project focuses on the design of a soil moisture detection system. The goal is to measure soil moisture and use LEDs to indicate whether the soil is sufficiently dry or wet.

Methods/Materials: The materials we used to build this system include an Arduino Uno, a soil moisture sensor, a breadboard, jumper wires, LEDs, resistors, and a computer for writing/uploading the code. The method we used for it to work was connecting the soil moisture sensor to the Arduino so that it could detect moisture levels.

Results: When the sensor is placed into wet soil, the expected results are a low sensor reading, and the other LED turns on, indicating moist soil. When the sensor is placed in dry soil, the expected result is a high sensor reading, and a certain LED turns on for dryness.

Conclusion/Discussion: The soil moisture detecting system successfully demonstrated how sensor data can be used to record environmental conditions and provide present feedback. By comparing the sensor's readings to a predetermined threshold, the Arduino was able to accurately determine the moisture of the soil and activate the appropriate LED indication.

Summary: Our project demonstrates how a system can be used to monitor soil moisture. This helps prevent overwatering or underwatering plants, essentially saving many.