

# Short Line School “Engineer Energy Kids”



You Want Energy?  
We Have Energy!

Advisor: Leslie Lively

“Kids Teaching Kids” has become part of our everyday lives when it comes to the NEED Project. With the use of the NEED Project kits we have been able to see how energy is made and used around the world and even in our small community. We have been so busy learning about all the energy sources. We have used lots of energy learning about energy in our classroom!

We continue to use our social media to reach out to the community. With our Twitter @energy\_kids we were able to post energy saving tips and even videos of us working on the NEED Project activities. Our Twitter has been a big success with followers from all over the world. It gives us an instant way to communicate with our followers. We even have an Instagram so that we can reach out to more and more people. Our Instagram is engineer\_energy\_kids.



Goal: Learn about potential and kinetic energy, endothermic/exothermic, radiant energy, chemical energy, thermal energy, and electrical energy.

Activities: To learn about forms of energy we used the Science of Energy Kit. By doing the activities we learned first hand about how energy changes. We learned that when the truck is sitting at the top of the ramp it has potential energy and when it is released it changes to kinetic energy. By using the NEED Project Science of Energy kit we were able to understand the concept more clearly. As we worked our way through the six stations we slowly learned about the forms of energy. Of course hands on activities from the NEED Science of Energy kit the demonstrations made it easier to remember the different forms of energy. We also designed and tested coasters on the JASON Learning site to explore potential and kinetic energy further. On the site we were able to make adjustments to our coaster in order to make it perform better. We even had the chance to talk with an engineer about friction when he designed jet airplanes. We learned about potential and kinetic energy as well as friction with our Hess Toy trucks and Dragsters.

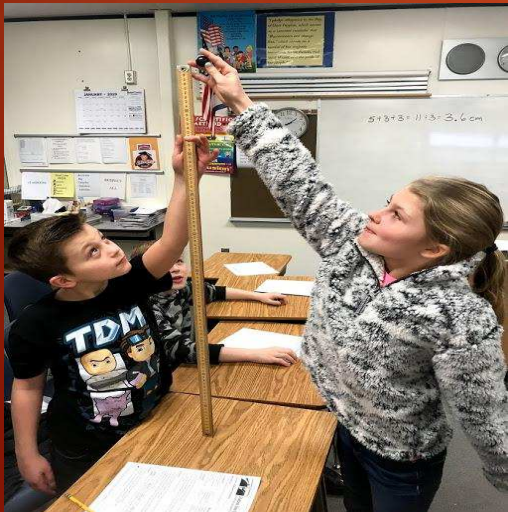
After we were finished with all of the stations we used QR codes to do a review of what we had learned.

We even completed food web posters in order to learn about the path of energy as it starts with the Sun and travels through the web. We then had to do presentations in front of the class.

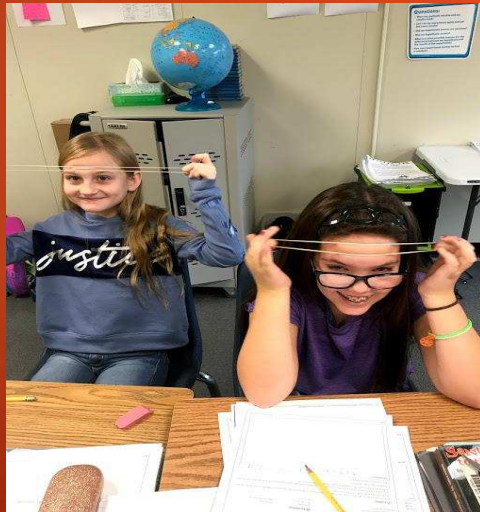
Resources: Science of Energy Kit from NEED, JASON Learning, FOSS kits, Hess Toy Truck and Dragster, and QR Codes

Student Leadership: We led the discussion on how to make an experiment better. We also worked in teams to complete there data analysis to see which road surface would allow the truck to roll the furthest. We wanted to incorporate the scientific process into our labs and learn how things worked.

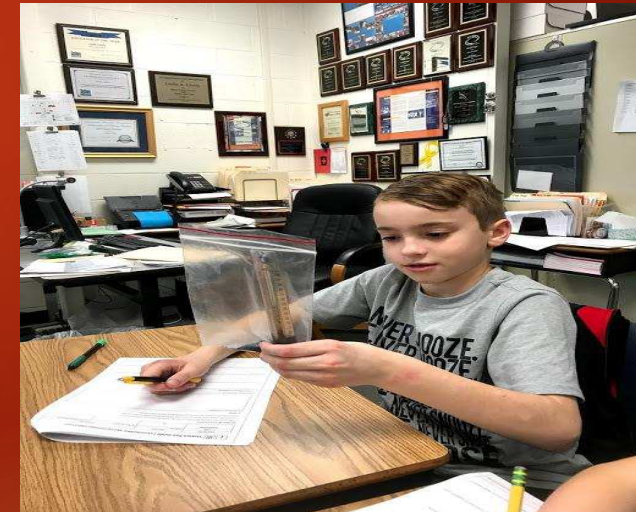
Evaluation: We had to write about what we learned from the NEED Project Science of Energy Kit. We also did a QR code quiz on what we had learned from the lesson.



Potential & kinetic energy

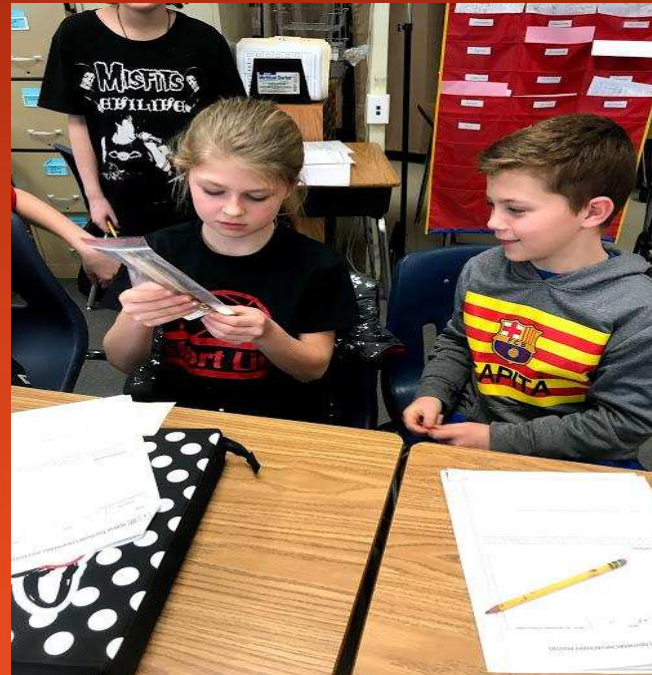
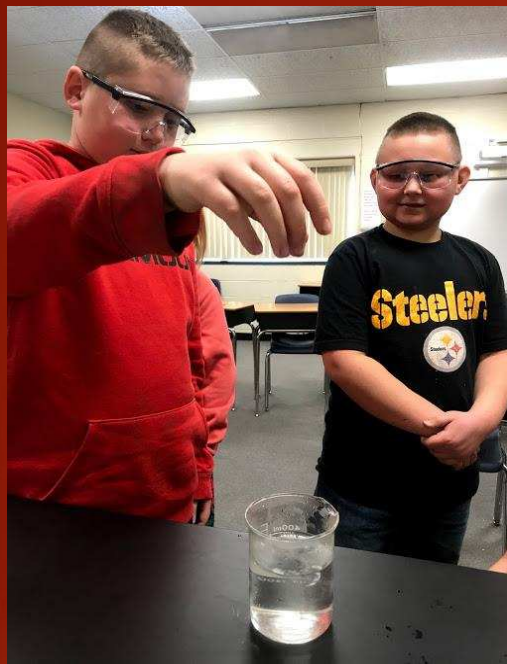


Thermal & motion energy with rubber bands & bi-metal bar

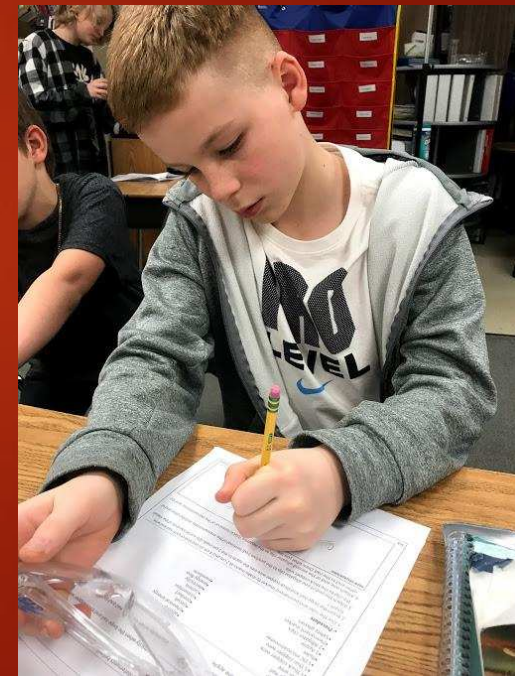
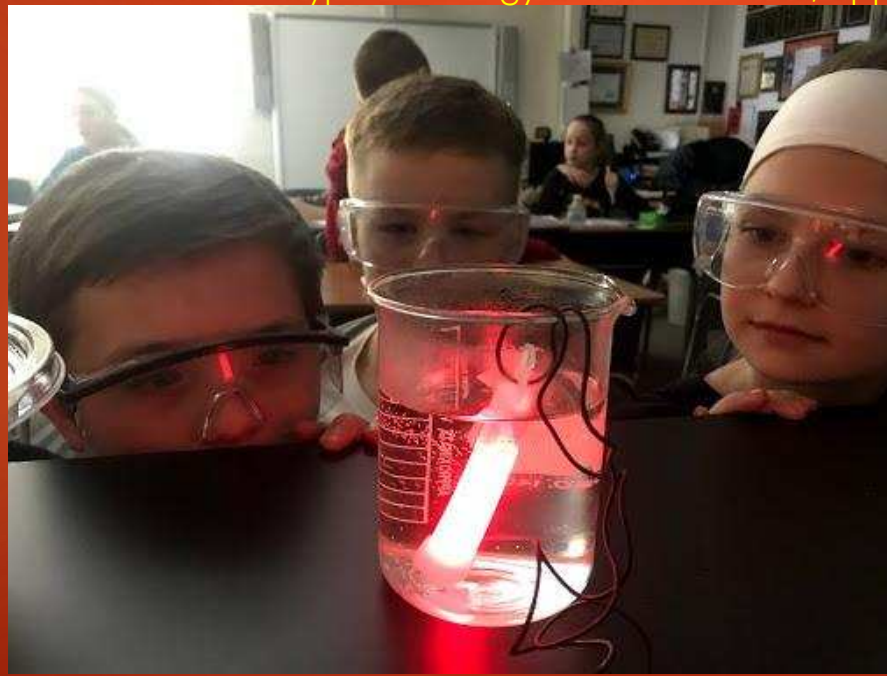
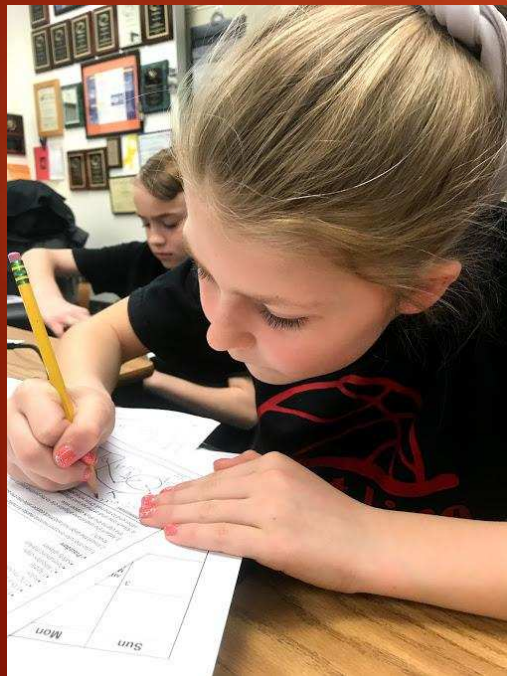


Learning about exothermic process.

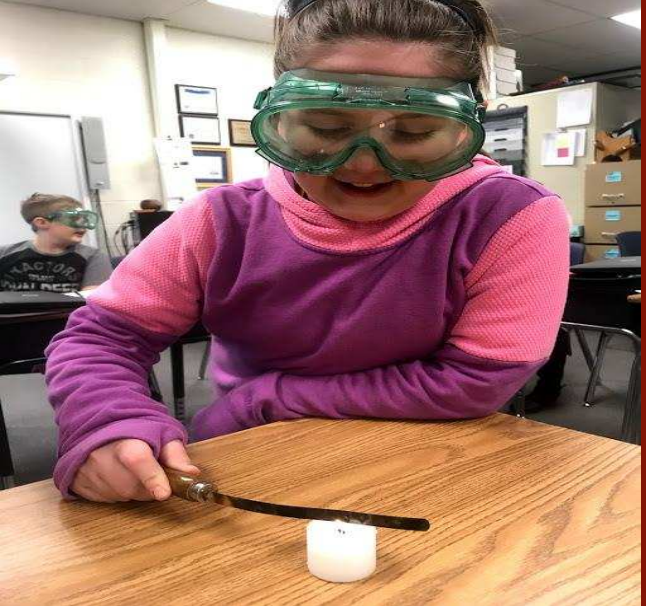
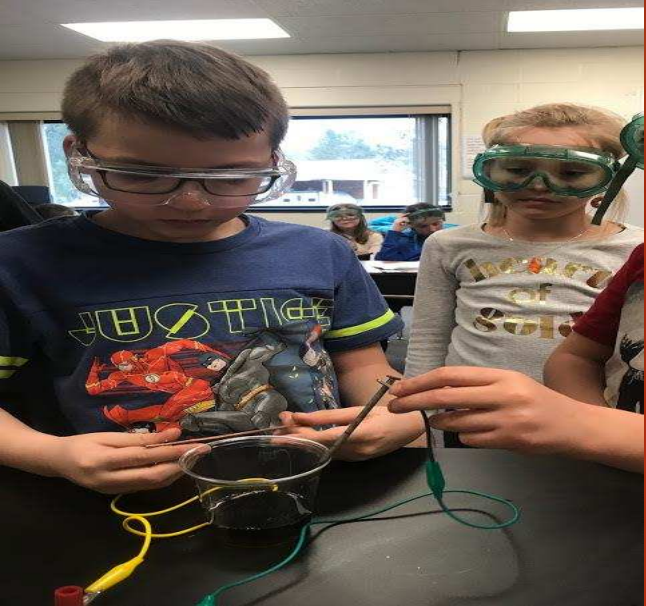
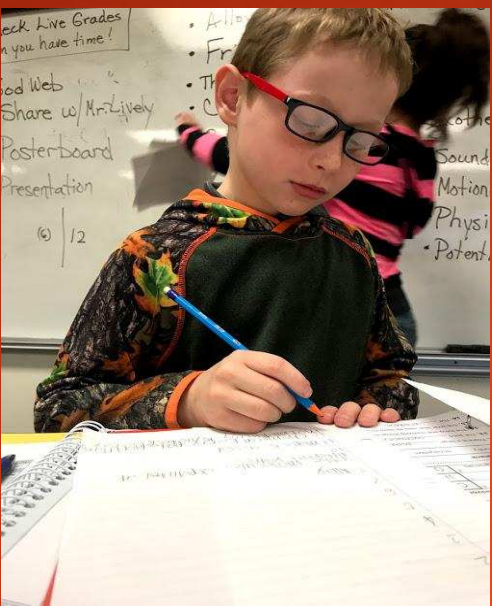




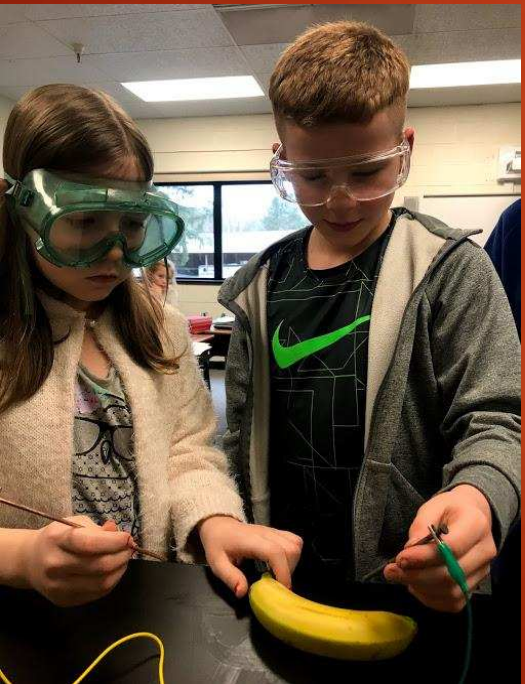
Learning about the different types of energy with our live wire , apple battery , and glow sticks.





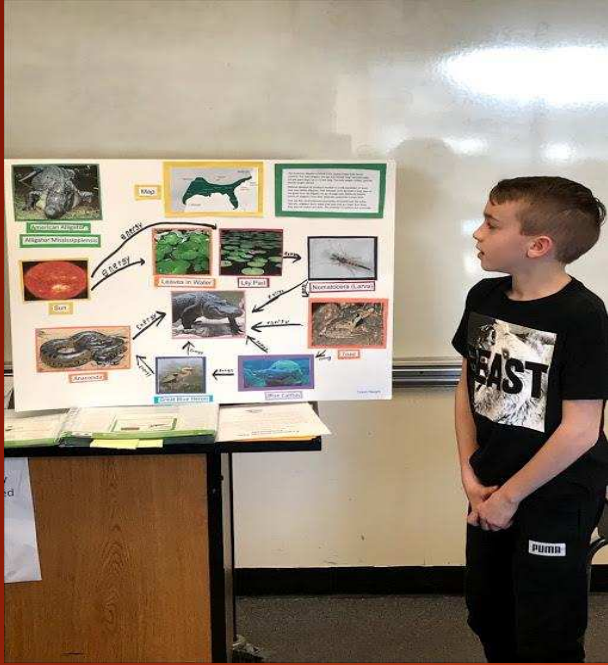


More learning and reviewing with QR codes. using the bi-metal bar to learn about thermal and motion energy. Endothermic and exothermic energy with baking soda/ vinegar and hand warmers.

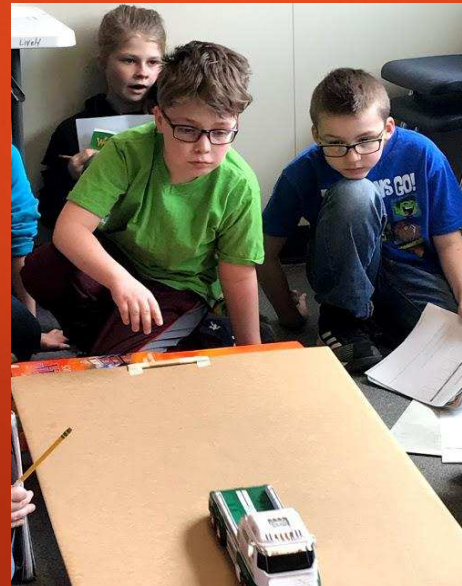
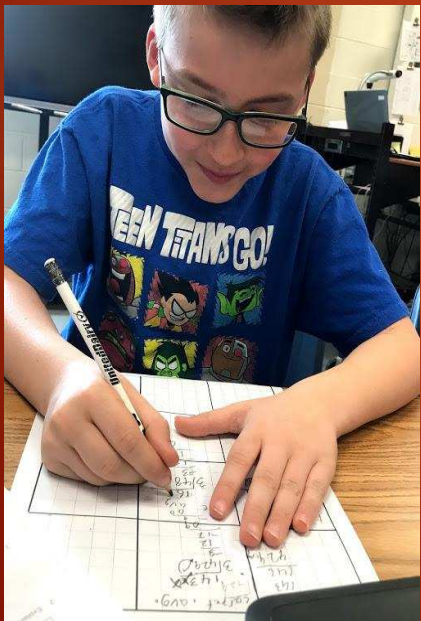




The flow of energy through the food web.



Learning about potential and kinetic energy as well as friction.





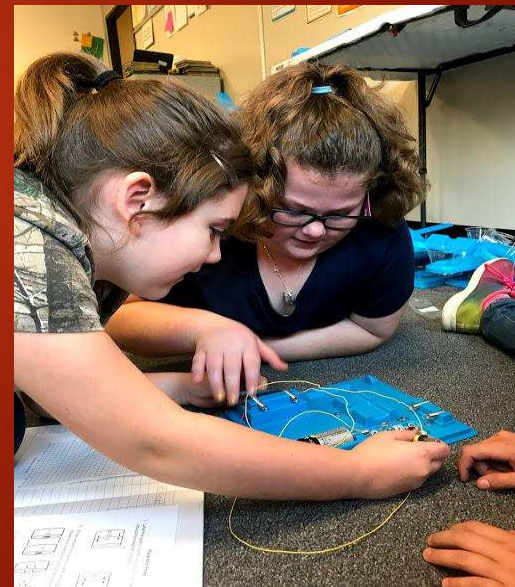
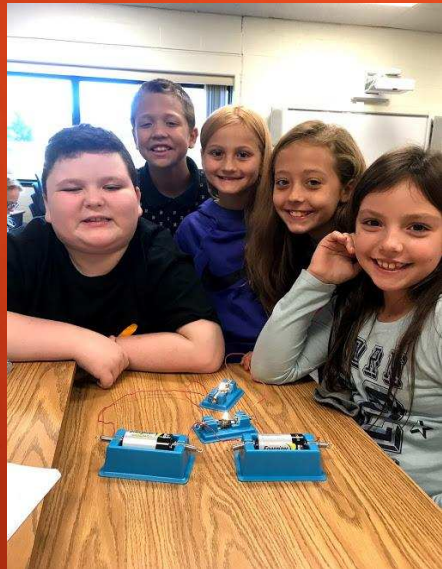
Goal: Learn about electricity, magnetism and force.

Activities: We first learned about energy, electricity, and magnetism from our NEED Elementary Info books. As we read through them and highlighted important information we learned that electricity has come a long way in its development. We then learned about series and parallel circuits. We always get time to discover on our own so we had to explore and learn how to light up the bulbs and make the motors run. Mr. Lively likes for us to find things on our own because it makes it more memorable for us. By using our motto: "In Learning You Will Teach, and in Teaching You Will Learn." he then allows us to work with other groups to find new ways to get the job done. When learning about magnetism and force we did an experiment with magnets to see how much weight it would take to break the force of the magnets. We found that the further the magnets were spaced apart the less magnet force they had. We also learned that the Earth is a giant magnet! We got to make our own electromagnet and have a contest to see how much weight it could pick up.

Resources: NEED Elementary Info Book, FOSS Kit, internet

Leadership: We explored on our own to find ways to light the bulb and then we were able to teach others. We worked with teammates to help each other build large parallel circuits around the room that met Mr. Lively's challenge standards that he wrote on the board each day. By working as a team we were able to get about 95% of the challenges completed.

Evaluation: We were given a pre and post test on general terms of electricity, magnetism and force. We also were given an hands on challenge that each person had to complete in front of Mr. Lively. That challenge consisted of making a series and parallel circuit as well as making an electromagnet that would pick up at least 30 washers. Mr. Lively would give us a short quiz after each of the stations take make sure we were able to understand the process.



Series and parallel circuits



May the force be with US!



Yeah! We got it!



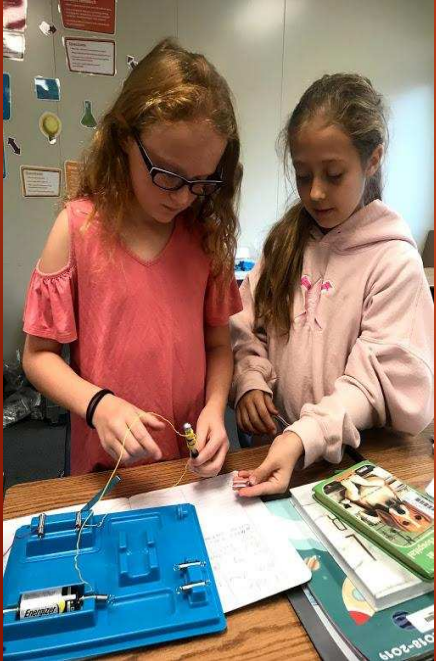
More series and parallel circuit challenges.



Looks like a successful electromagnet!



Make sure you collect your data.



Girl scientists Rule!



Potential and kinetic energy



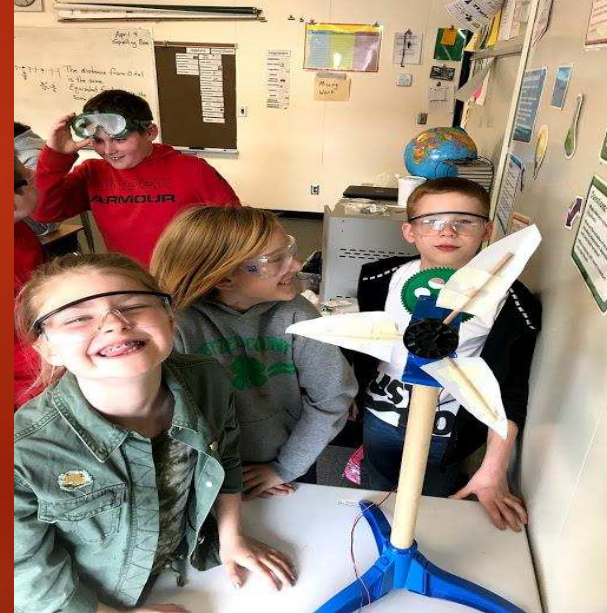
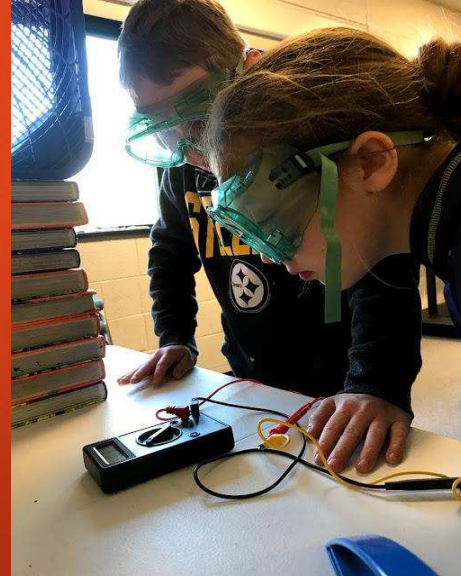


Goal: Learn to engineer a wind turbine and make adjustments as needed to increase the amount of electricity it can produce. By collecting data we can make adjustments to our turbine blades to increase the energy produced.

Activities: After learning about wind energy from our NEED Elementary Info Books we took on the challenge to make the best wind turbine. We could only use materials from the recycling bin at our school to make the blades. Once we gathered our materials we started making our first set of blades. Mr. Lively built a small wind tunnel in the classroom for use to test our wind turbine blades in. We then recorded our data on the excel spreadsheet. We then had to document the size, shape, spacing and pitch of our blades. Once that was recorded in our science notebooks we could then make adjustments to our blades and retest. After each round of testing and documenting size, shape, spacing and pitch we were able to fine tune our blades thus allowing them to produce more electricity. We soon realized that sometimes just a small adjustment to the blades would make a big difference. By documenting each change we were able to see how the adjustments affected the turbine and production of electricity.

Resources: NEED Elementary Info Book, NEED wind turbine kit (Wonders of Wind), Internet, Twitter, Instagram, JASON Learning Leadership: Students worked with classmates to engineer blades and complete testing and documentation. Students would later show their blades at our Wetzel County Schools Board Meeting what we had learned.

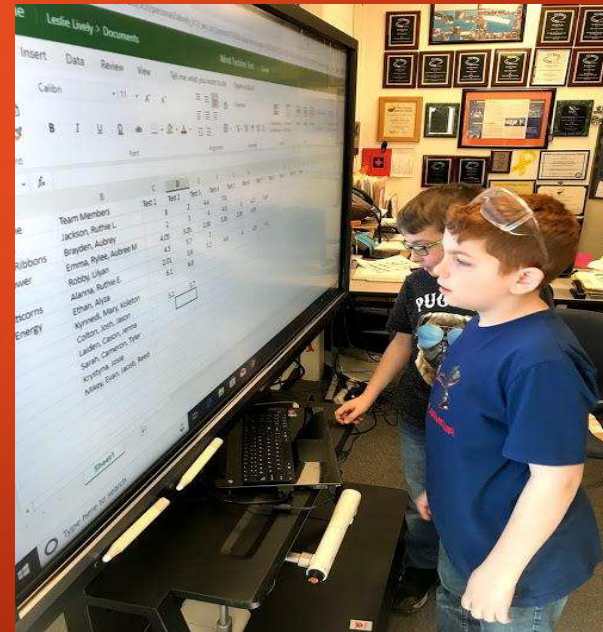
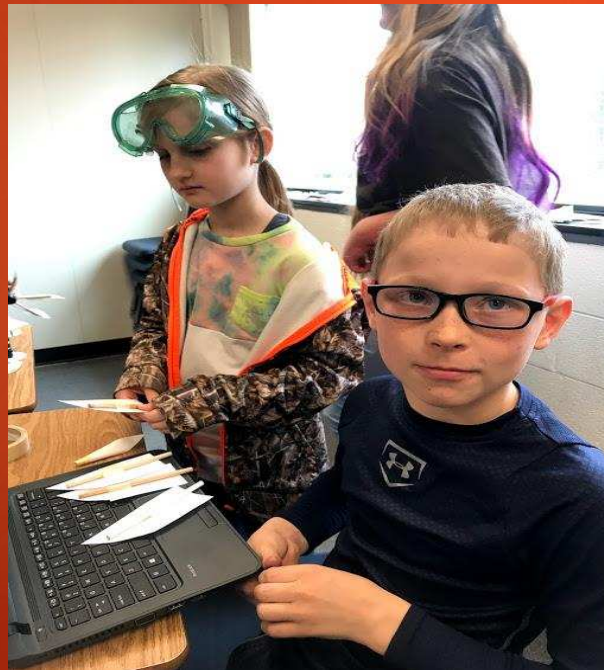
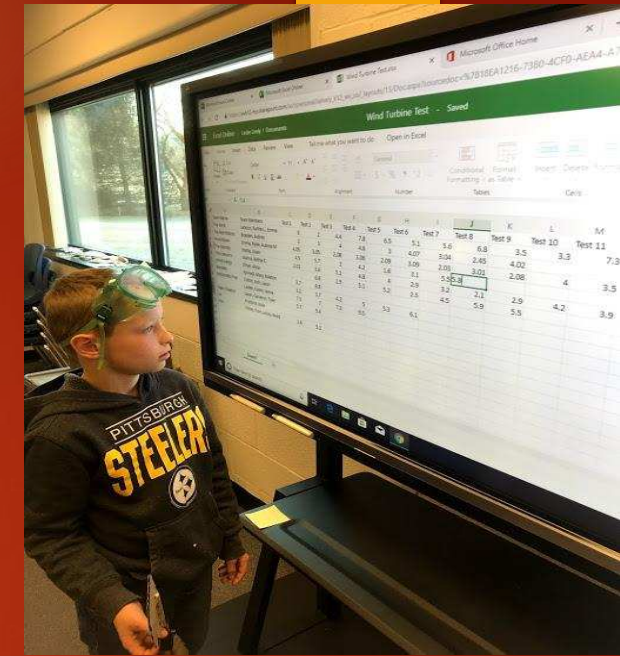
Evaluation: We were evaluated on our ability to improve our production of electricity through our data collection. We had to prove that we were making our blades produce more electricity on the turbine. We were also scored on our record keeping in our science notebooks. Information had to be ABCD (Accurate, Big, Colorful, and Detailed). We have learned over time that a good scientist keeps neat records and can prove his/her work. Mr. Lively gave us a score as he observed us presenting to our classmates.



So who will make the best wind turbine blades out of recycled materials?



Ok everyone , let's do this!



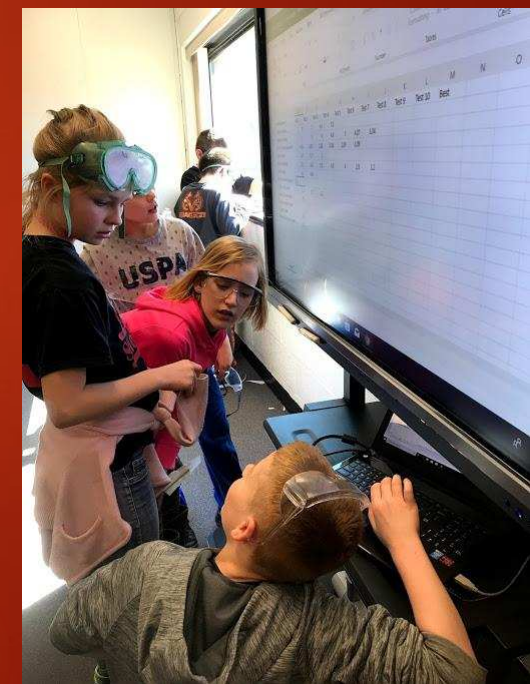
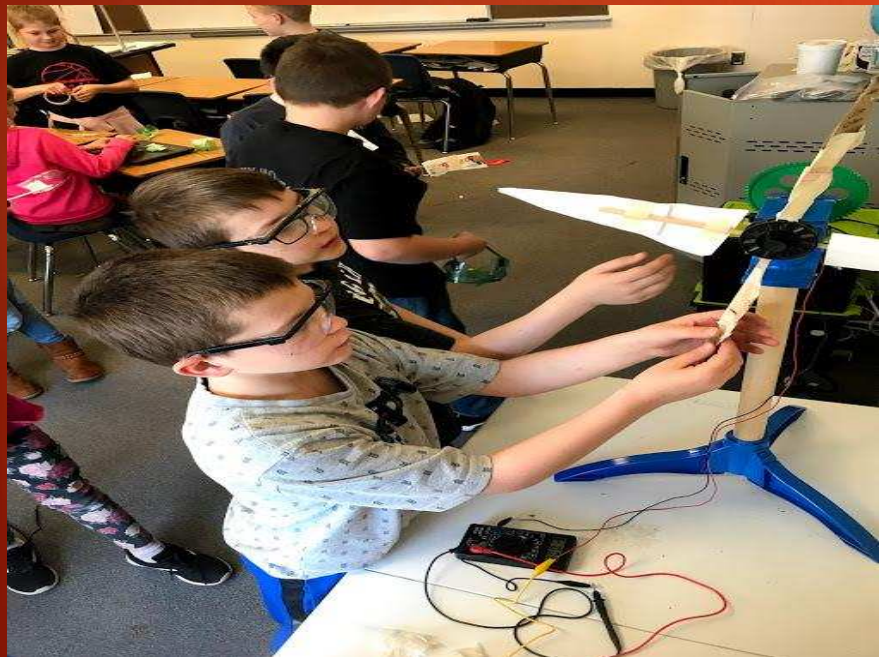
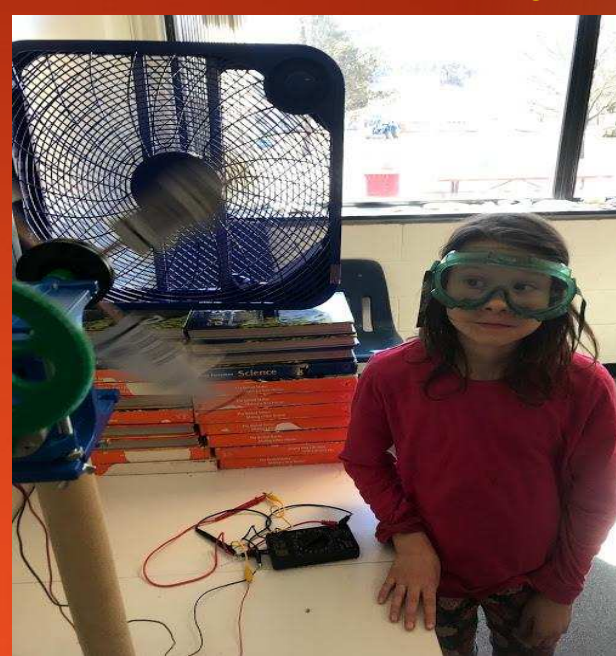
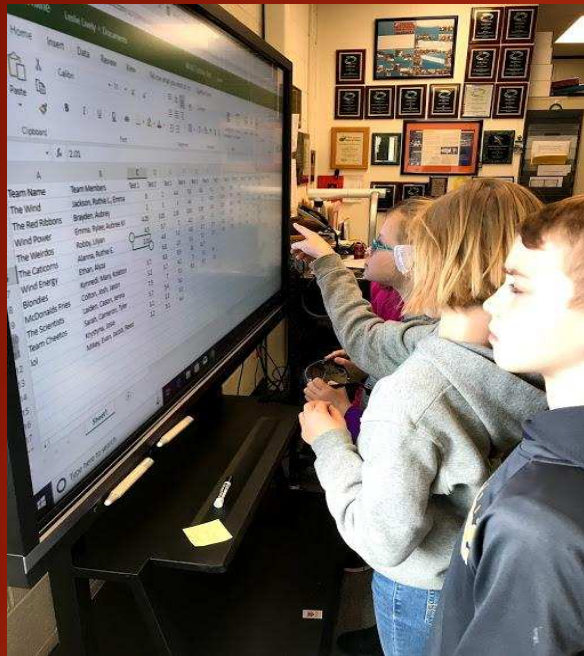
Does this pitch look right?

Collecting wind turbine data.



If we want to win we need to do research.

Looking pretty good girls!



Maybe if we adjust the pitch we can produce more electricity.



Goal: Learn about how oil and natural gas is found, extracted and processed.

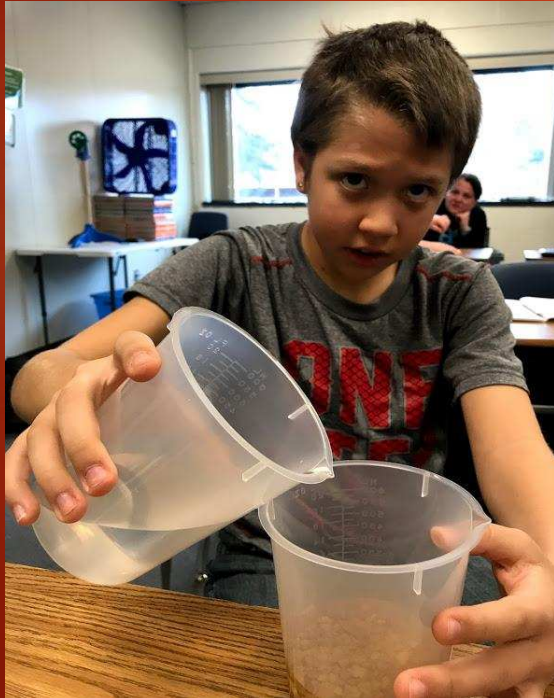
Activities: We used the NEED Project Wonders of Oil and Natural Gas kit to learn about density, porosity, fracturing, extraction, and processing. As a class we learned the many steps of finding and processing the oil and natural gas. We learned that one misconception was that oil and natural gas is in big pools under the ground. While learning about density and porosity we discovered that oil and natural gas are trapped in the fine pores in certain types of rocks. The industry uses core samples to help them find the resources more accurately.

Once we knew that the pores had the oil and natural gas trapped we were able to watch some videos about how the industry goes about getting it out of the ground. In that process we learned about perforated well casings as well as fracking. We did some experiments to simulate the process.

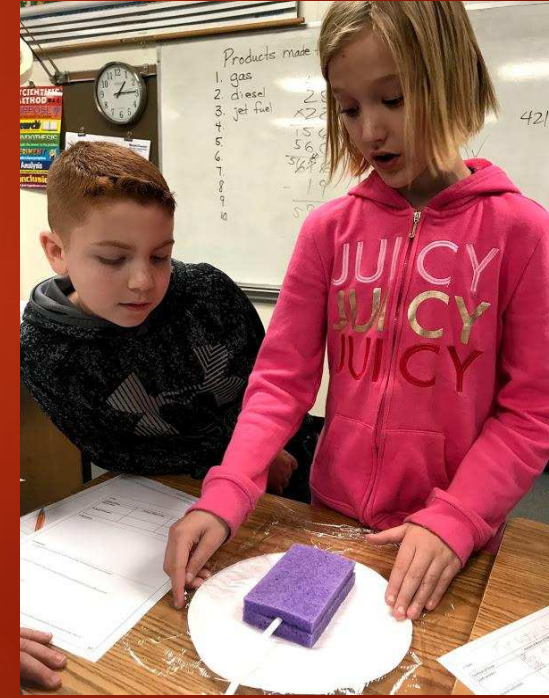
Resources: Wonders of Oil and Natural Gas, internet

Leadership: We worked in teams to discover the best way to get the oil and natural gas out of the ground.

Evaluation: We were evaluated on how successful we were at getting the oil and natural gas out of the ground as well as by writing about what we had learned from the process from start to finish.



Learning about porosity



Getting the oil out after fracking.

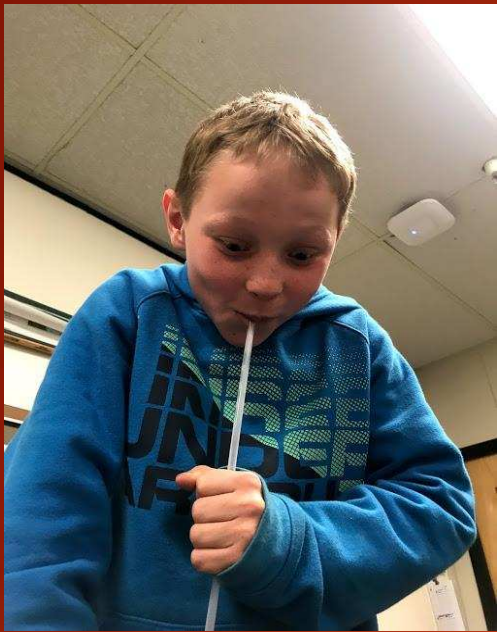




Learning how fracking and perforated casings helps get more oil and natural gas out of the ground.



Wow! It's much harder to get oil to the surface that has more viscosity and is deeper underground.





Goal: Spread the word about NEED through community outreach and to increase the number of followers we have on Twitter and Instagram.

Activities: We once again used our new sign to post energy facts so that community members could learn about saving energy as well as what events we had planned for the public. Events like our many fundraisers that we held in order to raise the needed money to travel to the NEED Youth awards in Washington, DC. While at those fundraisers we would set up small hands on activities for kids and adults to enjoy. We would also talk to people about what we were doing and have them help us spread the word about energy. We also continue to use our Twitter page @energy\_kids to pass along information about what we are doing in our school and community. We wrote and produced short videos using NEED materials and posted our videos on our Twitter account. We also have an Instagram account: engineer\_energy\_kids where we like to post information about energy and what events we will be at during the month. The Engineer Energy Kids worked on school newsletters to send home with each student in the school PreK-8th. Students worked in groups on the newsletters and then each were printed in color to be sent home monthly.

We are also part of a county wide recycling program. So far this school year we have recycled 11,060 pounds of cardboard, newspaper, paper, shredded paper, plastic, aluminum cans, and bi metal cans.

Resources: NEED materials, internet, Twitter @energy\_kids and Instagram engineer\_energy\_kids

Leadership: We looked up facts about energy and helped post the signs. We also took the lead when it came time for community interaction. We led the discussion at the events and were able to help people understand what our mission with NEED is all about. Students researched their energy topic and wrote the newsletter that was sent home. They then published it using Office 365. We also helped with the many fundraisers such as our Daddy Daughter Winter Wonderland Dance, Ramp Festival 5k Run/Walk, and Corn hole board raffle.

Evaluation: We have gotten good feedback from the community about our energy saving messages posted on our sign. The community has been very supportive in coming to our fundraisers and doing the activities that we have at each event. Many local businesses have been repeat donors over the last few years. In fact, one company liked what we were doing so well that they gave us money and then returned a few weeks later to give us more money because they liked what we were doing in our classroom.

