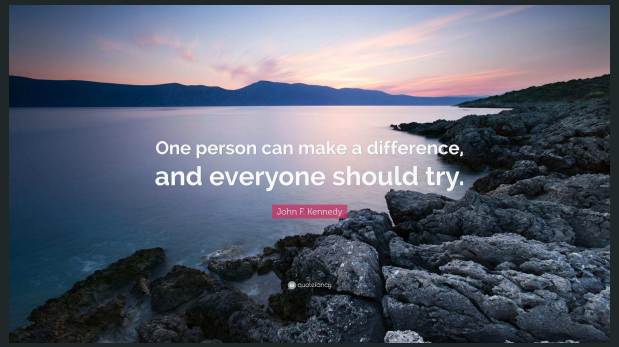
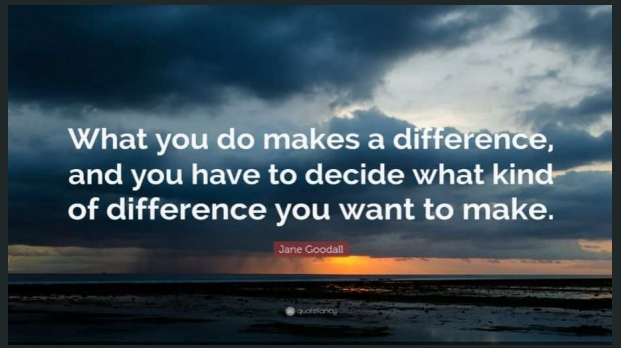




The Power of One

Ockerman Middle School Energy Club

Advisor: Jennifer Davis
Student Leader: Jayden Polley

Project Overview:

One...that's right, just one. This year Ockerman MS Energy Club has just one student. What can really be done with just one student? A LOT! Especially if that one student is 6th grader & energy rockstar Jayden Polley. Jayden has been a determined, dedicated powerhouse this year.

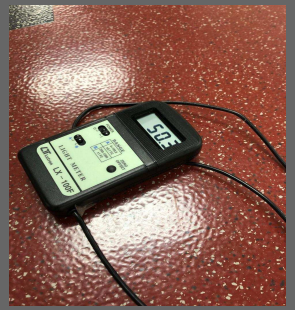
Our project this year focused on two main things: energy use in our school building and solar energy. We did an assessment of our school building to find ways that we can make changes to lower our energy use. For our solar project we used the Energy From the Sun curriculum. We decided to build a solar powered cell phone charging station for students to charge their cell phones while waiting for their parents.

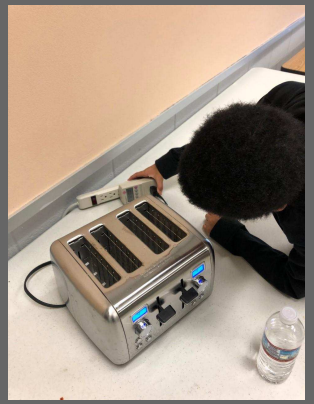
Saving Energy In Our School Building

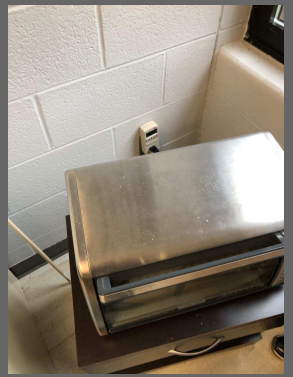
Goal 1: Asses the school building and find ways to reduce energy use.

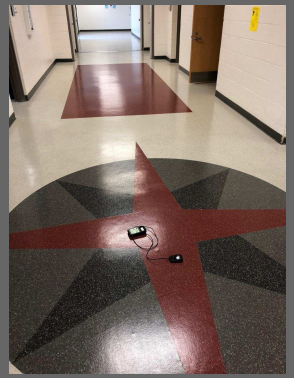
NEED Materials Used: Saving Energy at Home and School kit , Monitoring & Mentoring curriculum, Facts of Light activity

We went around the school building and tested the light levels, humidity, temperature, phantom loads, and took inventory of the personal appliances and electrical devices.

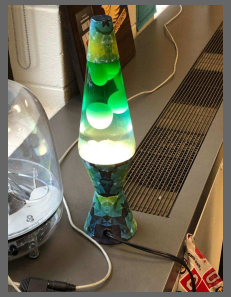








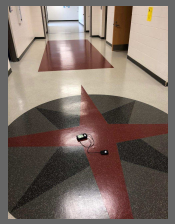
Data

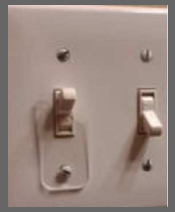


Appliances	Energy Use	Hours in Use per day	Days in Use	Total Energy Per Year (W)	Kilowatts (kW)	Annual Cost ($.10 per kWh)
Candle Warmer	**25 W**	**6**	**175**	**26,250**	**26.25**	**$2.63**
Microwave*	**3 W (not in use)**	**24**	**365**	**26,280**	**26.28**	**$2.63**
Keurig*	**3 W (not in use)**	**24**	**365**	**26,280**	**26.28**	**$2.63**
Air Freshener	**4W**	**6**	**175**	**4,200**	**4.2**	**$0.42**
Lava Lamp	**15 W**	**24**	**175**	**63.000**	**63**	**$6.3**

* phantom load

Average Light Levels:





Location	One Switch Low	One Switch High	Both/Total	Appropriate Light Level?
Hallways	n/a	n/a	100	No-overlit
Classrooms	30	58	86	One switch (Low)-underlit (High)-Yes Both-overlit

Most teachers only use one light switch, some use the low switch and some use the high switch.

One suggestion we have for administration/maintenance is to put a switch block on the low switch.

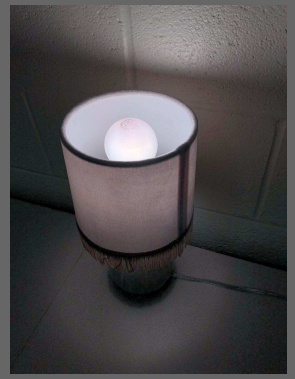
Classroom Lamps

One of the things we noticed is that a lot of the teachers have personal lamps in their classroom. We checked to see what type of bulbs they were using.

Total # Lamps: 18

LED bulbs: 8

Halogen/Incandescent: 10



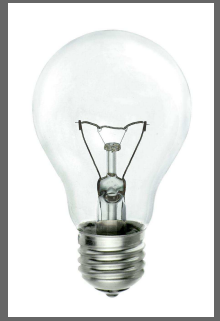
40 W: 7
42W: 1
93 W: 1
100W: 1

Energy Use-Classroom Lamps

We calculated how much energy the lamps are using and how much we energy we could save by replacing the halogen and incandescent bulbs with LED bulbs.

Cost for 25,000 Light Hours:

Bulbs	Price of Bulbs	Cost of Electricity (@ $.10/kWh)	Total Cost
9 W LED	$1.33	225 kWh x $.10=$22.50	$23.83
40 W Halogen	$1.50 x 2.5=$3.75	1000 kWh x $.10=$100	$103.75
43 W Halogen	$1.50 x 2.5=$3.75	1075 kWh x $.10= $107.50	$111.25
93 W Incandescent	$.50 x 25+ $12.50	2325 kWh x $.10 = $232.50	$245.00
100 W Incandescent	$.50 x 25+ $12.50	2500 kWh x $.10= $250.00	$262.50



Classroom Lamps-We Can Save Energy & Money

We then worked with our district energy manager, Karen Lenihan, to get 9 W LED bulbs for the lamps. We will replace the bulbs when school reopens.

Current OMS Cost for 25,000 hours (based on current bulbs in 18 personal lamps:

8 LED	X $23.83	$190.64
7 40W	X $103.75	$726.25
1 43W	X $111.25	$111.25
1 93W	X $245.00	$245.00
1 100W	X $262.50	$262.50

Total: $1535.64

Cost w/ all 18 using 9W LED bulbs: $428.94

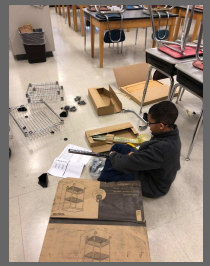
<u>Potential Savings:</u> $1106.70 (will use 10,650 less kWh of electricity)

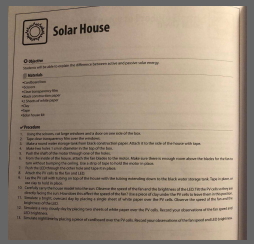
Solar Energy in the Real World

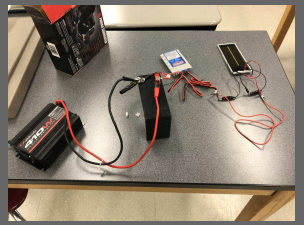
Goal 2: Learn about solar energy and design a Solar Energy Education Project

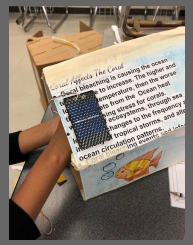
NEED Materials Used: Energy From the Sun kit & curriculum

We used the Energy From the Sun kit to explore solar energy. Jayden built a solar house from the kit and is working on more activities from the kit & student guide at home during NTI. We also decided to apply for the KY NEED Solar Education Project Mini-Grant. We decided to build a solar powered cell phone charging station for students to charge their phones while they wait to be picked up.



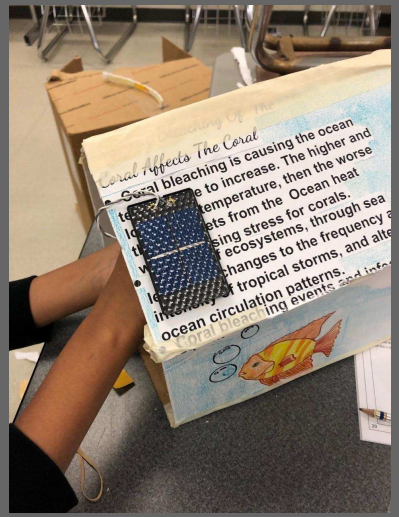

Solar House

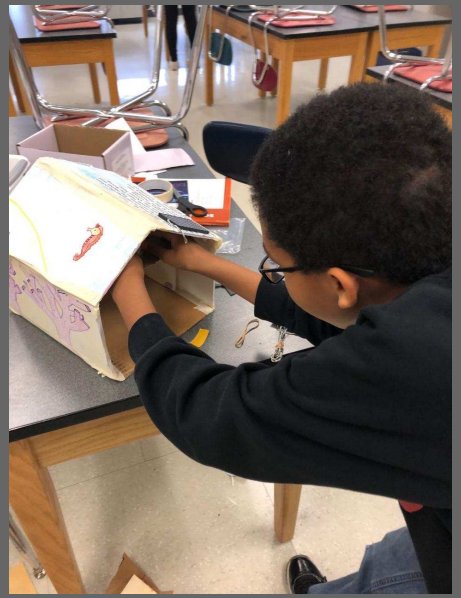




Solar House

To understand how solar energy can be used in the real world Jayden completed the Solar House activity from the Energy From the Sun curriculum. He used a foam-board from an old science project to build the base house, then added the solar panel, fan, light, and water heater from the kit.

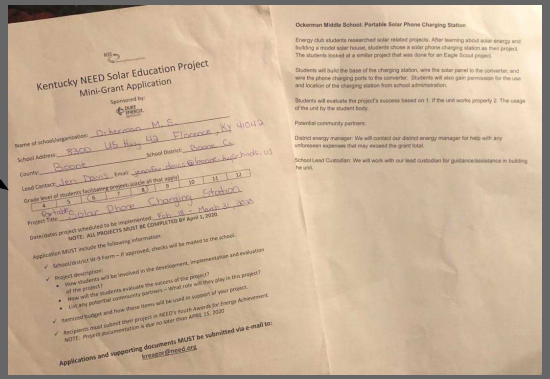




Solar Energy Education Project

We decided to apply for the KY NEED Solar Energy Education Project mini-grant, but first needed to decide on a solar energy project. After doing some research, we decided to build a solar powered cell phone charging station. We decided to build it on a cart that we could wheel out at the end of the day and bring back in for safe-keeping. All KY schools closed shortly after our supplies arrived, so Jayden is completing this project at home. We will introduce it to students at the start of next school year.

Grant Application



Kentucky NEED Solar Education Project
Mini-Grant Application

Sponsored by:

Name of school/organization: Ockerman M. S.
School Address: 9300 US Hwy 42 Florence, KY 41042
County: Boone School District: Boone Co.
Lead Contact: Jen Davis Email: jennifer.davis@boone.kyschools.us
Grade level of students facilitating project: (circle all that apply)
2 3 4 5 6 7 8 9 10 11 12
Project Title: Portable Solar Phone Charging Station
Date/dates project scheduled to be implemented: Feb. 16 - March 6, 2020
NOTE: ALL PROJECTS MUST BE COMPLETED BY April 1, 2020

Application MUST include the following information:

- ✓ School/district W-9 Form – if approved, checks will be mailed to the school.
- ✓ Project description:
  - How students will be involved in the development, implementation and evaluation of the project?
  - How will the students evaluate the success of the project?
  - How will the students involve community partners – What role will they play in this project?
  - List any potential community partners:
- ✓ Itemized budget and how these items will be used in support of your project.
- ✓ Recipients must submit their project in NEED's Youth Awards for Energy Achievement.
  NOTE: Proof/documentation is due no later than APRIL 15, 2020

Applications and supporting documents MUST be submitted via e-mail to: kreagor@need.org

Ockerman Middle School: Portable Solar Phone Charging Station

Energy club students researched solar related projects. After learning about solar energy and building a model solar house, students chose a solar phone charging station as their project. The students looked at a similar project that was done for an Eagle Scout project.

Students will build the base of the charging station, wire the solar panel to the converter, and wire the phone charging ports to the converter. Students will also gain permission for the use and location of the charging station from school administration.

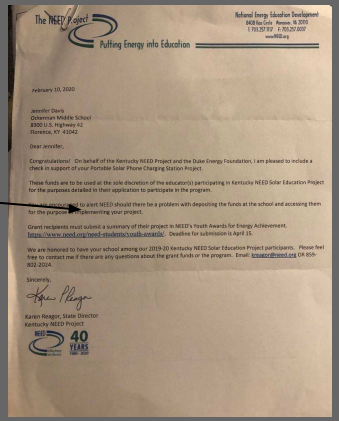
Students will evaluate the project's success based on 1. If the unit works properly 2. The usage of the unit by the student body.

Potential community partners:

District energy manager: We will contact our district energy manager for help with any unforeseen expenses that may exceed the grant total.

School Lead Custodian: We will work with our lead custodian for guidance/assistance in building he unit.

We got the grant!



The NEED Project
Putting Energy into Education

National Energy Education Development
8408 Kao Circle Manassas, VA 20110
1 703.257.1117 F 703.257.0037
www.NEED.org

February 10, 2020

Jennifer Davis
Ockerman Middle School
8300 U.S. Highway 42
Florence, KY 41042

Dear Jennifer,

Congratulations! On behalf of the Kentucky NEED Project and the Duke Energy Foundation, I am pleased to include a check in support of your Portable Solar Phone Charging Station Project.

These funds are to be used at the sole discretion of the educator(s) participating in Kentucky NEED Solar Education Project for the purposes detailed in their application to participate in the program.

Please contact me to alert NEED should there be a problem with depositing the funds at the school and accessing them for the purpose of implementing your project.

Grant recipients must submit a summary of their project in NEED's Youth Awards for Energy Achievement. https://www.need.org/need-students/youth-awards/ Deadline for submission is April 15.

We are honored to have your school among our 2019-20 Kentucky NEED Solar Education Project participants. Please feel free to contact me if there are any questions about the grant funds or the program. Email: kreagor@need.org OR 859-802-2024.

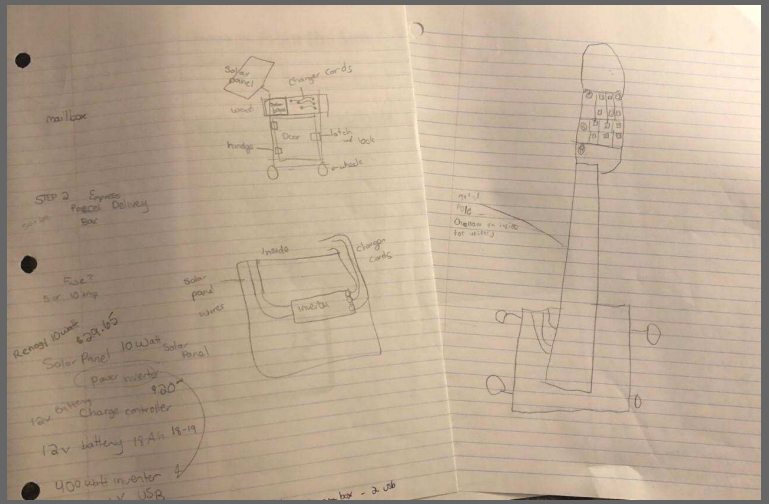
Sincerely,

Karen Reagor, State Director
Kentucky NEED Project

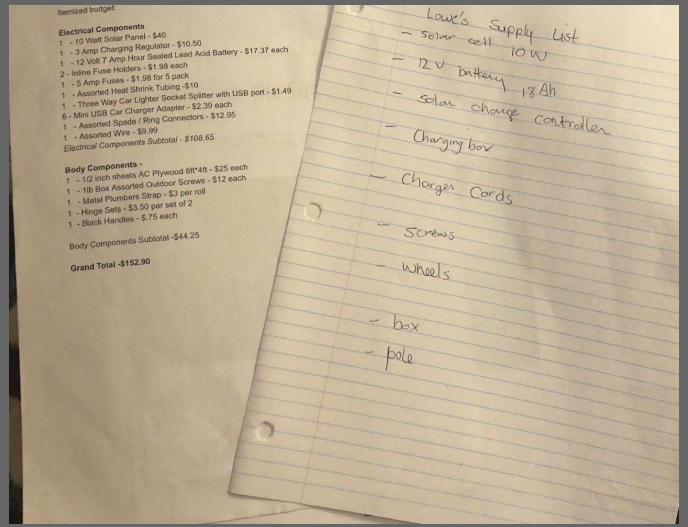
NEED 40 YEARS

Solar Energy Education Project- Solar Cell Phone Charging Station

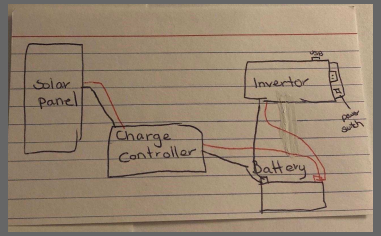
Sketched Out Design Plans



Supply (shopping) List

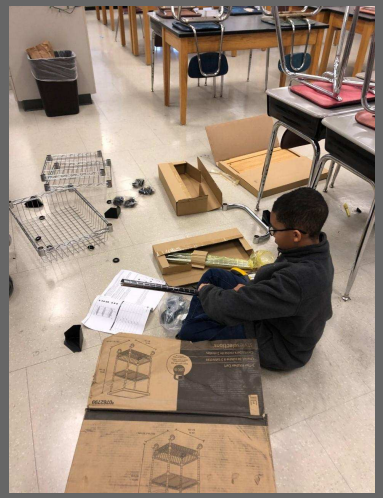


Solar Energy Education Project- Solar Cell Phone Charging Station



General Set-Up::

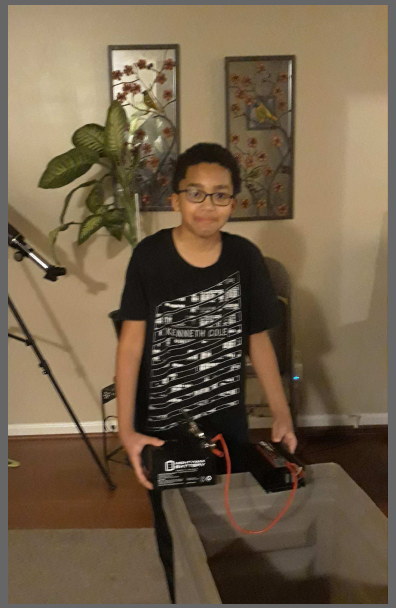
All of the components will be in the mailbox, with only the charging cords exposed and the solar panel velcroed to the lid.

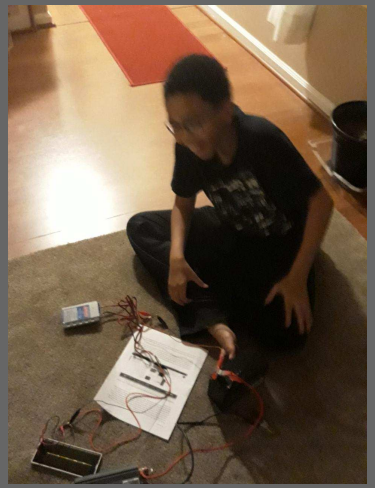


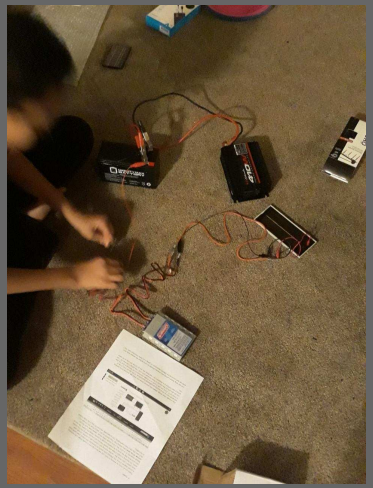
The mailbox will be velcroed to the top of the cart. The students will be able to plug their phones in a place them on the wire shelves.

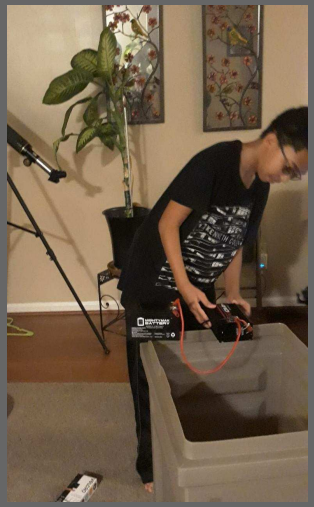
Jayden at Work-NTI won't stop Energy Education

Jayden has been busy at home working on the solar cell phone charging station and doing some solar energy activities.









EXTERNAL MESSAGE

Okay. Thank you! He has started and has been having fun doing differerent experiments. I was able to take a few pictures while he was working a few days ago. I will attach them to this email

Missed Opportunities

We had two more activities planned for this spring. First, we were supposed to display Jayden's solar house, along with some of the other solar energy activities at our school's Evening with the Arts. The event was canceled.We were also supposed to attend the KY NEED field trip to the Duke Energy Solar in Walton, KY. This event was also canceled.

Despite these missed opportunities, we had a

FABULOUS year learning about Energy!

Thank you KY NEED!