Cassidy Platt

Kavod Elementary School

Grades K-5

Harnessing Natural Energy in Play

Objective: The goal of this lesson is for students in grades 2-5 to utilize natural sources of energy to power robots and circuits. These students will utilize the knowledge they obtain through hands-on activities, research, discussions, and the exploration of their natural curiosities to teach students in grades k-1 about natural energy.

Duration: 2.5 days (approximately 4-5 hours per day)

Day 1:

- Introductory lesson from teachers in grades 2-5. Teachers will explain the impact of the world's growing population and their use of non-renewable energy sources. This will include cost, availability, and eco-impact. (1 hour)
- Students in grades 2-5 will answer overarching question "What sources of energy, outside of common electricity and batteries, are available to people?" Students will work with their pre-assigned groups (across grade levels, groups of 3-4) to answer this question. Answers will be shared. Major sources of renewable energy that students missed will be presented and expanded upon. (30 minutes)
- Groups will randomly be assigned a project (robotics kit). All projects/robots use renewable energy sources. They will work with their group to assemble their robot/kit with the assistance of rotating staff members. Their completed project will be tested to ensure it has been assembled properly and has the ability to harness/utilize energy. (2 hours)

Day 2

- Students will continue the assembly of their project with the assistance of staff. (2 hours)
- Students will use technology (tablets, computers, etc.) currently owned by Kavod Elementary to research how their completed projected is utilizing its specific energy. For example, a group who completed a robot powered by small, solar panels will research how solar energy works and the ways we use it. Students will also be asked to find the drawbacks of their energy source (for example, the sun is not always shining, therefore its power is inconsistent). (1 hour)
- Students will have choice in creating a presentation targeted at students in grades k-1. This could be a poster, a song, a play, a model, etc. They will use the duration of their day to finish this presentation. Each presentation should include HOW their project is obtaining its power and the science behind it. (1.5-2 hours)

Day 2 (4 hours):

- Students in grades K-1 and parents of all grade levels will be invited to an "alternative energy" fair. At this fair, students will present their finished projects along with information about the energy source they are using and the science behind that energy.
- Students in grades K-1 will each receive a "solar-powered cricket" as a souvenir and a reminder of what they learned. They can bring these homes to explain what they learned to their families.
- Teachers will run stations throughout the playground for students to enjoy activities such as a solar car race, a solar balloon, a water-powered rocket, and a "sensor stick" that demonstrates the energy we all harness within our own bodies.

Materials to be Obtained Through Grant:

NAME	QUANITY	SOURCE	COST
14-in-1 Solar Robot	3	Amazon	$13.95 each
T4 Transforming Robot	3	Amazon	$14.43 each
Solar-Powered Grasshoppers Pack	15	Amazon	$6.21 each
Super Solar Race Kit	5	Amazon	$14.97 each
Solar Balloon	1	Fat Brain Toys	$17.95
Sensor Stick	1	Fat Brain Toys	$9.95
Salt H2O Robot	1	Fat Brain Toys	$20.00
Crank Radio/Light	1	Amazon	$20.00
4M Salt H20 Robot	1	Amazon	$9.64
Jump Rocket	1	Amazon	$16.19
Wind-Powered Ordis	1	Amazon	$12.75
Wind-Powered Rhino	1	Amazon	$26.27
Snap Circuits Kit	1	Amazon	$50.19
Air Car	1	Fat Brain Toys	$29.95

Total Cost: $466.03 Before Tax

Extension:

- Students in grades K-1 will be asked to draw a picture of their favorite project or activity from the day. They will sit in a class circle and take turns sharing their artwork. Each student will be asked to explain their drawing and their favorite part of the energy fair. They will also be asked to explain to their class how the project worked in their own words.
- Students in grades 2-5 will complete their reflection (attached).
- Students in all grades will discuss how the energies in which they have used to power their robots could be used in the world at large. The conversation will focus on the conservation of energy and a reduction in our dependence on non-renewable sources.

Differentiation

- Students who do not speak English fluently will have the availability of a translator through the staff (Hebrew/Spanish) to ensure they understand all student presentations.
- Students who would benefit from alternative explanations will have rotating staff members who will assist the groups in explaining how energy is being used in each project.

Energy Fair Reflection

1. In your own words, briefly describe how your project uses its energy. You can use illustrations as well.

2. Briefly describe TWO other projects or activities from the Energy Fair. Be sure to explain (in your own words) the energy that was being used. Illustrations can be included in your response.

3. Why is it important for people to use alternate forms of energy? Give 3 reasons.

4. What are three difficulties in depending on alternative energies?

5. What are two questions you still have about alternative energy after participating in the fair?

6. If we did the fair again, what's one thing that you would change?

7. How can you as an individual help to use less non-renewable energy?

Links to all Aforementioned Materials

NAME	LINK
14-in-1 Solar Robot	https://www.amazon.com/Solar-Robot-Science-Education-Assembly/dp/B01IAJ8202/ref=sr_1_1?ie=UTF8&qid=1477070765&sr=8-1-spons&keywords=14-in-1+solar+robot&psc=1
T4 Transforming Robot	https://www.amazon.com/OWI-T4-Transforming-Solar-Robot/dp/B00JDVIPOU/ref=sr_1_3?ie=UTF8&qid=1477075838&sr=8-3&keywords=t4+transforming+solar+robot
Solar-Powered Grasshoppers Pack	https://www.amazon.com/Solar-Powered-Grasshopper-pieces-pack/dp/B00GT9UVAA/ref=sr_1_2?ie=UTF8&qid=1477075882&sr=8-2&keywords=solar+grasshopper
Super Solar Race Kit	https://www.amazon.com/OWI-Super-Solar-Race-Powered/dp/B000WWV4MY/ref=sr_1_1?ie=UTF8&qid=1477075992&sr=8-1&keywords=SUPER+SOLAR+race+kit
Solar Balloon	https://www.fatbraintoys.com/toy_companies/tedco/solar_balloon.cfm?redir=yes
Sensor Stick	https://www.fatbraintoys.com/toy_companies/tedco/sensor_stick.cfm?redir=yes
Salt H2O Robot	https://www.fatbraintoys.com/toy_companies/tedco/3_in_1_solar_and_salt_water_robot.cfm
Crank Radio/Light	https://www.amazon.com/iRonsnow-Emergency-Powered-Weather-Flashlight/dp/B00WIF2T7C/ref=sr_1_1?ie=UTF8&qid=1477076174&sr=8-1&keywords=crank+radio+flashlight+cell+phone+charger
4M Salt H20 Robot	https://www.amazon.com/4M-Salt-Water-Powered-Robot/dp/B00AV8XBGG/ref=sr_1_1?ie=UTF8&qid=1477076218&sr=8-1&keywords=4m+salt+water+powered+robot+kit
Jump Rocket	https://www.amazon.com/Original-Geospace-Jump-Rocket-Launcher/dp/B000246MS8/ref=sr_1_1?ie=UTF8&qid=1477076270&sr=8-1&keywords=jump+rocket
Wind-Powered Ordis	https://www.amazon.com/Wind-powered-Animaris-Ordis-Parvus-Strandbeest/dp/B00AM6W76W/ref=sr_1_1?ie=UTF8&qid=1477076293&sr=8-1&keywords=wind+ordis
Wind-Powered Rhino	https://www.amazon.com/Elenco-Rhinoceros-Mini-Beest-Science-Kit/dp/B00E0I4DGA/ref=pd_bxgy_21_2?_encoding=UTF8&psc=1&refRID=S1D7KB78HSKR0BD2SS9Y
Snap Circuits Kit	https://www.amazon.com/Snap-Circuits-SC-300-Electronics-Discovery/dp/B00CIXVIRQ/ref=sr_1_2?ie=UTF8&qid=1477076617&sr=8-2&keywords=snap+circuits
Air Car	https://www.fatbraintoys.com/toy_companies/elenco_electronics_inc/air_power_racer_kit.cfm