

Assemble and Demonstrate of Solar Panel to Operate a small fan (Grade VIII, State Standard)

Umar Dair¹

¹Affiliation not available

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Abstract

Overview: The World has great shortage of energy. The main sources of producing energy are oil, gas, coal etc. However, these sources are too much expensive and needs great efforts, resources to be utilized for industrial as well as domestic purposes. Sun is the main source of energy. it releases energy at a mass-The rate of conversion of energy is 4.26 million metric tons per second, which produce 3.846×10^{26} W. In Pakistan shortage of energy is the main problem. Industries and household requirements are several times greater than energy production by Hydroelectric mechanism. Pakistan is seeking alternatives for production of energy. Solar Panels are one of the cheap sources of production of energy. Solar Photovoltaic was discovered back in 1839 by French scientist Edmond Becquerel. Over the course of the next 100 years, many discoveries and inventions were made and by 1954, Daryle Chapin, Gerald Pearson and Calvin Fuller were the first to design the first silicon photovoltaic cell which was the precursor of all silicon cells today. Over the next few decades, solar power technology continued to develop. Photovoltaic research and development discovered new material, cell designs and novel approaches to solar material and product development. Now a days, solar panels are available all over world for converting solar energy to electricity. In Pakistan, they are widely used in areas Where the hydroelectric power has not reached, or to cope with the effects of load shedding in urban areas. Today we are going to design assemble and demonstrate a model of a fan run by a solar panel. Objectives of the lesson: ? To Develop curiosity in students about Scientific approach. ? To shift the students from rote memorization towards inquiry-based learning. ? To enable them to create ideas, think critically and logically and solve problems themselves. ? To develop and inculcate the zeal of Science, Technology, Engineering and Mathematics.

Name of Teacher	Umar Dair
Lesson	Assemble and demonstrate of solar panel to operate a small fan
Grade	VIII
Subject	IT
Standard	State Standard (Pakistan)
Time:	55 MINUTES
Date:	19-04-2021

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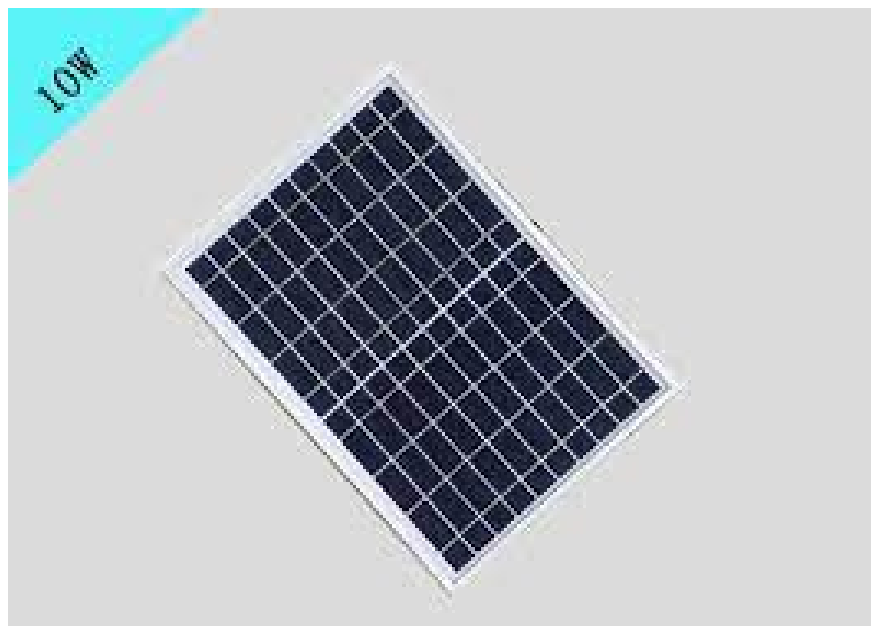
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- To Develop curiosity in students about Scientific approach.
- To shift the students from rote memorization towards inquiry-based learning.
- To enable them to create ideas, think critically and logically and solve problems themselves.
- To develop and inculcate the zeal of Science, Technology, Engineering and Mathematics.
- To motivate them to innovate and develop prototypes to serve the nation and the World.

Project Name: “To Assemble and demonstrate a model of a solar panel to operate a small fan” as per national curriculum of Pakistan 2020 subject IT chapter No 12, Grade VIII

Material required:







- Solar panel of 10 watts, 0.57 ampere
- 2 x one meter long electric wires,
- A small fan.
- A Key to turn the current on and off.

Procedure:



- Take a solar panel of 10 watt
- Connect one of the wires to the negative terminal of the solar panel and the fan.
- Cut the other wire in half and connect both parts to the key.
- Now connect both ends of this wire to the solar panel and the fan.
- Expose the solar panel to sun light.
- Turn on the key to allow current to reach the fan.
- The fan will start spinning due to solar power.

Presentation of lesson:

Hooking:

- Energy may be defined as the capacity or ability to do some work.
- Energy has many forms : such as kinetic energy, potential energy, heat energy, thermal energy, nuclear energy, electrical energy and solar energy etc

- Without energy life is not possible. Plants need solar energy to prepare their food in the process of photosynthesis.
- Human being needs more sources of energy to run industries, factories, operate vehicles, planes, ships, etc.
- Oil, gas and charcoal were the widely used source of natural energy used by the world in 20th Century.
- However, with the development in science, technology, mathematics and engineering more sources were invented to fulfill the requirement of the energy source of the world.
- Sun is the main source of energy. The core of sun fuses about 600 million tons of hydrogen into helium every second, converting 4 millions tons of matter into energy every second as a result. This energy escaped from the core of the sun in the form of heat and light energy.
- This solar energy can be utilized to produced electrical energy and can be a great renewable alternative to the limited non renewable sources of energy such as Coal, Oil and gas.
- Solar PV panel have been around for quite some time now. These panel convert Solar energy to electrical energy.
- The model explained here will help the students to get motivated towards innovations and research.

Formative Assessment:

- What is energy?
- Why do plant and animals need energy?
- Why do human need energy?
- What are the most common sources of energy?
- Do you think that solar energy can be an alternative to hydroelectricity?
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Lesson: Assemble and demonstrate solar panel to run a small fan	Lesson: Assemble and demonstrate solar panel to run a small fan	Outstanding = 3 Good = 2 Satisfactory = 1	Score
Align to grade level standard: The lesson is aligned to state standard Grade viii information Technology	Outstanding Good Satisfactory	Outstanding Good Satisfactory	3
2.Multidiciplinary The project is based on STEM (science, Technology, Engineering and Math)	Outstanding Good Satisfactory	Outstanding Good Satisfactory	2
Address authentic challenges The project has engaged the students to observe , critically analyze, and demonstrate practically and engage in solution of real world problem	Outstanding Good Satisfactory	Outstanding Good Satisfactory	2

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Integrates 21 st century skills The project motivates students to integrate creativity, developing idea and prototype	Outstanding Good Satisfactory	Outstanding Good Satisfactory	2
More than one solution The project motivates the students to sort out problems, conduct root cause analysis and develop hypothesis and choose the best solution	Outstanding Good Satisfactory	Outstanding Good Satisfactory	2
Using the Engineering design process: Engineering design process (define, identify, brainstorm, select, prototype, test, iterate and communicate) is used	Outstanding Good Satisfactory	Outstanding Good Satisfactory	3
Hands- on The project provides a hands-on experience to students about Science,Technology,and engineering.	Outstanding Good Satisfactory	Outstanding Good Satisfactory	3
Integrates technology : Technology is integrated in the project	Outstanding Good Satisfactory	Outstanding Good Satisfactory	3
Total	Total	Total	20