SASTA OLIPHANT SCIENCE AWARDS

SOUTH AUSTRALIAN SCIENCE TEACHERS ASSOCIATION

Prize Winner

Models & Inventions

Year 7-8

Ziena Aljawhari

Walford Anglican School for Girls

Government of South Australia
Department for Education

SASTA South Australian Science Teachers Association

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AUTONOMOUS SOLAR TRACKING PROTOTYPE (SOLARSKY)

By: Zeina Aljawhari

APPARATUS/EQUIPMENT

- 10rpm 6v geared motors
- 5v 0.6w solar panels
- Wood
- Red electrical wires
- Tie wraps
- Miniature tires
- Black electrical wires
- Soldering iron
- Miniature stand mixer

METHOD

1. Dismantle miniature stand mixer into the 2-axis.
2. Attach the parts to make the 2 moving axis.
3. Put the 2 axis on top of each other.
4. Spray paint the wooden pieces.
5. Make a grid of two pieces of wood crossing over and one long piece going through.
6. Attach the solar panels to the edges of the grid.
7. Reverse wire them with one red wire on the first axis attaching to the positive and black to the negative and the reciprocal with the other solar panel.
8. Do the same with the solar panels on the other axis making sire the way they are wired always moves them into the shade.
9. Attach a large piece of carboard to the end of the long piece of wood going through the grid.

SCIENTIFIC PRINCIPLES USED AND HOW TO OPERATE:

The scientific principles used in this solar tracking prototype are solar energy, electric energy, and engineering physics. Solar energy is applied when the solar panels are exposed to the sun it moves the mechanism. With the solar tracker finding the sun the next step is replacing the cardboard at the front with a solar panel and converting it to electricity. This prototype would be useful for solar energy because it will focus the large area of sunlight into one beam. Electric energy is used through the solar panels and automotive wires, as the solar panel is exposed to sunlight, it charges its sensors causing an electric charge to be put through the wires. The motor will then move in the direction that it is wired to (all solar panels are reverse wired) until no more energy is received this will happen when the front board covers the solar panels. This means it will be facing the sun. Engineering physics is applied through the principles needed to achieve correct mechanics in the autonomous machine as well as the application of electrical engineering and materials science. Help was received for cutting the wood and with the soldering equipment from my brother (year 11) and father.

PROBLEMS THAT OCCURRED

The initial problem that occurred was that the pieces needed for the 2 axis were very hard to make on their own. This was remedied by using 2 Jack and Jill wooden toy stand mixers as they already has the 2 moving axis meaning all that needed to be done was disassemble

them and wire the solar panels. Another problem that occurred was how to make the different axis move, using a tire and connecting rubber bands this problem was fixed.

Bibliography

- https://www.youtube.com/watch?v=hr07xKWM6tw
- https://www.youtube.com/watch?v=wL9PcGu_xrA