SASTA OLIPHANT SCIENCE AWARDS

SOUTH AUSTRALIAN SCIENCE TEACHERS ASSOCIATION

Highly Commended

Models & Inventions

Year 7-8

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Government of South Australia
Department for Education

SASTA South Australian Science Teachers Association

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S.P.E.A.R - solar-powered phone charger

The scientific principles demonstrated in our project utilises sustainable energy to make a future proof invention. We used a solar panel to convert solar energy, into electrical energy, to power a battery that charges your electronic device. The battery can be charged itself and be used as a portable power bank.

We made our invention in Fusion 360 which we have been using this past year in our STEM classes. We bought the parts necessary for the invention (4000mA hours of battery, 1 butt hinge, solar panel, 6 magnets and a USB chip) and then created a housing for the parts. We have had 3 prototypes before getting to our final design and had many problems that needed to be resolved before finishing the final prototype.

Once we got all the parts we encountered our first problem, we needed a case for the project. We saw people on YouTube design similar projects, they used Tupperware containers to store everything, but instead, we 3D printed a case.

Our first design was fairly successful, but the holes we made for the magnets to hold the lid closed were not in the right spot, the case wall was too thin leaving gaps on both sides.

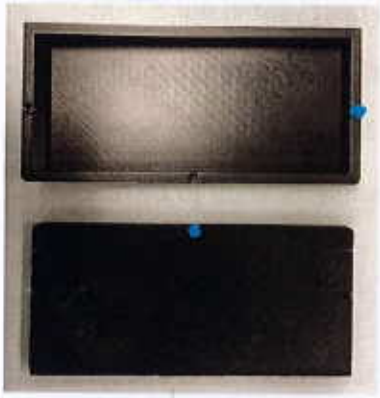
In prototype 2 we thickened the walls and added a micro USB and USB A ports with a hole for the led lights to shine through. We added some ledges on the inside of the case so that the solar panel will be flush with the lid. We also encountered problems like the walls being too thick, the ports not being the correct size and the hinges not fitting onto the case.

Our third and final print was successful, we glued and soldered the parts in place and connected it all up. On our first test, the invention charged an iPhone 8 on 13% up to 57% in 40 minutes.

When operating S.P.E.A.R, connect a USB A cable into the required port and plug the output into the desired electronic device and watch in satisfaction as the device starts charging. When wanting to charge, you can either plug in a micro USB cable and charge S.P.E.A.R like a power bank or you can lift the lid and let the sun charge it up. There are 5 led lights, four of which are

blue, indicating how much charge the S.P.E.A.R battery and a green light which is illuminated when the device is getting sunlight and charging the battery.

This model was made by Simran Bruce, Felix Lister and Xander Neeskens. The case helped designed by Mr Tom Pattingale.



Prototype 1 (left)
Prototype 2 (middle)
Prototype 3 (right)
Prototype 3 (right)

0068- 001

Brighton Secondary School

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Student(s):

	Gender:	***Patent Sought***
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App code: 6046506

Year Level: 7 - 8 ***Group Entry:*** Y ***Students:*** 3

Category: Models & Inventions

Project Title:

Instructions for operation of S.P.E.A.R

S = **S**olar

P = **P**owered

E = phon**E**

A = ch**A**rger

R = charge**R**

When operating S.P.E.A.R, connect a USB cable into the required port and plug the output into the desired electronic device and watch in satisfaction as the device starts charging. When wanting to charge, you can either plug in a micro USB cable and charge S.P.E.A.R like a power bank or you can lift the lid and let the sun charge it. There are 5 led lights, four of which are blue, indicating how much charge the S.P.E.A.R battery has and a green light which is illuminated when the device is getting sunlight and charging the battery.

Note: This sheet is for display purposes only.

Refer to report for more detail about the S.P.E.A.R.

Be gentle with cables, lid requires force to open and be careful not to break the hinge.