SASTA OLIPHANT SCIENCE AWARDS

SOUTH AUSTRALIAN SCIENCE TEACHERS ASSOCIATION

Highly Commended

Models & Inventions

Year 7-8

Mariam Joseph

Glen Osmond Primary School

Self-sustaining Greenhouse for Endangered Plants

-By Mariam Joseph

A brief explanation:
The general idea is to create a greenhouse that can produce a stable environment for endangered plants with medical uses to grow. This involves the need for a watering and climate control system. The greenhouse is also completely powered by solar power.

Scientific principles:
The scientific principle of converting solar energy into electricity is used to power most of the greenhouse needs. The solar panel powers the water pump and climate controller along with the PID controllers.

The capillary action. 'The movement of a liquid along the surface of a solid caused by the attraction of molecules of the liquid to the molecules of the solid'*. This scientific principle is used to water the plant, this is an easy effective self-sustaining alternative to sprinklers and hand watering. For further explanation visit this site. https://smartgardenguide.com/how-do-self-watering-pots-work/
* By dictionary.com

Materials:

• Stanley knife • Scissors • Hot glue • 3 Wooden rainbow rings • Black-board plant markers • Silicon ice cube tray • Fake moss, plants • Double sided tape • 100 white LED fairy lights • Three medium pieces of thread	• Black plastic board • Clear flexible plastic board • 8 Stackable circular plastic jewelry containers • Wooden dowels • Cardboard • Black paint • Masking tape • Plastic leaflet

Method
I started with making the water tanks with jewelry containers and masking tape. I made four two at the front of each end of the greenhouse. I then made the plants that go into the greenhouse, with a silicone ice cube tray and tray moss and trees. Once I finished, I placed them on the blackboard, I used the wooden rainbows to hold up the plastic covering and set them at the start middle, and end of the greenhouse. I covered the plants and the rainbows with flexible plastic and covered the two ends of the greenhouse with a cut-out plastic leaflet. To represent the parts of the greenhouse that would be powered by solar power, I cut 5 holes on the side of the clear flexible plastic and stuck 5 solar-powered LEDs. You can turn the LED on by using the switch on the solar panel. I labeled them with plant markers. To show a rough model of the self-watering feature I created a model, flexible clear plastic, wooden dowels, thread, fake plants, and fake trees. I then printed out some information and stuck them near the solar lights, the greenhouse, the water tanks, and the extra model.

Help

I had help from my parents to cut through the wooden dowel and the leaflet.

Problems

A problem I ran into was when the clear plastic sheet used to cover the greenhouse snapped at the edge, and we had to cut a wooden dowel and stuck it on with hot glue to keep it stable.

Another problem we had was when we tried using liquid glue to keep the plants inside the greenhouse stay still, it did not dry in time, and we used double-sided tape instead.

RISK ASSESSMENT FORM
Models & Inventions

This must be included with your report, log book or entry

NAME: Mariam Joseph ID: 0201-020

SCHOOL: Glen Osmond Primary

Activity: Give a brief outline of what you are planning to do.

My model is of a self-sustaining greenhouse. It is solar powered and self-watering and it has a climate control system. the only working thing in the model is the connection from the solar panel to the LED lights representing the solart connection to the greenhouse. This Greenhouse is specifically made to cultivate endangered plants with medical uses until they are capable enough to survive on their own. Trees like the, Slippery Elm which has many uses and are dangerously close to extinction.

Are there possible risks? Consider the following:

- Chemical Risks: are you using chemicals? If so, check with your teacher that any chemicals to be used are on the approved list for schools. Check the safety requirements for their use, such as eye protection and eyewash facilities, availability of running water, use of gloves, a well-ventilated area or fume cupboard.
- Thermal Risks: are you heating things? Could you be burnt?
- Biological Risks: are you working with micro-organisms such as mould and bacteria?
- Sharps Risks: are you cutting things, and is there a risk of injury from sharp objects?
- Electrical Risks: are you using mains (240 volt) electricity? How will you make sure that this is safe? Could you use a battery instead?
- Radiation Risks: does your entry use potentially harmful radiation such as UV or lasers?
- Other hazards.

Also, if you are using other people as subjects in an investigation you must get them to sign a note consenting to be part of your experiment.

Risks	How I will control / manage the risk
1.Being burned by the hot glue gun 2.Cutting my self with the Stanley knife 3.using sharp scissors	Firstly i will do everything under parent supervision and if a task proves to be to hard for me to exacute, like cutting wood or glueing thick plastic. I will make sure that one of my parents do it so there won't be chance of getting injured.

(Attach another sheet if needed.)

Risk Assessment indicates that this activity can be safely carried out

RISK ASSESSMENT COMPLETED BY (student name(s)): Mariam Joseph

SIGNATURE(S): _____

☑ **by ticking this box, I / we state that my / our project adheres to the listed criteria for this Category.**

TEACHER'S NAME: Theresa Andreucci SIGNATURE: _____

DATE: /18/8/2021

Dear Parents and Students,

Congratulations to all students who successfully submitted projects in the Programming, Apps & Robotics, Multimedia and Science Writing categories. Judging is now well under way for these projects.

Please see below all the necessary information regarding the next phase of the Oliphant Science Awards.

ONSITE PROJECT DELIVERY –

- **ALL Crystal Investigations, Models & Inventions, Posters, Games and Photography projects are due to be delivered on Thursday 19th August.**

Please bring your entries to Room 1 by WEDNESDAY AUGUST 18. I will put the ID labels on projects and deliver them to the Festival Function Centre on Thursday 19 August. I will store entries in the secure office area until delivery.

NEW FOR 2021: ONLINE PROJECT SUBMISSION – 12 – 19 AUGUST

- This year, there is a new process of electronic submission for some parts of **Models and Inventions** (reports only), **Crystal Investigations** (reports only) and **Games** (electronic Games or supporting videos) projects.
- Online submission will be available from 12-19 August and the full details for this process can be found on the website. *Please note that electronic submission is optional in 2021*, however this will be a requirement from 2022 onwards, so we would encourage your students to give it a go!
- Coversheets have been sent home with students. Where it is a group entry, one student has taken responsibility for the coversheet.

PROJECT COLLECTION – MONDAY 23 AUGUST

I will collect all Games, Crystal Investigations, Models & Inventions, Posters and Photography after school on Monday August 23rd. I am hoping to display entries in the conference/library area afterwards.

OPEN DAY – SUNDAY 22 AUGUST

At this stage the Open Day will be going ahead this year on Sunday 22nd August at Festival Functions (292 Findon Road, Findon), providing Government restrictions allow. Entry will be by Gold Coin Donation, and we will adhere to all Government imposed restrictions that are in place at the time.

After a successful launch in 2020, SASTA will again be holding the Virtual Open Day for anyone who is not able to attend Open Day in person, so keep an eye out for that in September.

PRESENTATION CEREMONY – FRIDAY 17 SEPTEMBER

At this stage, SASTA are still working towards running the Presentation Ceremony evening on Friday 17th September 2021. Further details will be sent to School Coordinators at the end of August / beginning of September.

Kind regards,

Theresa Andreucci
Glen Osmond Primary School
Oliphant Science Competition Coordinator