SASTA OLIPHANT SCIENCE AWARDS

SOUTH AUSTRALIAN SCIENCE TEACHERS ASSOCIATION

Highly Commended

Models & Inventions

Year 3-4

Tobias Heidrich

Annesley Junior School

Pixel Power!

Name: Tobias Heidrich
School:Annesley Junior School
Year: 3-4
Models & Inventions

My Model Report

- ***Risk assessment attached***
- ***Scientific principle***

I have created an electrical circuit to show how a pixel works.

Pixels are found in the screens of many different devices like televisions, mobile phones, computers & iPads.

Each pixel is made up of three different colours, red, green and blue, surrounded by a black frame. If the red, green and blue are all turned on, the colour is white. If all the colours are turned off, it's seen as black. If you adjust the brightness of each individual colour, you can make many different colours.

On our screens, each pixel is very small. A television screen can have millions of pixels which create the pictures we see.

- ***Construction of electrical circuit***

Used:

Bread board
Transistors
Single LEDs – red, green, blue
Jumper leads
Switch
Glue
Resistors
Potentiometers
Combined LED
9V battery
Cardboard
Plastic container

The concept of the model was Tobias'. Tobias & his Dad worked together to investigate what items were needed and the design of the circuit. Tobias constructed the circuit based on this design. Once completed & tested, his Dad soldered some connections for strength with Tobias' assistance.

- ***Challenges***

The first challenge was to learn lots about how to make an electrical circuit not using a kit. Some of the words were hard to remember and working out what order things had to go in. I did lots of testing and talking with my Dad so I could understand how it worked. Then my Dad and I designed a simple circuit.

The hardest problem was working out how to stop the combined LED from burning out from the 9V battery. We had to research on the internet and my Dad even had to ask a chat group to find our answer which was that we had the resistor in the wrong place.

Instructions

1. *Press the green button to turn on.*
2. *Turn the knobs marked red, green and blue.*
3. *The individual LEDs will show you how much of each colour you are using.*
4. *The large LED will show you the pixel colour.*
5. *Experiment and see what colours you can make!*

- ***Acknowledgement of adult contribution***

Nicole Francis, Mother

- *Assistance sourcing research reference materials*
- *Assistance provided in reading and understanding written source materials*
- *Discussion*
- *Prepared written report except for Scientific principle, Challenges & Instructions section.*
- *Edited Scientific principle, Challenges & Instructions sections. Some parts typed as dictated by Tobias*
- *Assisted measuring lining for box*

Scott Heidrich, Father

- *Explanation of electrical components & functions*
- *Discussion*
- *Design of circuit with assistance from Tobias*
- *Investigation to resolve queries and finalise design of circuit*
- *Soldering of connections with assistance from Tobias*
- *Drilled holes in plastic container to house circuit*
- *Assistance using hot glue gun to attach cardboard & lining of box*

OSA RISK ASSESSMENT FORM

for all entries in (✓) ☐ Models & Inventions and ☐ Scientific Inquiry

This must be included with your report, log book or entry. One form per entry.

NAME: TOBIAS HEIDRICH ID: _____

SCHOOL: ANNESLEY JUNIOR SCHOOL

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

Make an electrical circuit powered by a 9V battery with LEDs to show the colours used in a pixel & how they mix together to create the colour we see.

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
Minor risk of low voltage shock from battery Burns risk from soldering	-Safety instructions provided by adult prior to building circuit. -Supervision / check by adult prior to completing circuit (attaching battery) -Adult to do soldering with assistance by Tobias

(Attach another sheet if needed.)

Risk Assessment indicates that this activity can be safely carried out

RISK ASSESSMENT COMPLETED BY (student name(s)): TOBIAS HEIDRICH

SIGNATURE(S): T. Heidrich!

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

TEACHER'S NAME: Christiana Schammer

SIGNATURE: CSchammer DATE: 30/6/21