# SOLAR BENCH

Created by Samuel & Ainsley & Willow

DOWERIN HIGH SCHOOL SOLAR BENCI The Solar Bench is a STEM project of the Domerin District High School Final design and construction has been Hhat thesign una construction of the state o

The project has been funded by a grant

Significant support has been provided

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#### What is a solar bench?

A solar powered bench is a bench that allows you to charge your phone or device on the go. They are equipped with wireless device chargers and smart USB connectors. They provide fast charging of mobile devices whilst ensuring battery protection, entirely powered by integrated solar panels. There are seven solar benches around Perth.



#### How our project started

- At the end of 2019, our Deputy, Miss Scott, developed the idea from our school being involved in the STEM Enterprise Schools Project. She saw it as a sustainable and renewable energy initiative for the Dowerin community.
- In 2020, Mr. Hall got the students to design solar bench prototypes during our Wednesday Metal Work class.
- Originally, the plan was for all of us in the class to build a small-scale solar bench in groups. However, due to Covid, the project was never completed, it was also disrupted as were having our new Metal/Woodwork shed built.
- Our Deputy Principal, Miss Scott, resurfaced the project at the beginning of 2022 and a small team of students, Samuel, Ainsley, Blair and later Willow, were chosen to complete a lifesized solar bench.
- Education Assistant, Mr. Trevor Gerrard volunteered to facilitate the project.

Funding	Equipment/Materials	Cost
	Metal frame	\$845.00
In 2020, we were successful in receiving a \$2500 grant from the Dowerin Field Days Management Team to create a life-sized solar bench.	Solar Panels x2 (full)	\$400.00
	Miscellaneous (screws, glue, cabling etc)	\$150
	Poly-carbonate top	\$830.00
	Paint	\$350.00
	USB ports	\$40
	Wireless Charging Spot	\$140.00
	Battery	\$120

#### Men's Shed support

 As we lacked the necessary equipment and skills to build the frame, this was constructed by Dowerin Men's Shed.



#### **Electrical Components**

- Mr Graham Johnson at Electritech Industries came to service our school solar panels.
- We took this opportunity to gather some expert guidance and Graham was happy to provide this.



# Designing the frame

- As a school based STEM project, Samuel, Ainsley and Blair started designing the bench using the existing frame.
- They used a computer program called Tinker Cad



# THE BUILDING PROCESS

## Designing the frame

- Advice was provided by Wheatbelt Engineering on structural design.
- Chris was more than happy to provide ongoing support for this.



#### Frame Modifications

- Design changes were implemented by Willow who was doing work placement at Wheatbelt Engineering.
- She also developed the box to house the electrical parts.



#### Finalising the Frame

- The frame was painted by Willow at Wheatbelt Engineering.
- She used a pneumatic spray gun to paint the undercoat and the final coat of paint.



#### **Polycarbonate Sheeting**

- Advice for the polycarbonate sheeting was provided by Dotmar Engineering.
- Blair, Ainsley and Samuel implemented the final measurements and design specifications.



#### **Combining the Electrical Components**

- Samuel & Ainsley assembled the electrical components.
- We tested these parts with assistance from Mr Gerrard



## **Dowerin Field Days**

- The Solar Bench was displayed at the Dowerin Machinery Field Day.
- We received some good feedback and ideas.







#### Meeting with the Shire

• We met with Ms R. McCall, Dowerin Shire CEO, to discuss a permanent location for bench.



#### Potential Design Improvements

- Design aesthetics improvements
- Solar panel access
- Allowances for welding tolerances
- Design frame to solar panel sizes
- Investigation of power storage options

