

MISSION 3: HEATWAVE!

Oh no. The zoo's power is out of control and it's starting to overheat!

Over time, StellarShields which protect the zoo enclosures from stellar radiation from the nearby star have been removed to make way for PowerPanels which use stellar radiation to top up the zoo's power needs.

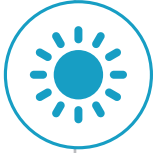
Unfortunately, too many StellarShields have been removed, meaning the zoo will get far too hot if nothing is done!

Your mission? To calculate how to cover the outside of your bio-dome with PowerPanels and StellarShields so that there is enough power for the next 12 months – while also creating a comfortable temperature for the creatures.

Test out the temperatures reached and amount of power produced for the different ratios of PowerPanels to StellarShields. Use this information to work out the best division of the Dome surface area to try to find a sustainable environment for the creatures.

If you can generate a power surplus you can use it to make the AstroZoo brighter and more visible to passing spaceships, so attracting more visitors to come and learn about the endangered species for which you are caring.





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STELLAR RADIATION

Molecules in the air, in water, in our bodies and in the zoo's different creatures are constantly moving about or vibrating. This is called kinetic energy.

Radiation from the star is absorbed in the molecules of gases, liquids and solids, causing them to vibrate more strongly. As molecules collide with each other this kinetic energy is transferred. This is what we understand as heat transfer or conduction!



STELLARSHIELDS

- These shields protect the zoo from the stellar radiation.
- StellarShields are 100% effective at reflecting stellar radiation
- Each StellarShield reduces the temperature in the Dome by a fixed amount.



POWERPANELS

- These are essential for generating power in space!
- Each 1m² of PowerPanels produces a fixed amount of power in kilowatts.
- PowerPanels are not 100% efficient - some radiation will reach the Dome and will raise the temperature at a rate of 0.1°C per PowerPanel per year.
- You cannot place PowerPanels in front of the StellarShields

