Name _____

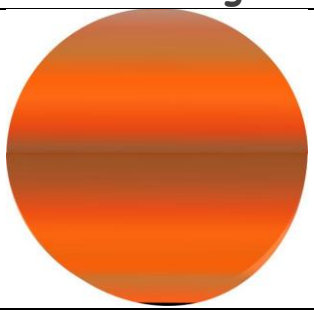
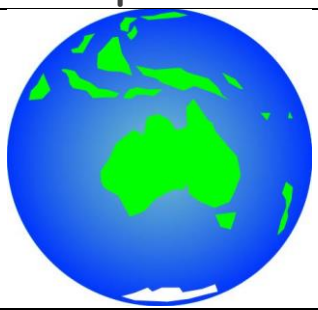
Energy for Planets - Student Worksheet

Our Sun emits radiation across space and only some of it arrives on Earth.

"Goldilocks" Earth is just the right distance from the Sun to be able to have liquid water. It has just the right magnetic field to deflect some of the nastier forms of solar radiation and just the right atmosphere to be able to retain some heat to keep water liquid. These three important characteristics mean it can maintain life.

Venus is too close to the sun and is too hot. Mars is further away from the Sun, has lost its atmosphere and is too cold, though things were different in the past.

Average surface temperature of three planets

		
Venus	**Earth**	**Mars**
450°C	13°C	-87°C to 20°C

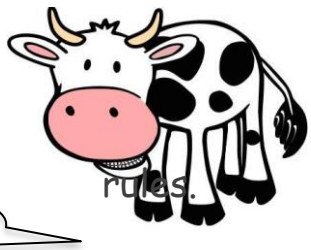
Name _____

Energy for Planets - Student Worksheet

The Greenhouse Effect

Without clouds reflecting back heat from the Sun and gases retaining heat, our Earth would be too cold for life.
Like greenhouses in icy parts of the world, they keep plants warm enough to grow. Living things' body processes depend on enzymes, which only work within a narrow range of temperatures.

To Find if the Sun Heat the Atmosphere and Which School Location is the Warmest



If we want to experiment scientifically we need to follow the same rules.

Cows Moo Softly

C _____

M _____

S _____

We also need to be able to use technology that will give us accurate and precise measurements. What technology can we use to measure heat?

_____

Name _____

Energy for Planets - Student Worksheet

Improving the safety and accuracy in using a glass thermometer.

1. Never hold it by the bulb end. Why?

_____

2. Carry the thermometer horizontally across your body when moving. Why?

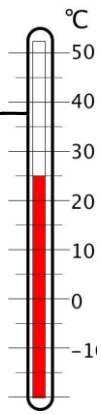
_____

3. Always raise the thermometer so that your eyes are level with the fluid when you read the temperature. Why?

_____

4. How accurately can you estimate the temperature using this technology?

_____



Materials per group

- A thermometer (laboratory thermometers - no mercury)
- A worksheet and pen
- A roll of masking tape

Name _____

Energy for Planets - Student Worksheet

- A ruler
- A map of the school with three locations marked on it.

Method

1. Measure a height of 1m on the classroom wall or door and mark with masking tape.
2. One student in each group lines up with the measured mark and places a piece of masking tape on himself or herself at exactly the same (1m) height as the marking on the wall. This student is in charge of the thermometer.
3. Care must be taken to ensure to select two similar locations but one in full sun and the other in shade. As much as possible everything else should be the same (closeness to buildings or dark surfaces, both out of wind etc.)
4. At the first location, the student in charge of the thermometer holds it vertically away from their body with the bulb level with their 1m mark. After waiting one minute, three readings are taken and entered in the worksheet.
5. Students move to the second location and repeat.
6. Calculate the average temperature of the readings in shade and those in full sun.

Name _____

Energy for Planets - Student Worksheet

Observations for location 1

	Shade (°C)	Full sunlight (°C)
Reading 1		
Reading 2		
Reading 3		
Average Reading		

Observations for location 2

	Shade (°C)	Full sunlight (°C)
Reading 1		
Reading 2		
Reading 3		
Average Reading		

Observations for location 3

	Shade (°C)	Full sunlight (°C)
Reading 1		
Reading 2		
Reading 3		
Average Reading		

Conclusion A conclusion is the idea that our collected data leads us to state.

Which location about the school is the warmest? _____

Name _____

Energy for Planets - Student Worksheet

What can you conclude from this data?

_____

Why did we hold the thermometer 1m above the surface?

_____

Why did we take three readings and not just one?

_____

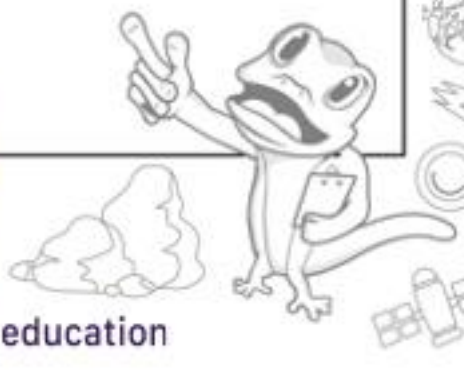
_____

Extra for Experts

Weather scientists take readings from stations set 1.2m above ground to minimise the effect of heat radiated back from the ground. The equipment is held behind double louvered walls to minimise the cooling effect of wind or rain and under double roofs. The box is called a Stevenson Screen.
Students may wish to return to their reading locations and contrast readings when the reading is taken close to the ground, with a wet thermometer bulb or if "wind" is blown onto the bulb.

Why wouldn't you erect a weather station near the barbeque?

_____



Name _____

Energy for Planets - Student Worksheet

Why aren't weather stations erected under the eaves of a building?

_____

_____

Why wouldn't you paint the walls of the station black?

_____

_____

PALMS
PRIMARY AUSTRALIAN LITERACY MATHEMATICS AND SCIENCE

Santos & ESWA supporting earth science education