

TAP 315-1: Summer Sun remembered

Measuring brightness, hoping to measure distance

Comparing energies incident on the face allows an estimate of the distance of the Sun.

You will need

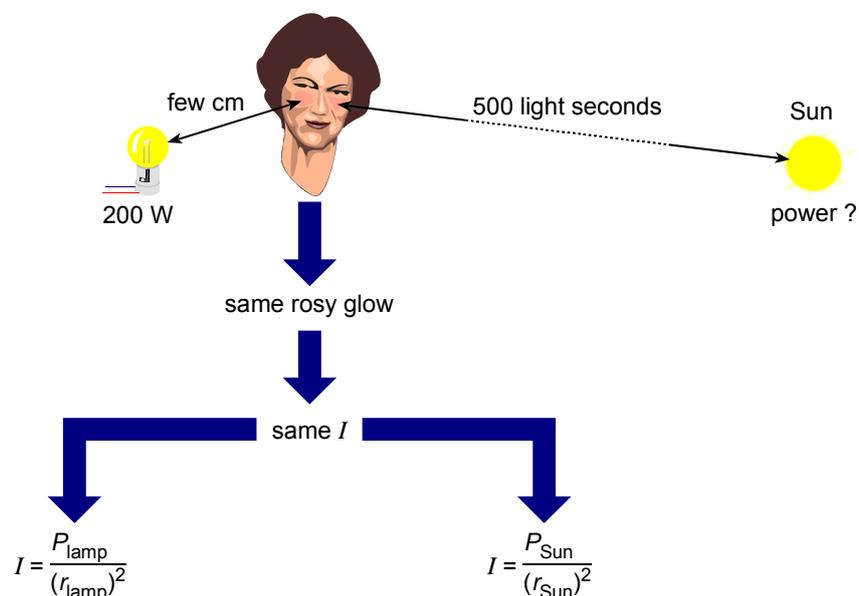
- ✓ high-powered lamp, perhaps 200 W (use a safety-pattern batten lamp holder wired to plug directly into a 13 A socket)
- ✓ ruler
- ✓ partner

	<p style="text-align: center;">Safety</p> <p>The second student is important, as one cheek will have to get quite close to the 200 W lamp.</p>
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What to do

Close your eyes, imagine lying on a beach and remember the summer Sun on your face. How hot did it feel?

Now bring your face up close to a high-power lamp – take care! A partner should watch you carefully, so that you do not touch the lamp. Aim to feel the same warmth that you remember in the summer Sun. Record the distance to the lamp and the power of the lamp.



Can you use these data to suggest the power output of the Sun? Remember that the Sun is about 500 light-seconds away.

You have

1. Used the $1/r^2$ relationship to relate power outputs.

Practical advice

The incident power per square metre is identical, and so application of the inverse square law will relate the power outputs of the lamp and Sun to the distances of the two.

A calculation can also show that the Sun's radiation at the Earth is of the order 1 kW m^{-2} .

**Safety**

The second student is important, as one cheek will have to get quite close to the 200 W lamp.

Social and human context

The power output of the Sun might usefully be compared with the power output of all human power stations.

External reference

This activity is taken from Advancing Physics chapter 12, 50E