H

Higher Assignment  
Guide Sheet B: Stellar Brightness



**Stellar Brightness and the radius of an exoplanet**



Light level meter

**Apparatus**

Diffuse large light source, black card discs of various size, light level meter, metre stick, method of hanging the discs with very fine thread.

**Instructions:**

* Cut out circular discs of various diameters to measure represent the planets Students may devise other ways of making the planets. One group has used coins of various sizes.
* Set up the large diffuse lamp to represent the star and a light detector to measure the light from the star. Any lightmeter which gives a numerical output can be used to measure the brightness of the star. A lightmeter app can be used.
* Use a darkened room or find a method of measuring ambient light levels
* Suspend the planet in front of the star. One method that works well is to make a cross wire from light nylon fishing line. The planets can be attached in the centre using blutak or equivalent.
* Take various light level readings of the brightness of the star for different diameters or radii of planets

**Risk Assessment**

* Do not overload the power supply or put too large a voltage across the bulb.
* Beware of breakable glass
* Beware of hot equipment.
* Check all electrical wiring

**Instructions**

* Teachers must exercise their professional responsibility to ensure that the report submitted is the candidate’s own work.
* No more than 8 hours should be spent on the whole assignment.
* A maximum of 2 hours is allowed for the report stage.
* The instructions for candidates outline the requirements for the assignment. must be given to candidates at the outset.
* Teachers must ensure candidates understand the requirements of the task.
* Teachers must not, at any stage, provide candidates with a template or model answers.

**Experimental research**

* Teachers can supply instructions for the experimental procedure(s).
  + This **must not** include details of range and interval of measurements, and reference to repeats.
* Teachers are responsible for ensuring that appropriate risk assessment has been carried out and that candidates have guidance on the safe and correct use of equipment.
* Teachers **must not** provide candidates with experimental data.
* Teachers **must not** provide a blank or pre-populated table for experimental results.
* Candidates must carry out the experimental work either individually or as part of a small group. (A small group is defined as having two, three or four candidates.)
* Group work may be an appropriate approach in a number of circumstances, for example:
  + to encourage diversity of research topic
  + where experiments are labour- or time-intensive
  + where resources are limited Where candidates work in a group, teachers must ensure every candidate participates in the experimental work.
  + Within the small group, it is acceptable for candidates to share experimental data, but experimental data must not be shared between groups.
* Teachers **must not** provide feedback to candidates on their data. However, where candidates identify a problem with their results and indicate that they wish to repeat the experiment(s), they may do so.

**Mrsphysics takes no responsibility for any health and safety. It is the responsibility of the teacher and student to risk assess any practical activity they complete! It is also the responsibilty of the teacher to check that these experiments meet the specifications. Mrsphysics has done her best to check that these meet the criteria**

* **Sept 2023**