

GCSE Astronomy Coursework

A4 & B4 Drawings or Photos of Constellations

Observe and make detailed drawings (A4) or photographs (B4) of three different constellations, recording dates, times, seeing and weather conditions and noting colours (if possible) and magnitudes by comparison with reference stars.

Try to do this when the Moon is below the horizon. Also choose a time to view your chosen constellations when they are at their highest point (if this is reasonable). Remember, the Plough is an asterism that is part of Ursa Major and the Pleiades is NOT a constellation (it is an open cluster in Taurus). Choose at least 3 reference stars for your magnitude estimates - these must not be in your chosen constellations. Rank the stars according to their relative brightnesses e.g. Sirius = -1.5 (brightest); Pollux = 1.2; Kocab = 2.1; Pherkhad = 3; ϵ UMi = 4.2 (faintest), then use them to estimate the magnitudes of the stars in your constellations. If you do not do this you will score zero for your analysis section. You can compare your estimated magnitudes to actual magnitudes of the stars afterwards.

If you are doing photography you may want to think about the exposure time you use to avoid trails. If you have access to an equatorial telescope you can take longer exposure photographs (with the camera attached to the telescope) as these telescopes track objects across the sky thus eliminating star trails.

To locate constellations use www.stellarium.org or alternatively download an app for your mobile: http://downloads.bbc.co.uk/tv/guides/BBC_Stargazing_Live_2012_Mobile_App_guides.pdf

To find sunrise, sunset, moonrise and moonset times and the phase of the Moon use www.timeanddate.com

Check the weather forecast - www.metoffice.gov.uk

See our useful guides for help on how to carry out observations and take photographs of various objects: www.rmg.co.uk/discover/astronomy-photographer-competition/how-to-guides

For examples of reports with moderator comments visit the Edexcel GCSE Astronomy website: <http://www.edexcel.com/quals/gcse/gcse09/astronomy/Pages/default.aspx>

Here you will find two documents that will help you write a report: Under 'Controlled assessment' download 'Controlled Assessment Teacher Support Book' and under 'Teacher Support Materials' download 'GCSE Astronomy Teachers Guide'.

Below is a checklist of points that you should include in your report. Remember to reference all sources of information and to label all images, diagrams and tables and refer to them in the text e.g. Table 1, Figure 1 etc.

Design (5 marks)

- > All equipment listed
- > **B4 only:** All set-up details of binoculars/telescope/camera listed (aperture size, magnification, field of view, ISO, f-stop, exposure time, focal length/zoom, tripod)
- > Astronomical terms explained
- > Rise and set times of the Moon
- > Phase of Moon and position of Moon taken into account
- > Limits of location noted
- > Alternative locations suggested
- > Reference stars chosen for magnitude estimates appropriate to location
- > 3 constellations chosen
- > Explanation of why they were chosen (positions)
- > Mention of the weather forecast
- > Range of dates and times to observe & why

Edexcel marking guidelines:

0	No procedure designed.
1	Outline a simple procedure for the observations, using basic astronomical terminology.
2-3	Astronomical knowledge and understanding used to decide on the most appropriate site,time, equipment for observations.Spelling, punctuation and grammar used with reasonable accuracy. Limited use of astronomical terminology.
4-5	Detailed astronomical knowledge and understanding used to design the most appropriate observing programme with a range of sites, times and instruments evaluated. Spelling, punctuation and grammar used with considerable accuracy. Good range of astronomical terminology used correctly.

Observation (5 marks)

- > 3 constellations observed and recorded
- > **B4 only:** all camera settings listed for each image
- > Limiting magnitude stated
- > Location stated (latitude & longitude)
- > Date and time stated
- > Night vision acquired & maintained (red light used)
- > Weather
- > Seeing

Antoniadi scale

A five-point scale to indicate the quality of seeing:

I – perfect seeing, without a quiver

II – slight undulations, with moments of calm lasting several seconds

III – moderate seeing, with larger tremors

IV – poor seeing, with constant troublesome undulations

V – very bad seeing, scarcely allowing the making of a rough sketch.

- > Positions of stars in constellations
- > Proximity to meridian (hour angle/altitude)
- > Position of Moon and phase (if above horizon)
- > Percentage illumination of the Moon (according to phase)
- > Colours of stars noted
- > Estimated magnitudes of stars noted
- > All figures labelled and referenced in text

Edexcel marking guidelines:

0	No observations completed.
1	Simple observations completed, providing some data. A few observational details included.
2-3	Sound observations completed and recorded, providing adequate data for the task. Clear and accurate observational details included.
4-5	Excellent programme of observations completed and recorded, providing conclusive data for the task. Full observational details included clearly and accurately.

Analysis (5 marks)

- > Estimated magnitudes for all stars observed
- > Suitable precision of estimates for magnitudes
- > Comparison to actual magnitudes

Edexcel marking guidelines:

0	No analysis on the observations.
1	Simple comments on what is shown by the observations, using basic astronomical terminology.
2-3	Conclusions or calculations derived from observational data used to address the task set. Spelling, punctuation and grammar used with reasonable accuracy. Limited use of astronomical terminology.
4-5	Full analysis of the observational data, resulting in clear conclusions related to the task set. Spelling, punctuation and grammar used with considerable accuracy. Good range of astronomical terminology used correctly.

Evaluation (5 marks)

- > Accuracy of measurements evaluated
- > **B4 only:** Quality of photos evaluated
- > Limitations of project explored
- > Suggested improvements to project
- > Suggested extension to project

Edexcel marking guidelines:

0	No evaluation of the observation.
1	Simple comment on the accuracy of the observations, using basic astronomical terminology.
2-3	Supported statement of the accuracy of the observational data obtained. Feasible suggestions for improvements or extensions to the observations. Spelling, punctuation and grammar used with reasonable accuracy. Limited use of astronomical terminology.
4-5	Clearly reasoned quantitative assessment of the accuracy of the observational data obtained. Detailed suggestions for improvements or extensions to the observations. Spelling, punctuation and grammar used with considerable accuracy. Good range of astronomical terminology used correctly.