

6. Celestial Observation

Edexcel GCSE Astronomy Course
(Taught Concepts Only Sept 2020)

Topic 6 Specification Points - Part 1 Naked Eye Objects

Topic 6 – Celestial observation

Students will gain an understanding of how to observe a variety of naked-eye astronomical phenomena. They will study how to plan their observations to be at the best time and location, taking into account effects such as weather and light pollution.

6.1 Be able to recognise the following astronomical phenomena visible to the naked eye, including:

a Sun b Moon c stars (including double stars, constellations and asterisms) d star clusters e galaxies and nebulae f planets g comets h meteors i aurorae j supernovae and artificial objects, including: k artificial satellites l aircraft

6.2 Be able to recognise and draw the following constellations and asterisms, including their most prominent stars:

a Cassiopeia b Cygnus c Orion d Plough e Southern Cross f Summer Triangle g Square of Pegasus

6.3 Understand the use of asterisms as pointers to locate specific objects in the night sky, including:

a Arcturus and Polaris from the Plough

b Sirius, Aldebaran and the Pleiades from Orion's Belt

c Fomalhaut and the Andromeda galaxy from Square of Pegasus

6.4 Understand why there is a range of constellation, asterism and star names among different cultures

6.21 Understand the appearance of the Milky Way from Earth as seen with the naked eye

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and artificial objects, including:

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c stars (including double stars, constellations and asterisms)
(See item 6.2 later for which ones to learn)

Double star challenges:

<https://skyandtelescope.org/astronomy-news/observing-news/see-summers-best-naked-eye-double-stars-07092014/>

A guide to the 88 constellations:

<https://www.iau.org/public/themes/constellations/>

A table of well known asterisms:

<http://maps.seds.org/Const/asterism.html>

d star clusters
e galaxies and nebulae
j supernovae

The Pleiades - a famous star cluster <https://www.space.com/pleiades.html>

Andromeda - our neighbouring galaxy

<https://earthsky.org/astronomy-essentials/2-ways-to-find-the-andromeda-galaxy/>

You will need to learn to 'avert' your vision to see Andromeda by eye

<https://www.skyatnightmagazine.com/advice/how-to-master-the-art-of-averted-vision/>

The Orion Nebula - a winter sky challenge for beginners:

<https://earthsky.org/clusters-nebulae-galaxies/orion-nebula-jewel-in-orions-sword/>

The closest supernova seen from Earth SN187A

https://en.wikipedia.org/wiki/SN_1987A

Topic 6 Specification Points - Part 2 Observation Planning

- 6.5 Be able to use information from star charts, planispheres, computer programs or 'apps' to identify objects in the night sky
- 6.6 Understand the causes and effects of light pollution on observations of the night sky
- 6.7 Understand the meaning of the terms: a celestial sphere b celestial poles c celestial equator
- 6.8 Understand the use of the equatorial coordinate system (right ascension and declination)
- 6.9 Understand the use of the horizon coordinate system (altitude and azimuth)
- 6.10 Understand how the observer's latitude can be used to link the equatorial and horizon coordinates of an object for the observer's meridian
- 6.11 Understand how the observer's meridian defines local sidereal time and an object's hour angle
- 6.12 Be able to use information on equatorial and horizon coordinates to determine: a the best time to observe a particular celestial object b the best object(s) to observe at a particular time
- 6.13 Understand, in relation to astronomical observations, the terms: a cardinal points b culmination c meridian d zenith e circumpolarity
- 6.14 Understand the diurnal motion of the sky due to the Earth's rotation
- 6.15 Be able to use a star's declination to determine whether the star will be circumpolar from an observer's latitude
- 6.16 Understand the apparent motion of circumpolar stars, including upper transit (culmination) and lower transit
- 6.17 Be able to use information about rising and setting times of stars to predict their approximate position in the sky
- 6.18 Be able to find the latitude of an observer using Polaris
- 6.19 Understand naked eye techniques such as dark adaptation and averted vision
- 6.20 Understand the factors affecting visibility, including: a rising and setting b seeing conditions c weather conditions d landscape

Resources

https://qualifications.pearson.com/content/dam/pdf/GCSE/Astronomy/2017/Teaching-and-learning-materials/GCSE_Astronomy_Topic_Guide_Celestial_Sphere.pdf

Use the Examwizard example questions with MS and Examiner's report to look at the maths of these types of questions

Model in Stellarium by selecting both equatorial and azimuthal grid, then select individual star details - Stellarium gives RA and hour angle of targets