

5. Solar System Observation (5.1-5.4)

Edexcel GCSE Astronomy Course

5.1 Understand how to use pinhole projection to observe the Sun safely

Tasks:

Try pinhole projection of the Sun for yourself BUT

**YOU MUST NOT EVER LOOK DIRECTLY AT THE SUN ESPECIALLY WHEN
LINING UP YOUR PINHOLE PROJECTOR**

The best way to get the alignment right is to look away from the Sun use the shadow of your projection device - when the shadow is smallest, the Sun will be directly in line with it. The simplest method is to use two pieces of white card, one in front with a pinhole in it and one behind to project onto (remember the tip, when the back piece is in the shadow of the front piece, they will be perfectly aligned).

Experiment with the size of the hole and the distance between the cards to get the best result you can. Write a short report on your method, take photographs of your set up and photograph or sketch your observations

Here is a link to a handy pdf document with lots of information about pinhole projection and solar observing <https://pwg.gsfc.nasa.gov/istp/outreach/sunobserve1.pdf> and a video showing how you can make a home made solar viewer <https://www.youtube.com/watch?v=iFiLWIKL0Q>

5.2 Understand the observed motion of the Sun follows an annual path called the ecliptic

Tasks:

This link explains the vocabulary you need and has some very clear graphics:

<https://earthsky.org/space/what-is-the-ecliptic>

Here are some things to do and questions to answer from this link:

1. What is the definition of the ecliptic?
2. What is the relationship between the ecliptic and the constellations belonging to the Zodiac?
(Observing task - learn the names of these constellations and see if you can spot them in order along the ecliptic)
3. What is the link between the ecliptic and solar and lunar eclipses?
4. How can the ecliptic help you find the location of the planets in our solar system?
5. Why is the ecliptic at an angle to the horizon except at the equinoxes?

Another way to familiarise yourself with the ecliptic is by running Stellarium, which allows you to 'Show Planet Orbits' in the 'Sky and viewing options' window - this line is the ecliptic

5.3 Understand the changing position of the planets in the night sky

5.4 Understand the observed motion of the planets takes place within a narrow Zodiacal Band

Tasks:

This website has a great diagram showing the path of the ecliptic through the constellations and lots of links to help you find where the planets are on a particular date:

<http://www.nakedeyeplanets.com/>

And this link shows the positions of the planets in their orbits in real time:

<http://www.fourmilab.ch/cgi-bin/Solar/action?sys=-Sf>

A more advanced explanation of planetary orbits is given here if you want more detailed notes:

<https://www.astronomynotes.com/nakedeye/s15.htm>