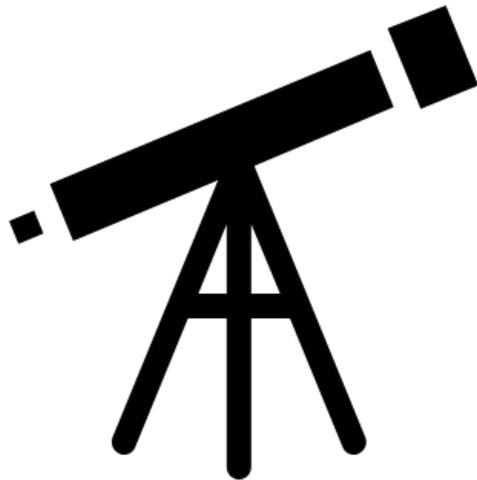


TELESCOPE ACTIVITIES

BECOME AN ASTRONOMER AND MAKE OBSERVATIONS
WITH YOUR NEW TELESCOPE!

REMEMBER TO ONLY USE YOUR TELESCOPE AT NIGHT,
AND NEVER POINT IT AT THE SUN DURING THE DAY.



This booklet gives a few examples of projects you can test out using your telescopes, and some other topics to take a look at if you're interested in astronomy. Part of being a scientist is doing research to find out what other scientists are up to!

Tips for making observations

- Make sure you've got an adult with you while you're using your telescope. Make sure you have permission to go out with your telescope; some of these tasks can only be seen during the night so it's very important to ask permission.
- Try to observe somewhere as dark as possible. The less light the better, but don't worry about if you can't get away from all light.
- If you're having trouble seeing any stars through the telescope, then try focusing on something a little closer to home. Find a house or a tree about 100m away from where you're observing and move the telescope until it is in focus. This should give you a good starting point to find some stars with your telescope and then you can adjust the focus again.
- If you're finding it tricky to keep still enough to keep something in view, try bringing along something to rest your arms or elbows on.
- Try to observe on a night with as few clouds as possible!

Can you track the movement of the moon?

The moon is one of the easiest objects to observe in space because it's the closest object to Earth. However, the moon looks different every night- can you track how it moves and changes?

This activity asks you to observe and record the shape of the moon on different nights. Try comparing your observations with other people to see if they saw the same shape and adding these to your observation record.

Take a look at the shape of the moon without your telescope first. How much detail can you see? Try drawing what you can see, or writing a description in the space below.

Now try looking through your telescope. What can you see through the telescope? Are there any details you couldn't see before? Record your new observations

Observation record

Date:	Date:	Date:
Date:	Date:	Date:
Date:	Date:	Date:

What has happened to the shape of the moon during your observations? Describe how it has changed in the space below.

Do you know why the moon changes shape like this?

Could you be a soldier in the Roman army?

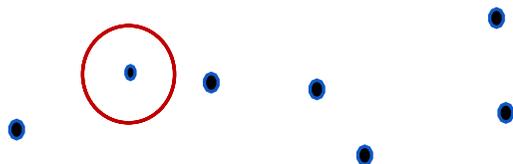
Astronomy was a part of human life long before the invention of the telescope. Explorers used positions of stars to guide them during treacherous journeys across uncharted seas. Stars have roots in cultures, religions and legends over the world.

There is a tale of the Romans using stars to test their soldiers. Before the invention of glasses, it was very important that soldiers had good enough eyesight to fight. The Romans used an **asterism** (an arrangement of stars) called the Plough to test how good a soldier's eyesight was. If you've gone stargazing before, you might recognise these stars (it's also called the Big Dipper).



This picture shows what the Plough looks like. Look for it without the telescope first- be aware that it might not be horizontal like in this photo, just look for the pattern of stars. If you're having trouble finding it, make sure you're facing North-East and try again. Some stargazing apps can also be really useful.

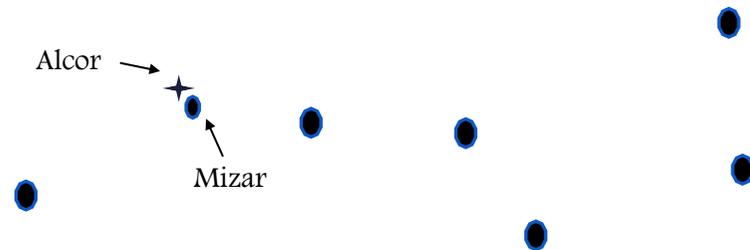
Once you've found the Plough, pay close attention to the area in the circle on the picture below:



Can you see anything odd about this point in the Plough?

If you answered yes, then you would be a good candidate for the Roman army!

This point in the Plough is actually two stars which look very close together. The Romans used this to test which soldiers had good eyesight; if you could see both stars then you passed. If you couldn't tell the two stars apart then you might not have good enough eyesight to be a Roman soldier. Don't worry if you didn't spot it! It can be hard to tell them apart on cloudy nights, or if it's not quite dark enough.



Now take a look again through your telescope. Can you see the two stars now? These stars are called Alcor and Mizar. They might look really close together through the telescope, but that's just because they're so far away; these two stars are actually:

6 000, 000, 000, 000 miles apart!

If you had a really powerful telescope, you might even be able to tell that there are actually 6 stars there! Mizar is actually 4 different stars and Alcor is 2 different stars. There's no way to tell this by eye though because they look too small from Earth. This is why astronomers need powerful telescopes- because there are lots of details in space which you can't see without a telescope.

The Hubble Space Telescope

This activity introduces you to some other areas of astronomy. If you can't use the telescope at home yet, or if it's cloudy, then this will be an interesting exploration of one modern telescope. The Hubble Space telescope is one of the most well-known telescopes because of the impact it has had on our knowledge of space.

The Hubble Space Telescope is a telescope which takes images from (you guessed it!) space. Instead of **ground based telescopes** like the one you made (telescopes which sit on the surface of the Earth to take observations), the Hubble Space telescope is a **space based telescope**; it lies in an orbit around the Earth.



It has given us many important discoveries over the many years it has been operating. Probably the most important discovery Hubble has ever made was finding evidence for the Big Bang Theory, which explains what happened at the very start of the Universe. Even over the last few months, the Hubble Space Telescope has found a new moon belonging to Neptune!

As well as many essential scientific discoveries, Hubble is well-known for taking beautiful pictures of the different formations visible in space. Try researching the different photos taken by Hubble. Which one is your favourite?

You might find this website useful for the next section:
<https://www.spacetelescope.org/>

Try to find out the answers to these questions!

1. When was the Hubble Space Telescope launched?

Hint: Think about the types of telescope that were mentioned in the lesson. Does the Hubble Space Telescope only use lenses?

2. What type of telescope is it?

3. How far above the surface of the Earth is it?

4. What makes space-based telescopes like Hubble, better than ground based telescopes?

5. How many observations has Hubble made?

Even if you can't use your own telescope at home, you can take a look through Hubble's lens. Head to this website to take a look at what Hubble is seeing right now:

<http://spacetelescopelive.org/>

Find out more

If you're interested in finding out more about astronomy, observing the stars, or telescopes, the following resources are a great place to start:

<https://spaceplace.nasa.gov/>

<http://www.esa.int/kids/en/home>

http://www.iop.org/resources/videos/education/classroom/astronomy/page_51897.html

<http://amazingspace.org/>

<https://i4is.org/>

Initiative for Interstellar Studies is an organisation dedicated to the research and interstellar exploration of the stars. They are committed to delivering educational programmes to inspire, inform and connect with the public.

Image credits:

The Plough: <http://thestarsandplanets.com/skyguides/may.html>