ABINGDON SCIENCE PARTNERSHIP

Introducing Astronomy

ASP/AFSO Workshop
Tuesday 18 August 2020

Programme:

11:00 Sign in and welcome
11:05 Introduction to the workshop leader, the Abingdon Science Partnership and to studying Astronomy
https://www.abingdonsciencepartnership.org/about-us/
11:10 The Solar System and the size of the Universe
11:35 Stars and the night sky
11:55 Any questions?
12:05 Break
12:15 What's in the sky tonight?
12:25 Galaxies and beyond
12:50 Any more questions?
13:00 End of workshop

Making a Model of Our Solar System

You will need these things:

A piece of A4 paper; scissors; glue (or tape); a pen or pencil and colouring pens/pencils if you have them

Watch what I do and listen to my instructions to make a simple model of the Solar System

If you find it hard to follow me, then look for the instruction sheet online here:

https://www.abingdonsciencepartnership.org/wp-content/uploads/2020/08/Solar-System-in-your-Pocket-with-Logos.pdf

I will share this link in Chat - then I will need to switch to my camera...

How big is space?

Very big!

Early astronomers couldn’t make direct measurements of distances in space so they compared everything to the distance from the Earth to the Sun

They called the mean distance from the Earth’s centre to the Sun’s centre one astronomical unit (1 AU)

The mean distance from the Sun to Pluto is approximately 40 AU

My model of the Solar System is about 1m long

So I can use a scale of 40 AU = 1 m to compare distances to other things in space

Voyager 1 and Voyager 2

Voyager 1 and Voyager 2 are the most distant human made objects that exist. Where are they now? https://voyager.jpl.nasa.gov/mission/status/

So if my model Solar System is 1m long and represents 40 AU, where would Voyager 1 be on my model scale? Let's calculate the model distance in metres using this formula:

(Distance to Voyager 1 in AU)/(40 AU) = Distance to Voyager 1 in metres

Where would that be on the scale of my model? (Suggestions in chat please!)

Proxima Centauri

The next nearest star to our Sun.

It is 269 000 AU away.

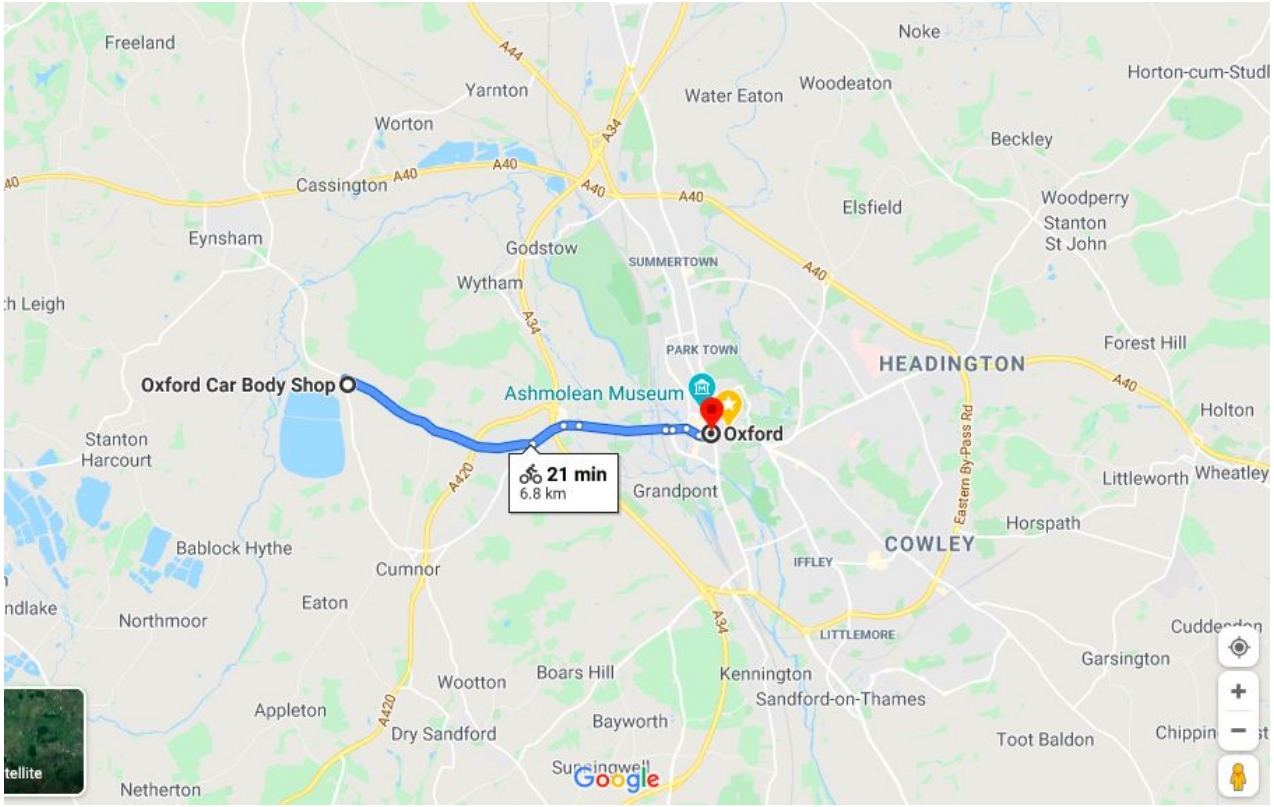
How far is this on my scale of 40AU = 1 m ?

Where would this be on my scale model?

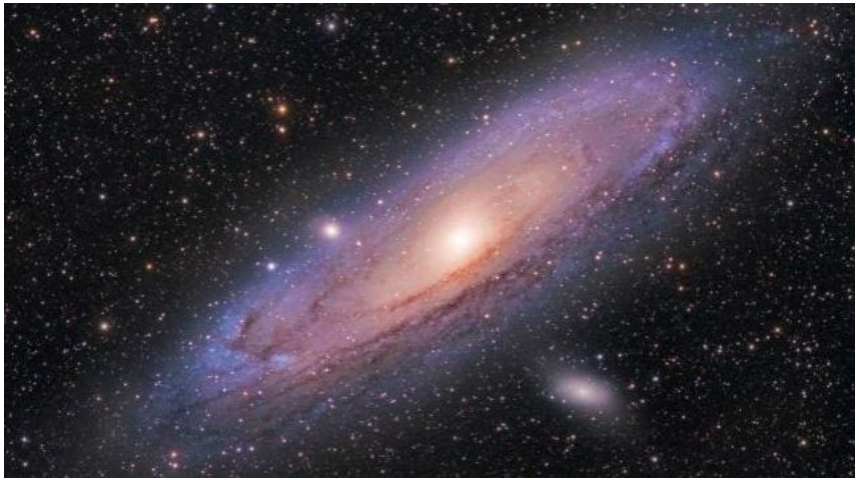
(Suggestions in the chat?)

Let’s look at a map:

Proxima Centauri on my scale model:



M31 The Andromeda Galaxy



This is the nearest major galaxy to our own Milky Way Galaxy.

It is 160 000 000 000 000 AU away!

I make that 4 million **km** on my scale.

Where would I need to put M31 on my model? Here's a clue:

So, even on this scale, a model of the whole Universe isn't possible!

As I said earlier, it's BIG!

Are there any quick questions about the Solar System?

Stars and the night sky

What can you see in the photo?

(Taken from my back garden in April, 2020)

These stars are very hot and quite young.

They are in a cluster.

Let’s find out more about stars...

The Lifecycles of Stars

The differences in different types of stars depend on how they formed and how old they are.

Stars follow a life cycle as they grow, become stable and then die.

This link will help to explain this:

https://www.schoolsobservatory.org/discover/quiz/life-cycle-star

And this video (2:33) will tell you a bit more about the size of stars - if you don't like loud music, please turn down your speakers now:

https://www.youtube.com/watch?time_continue=8&v=HEheh1BH34Q&feature=emb_logo

Any questions?

Let’s see if I can answer any questions waiting in the Q+A…

And then we’ll have a break!

What’s in the sky tonight?

Let’s take a look with Stellarium - if you have already got a copy of Stellarium, follow along. I will share the download link in the Chat later.

Downloading Stellarium:

Here is the link - please be aware that some of the App versions are not free:

https://stellarium.org/

Galaxies and deep space

Just like stars, there are different types of galaxies. Astronomers have classified them according to their shape and other features.

Let’s have a go at classifying some different galaxies - you will need the Tuning Fork diagram and the Classification Table you were sent in advance to do this.

There are also copies here https://www.abingdonsciencepartnership.org/afso-remote-workshops/ - let’s take a quick look at them and I’ll explain what we are going to do (I will share this link in the chat too).

Back to my camera...

Classifying galaxies

Ok, so we are now going to look at some images of galaxies shortly and you will use your tuning fork diagram to decide what type you think they are.

When you have decided, write down your answer in the Classification Table.

When we have finished, we'll check the answers.

Here we go:

Galaxy Images

Answers and more things you could do:

Answers:
Galaxy Classification Answers

If you found this interesting then you can help scientists with new galaxy classifications in Galaxy Zoo. This contributes to real research and some people have even found new types of galaxies and other objects:
https://www.zooniverse.org/projects/zookeeper/galaxy-zoo/classify

You could also watch this video about the cosmic web of galaxies showing what the whole universe looks like (I'll share the links):
https://www.youtube.com/watch?time_continue=4&v=rENyyRwxpHo&feature=emb_logo

Any more questions?

If there is time, I'll try to answer more questions.

I have shared some useful resources and links for doing more astronomy on the Abingdon Science Partnership website here:

https://www.abingdonsciencepartnership.org/afso-remote-workshops/

That's it for now - end of today's workshop!