

# YOUR STICKERS GO HERE

HydrogenAlpha telescopes  
 Colander  
 Earth **Safe**  
 cold Filters **Eclipse**  
 dark fun **Solar**  
 size  
 hot Moon glasses  
 distance Sun  
 powerful Partial  
 WhiteLight Total Detective  
 eyepieces



# Solar Detective's



## Handbook



Observing the Sun Safely

Partial Solar Eclipse

20 March 2015

Madley Environmental Centre

Hereford

This Book belongs to Detective

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MESC, BT, Hereford Astronomy Society,  
 AstroCymru, Welsh Government,  
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**This is your Solar Detective's Handbook—it is a place to log your findings and keep your stickers as you follow your Mission to understand the Sun.**



Your briefing:

Solar detectives need to know a lot about the Sun. To do this they don't just read things (although that is important), but they observe and record things, they experiment and test, and they watch and look.

But the first thing that every solar detective must know is that the Sun is very powerful. It produces more energy in a second than all the power plants on Earth could produce over a million years. So looking at it can be extremely dangerous.

SO NEVER LOOK AT THE SUN WITHOUT SPECIAL EQUIPMENT—TODAY OR ANY DAY

If you do, all the power of the Sun will be directed straight at the back of your eye, it will melt your eyeballs, and you will be **permanently blinded** in an instant!

We do not want blind solar detectives!

**Are you a solar know-it-all? (See posters to find the answers)**

How Big is the Sun?	
How many times bigger than the Earth is the Sun?	
How many times could the Earth fit inside it?	
How far away is the Sun?	
How far away is the Moon?	
How many times bigger is the Moon than the Sun?	
How many times as far away?	
How hot is the Sun at the centre?	
How hot is it at the surface?	
Are sunspots hotter or colder than the surface?	
Name 3 parts of the Sun	
How long does Earth take to go around the Sun?	
So how many times have you gone around the Sun?	

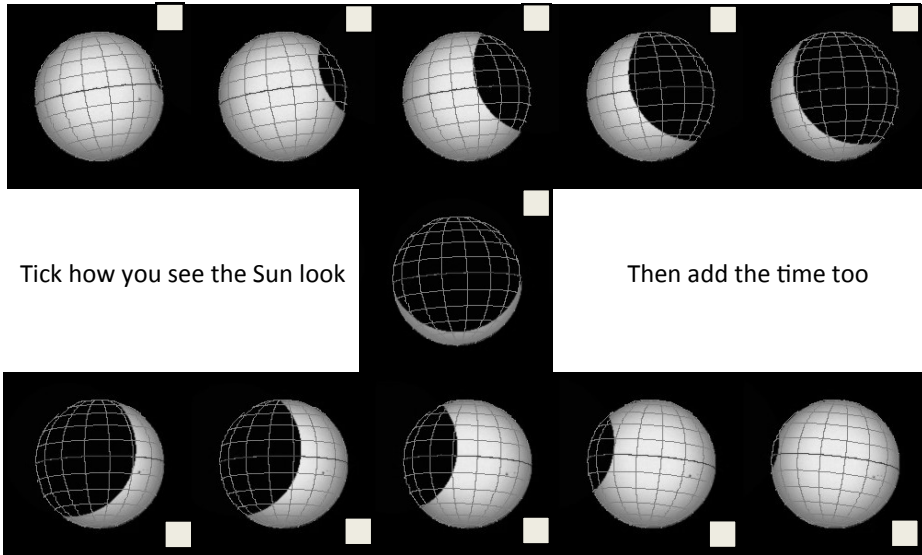
**Match the wavelength answers (see the Poster in the Tent)**

A	B	C	D	E

**Calculating Magnification box**

Focal Length = F	Eyepiece size = E	Magnification = $F \div E$

So If you want to magnify something more should you use a smaller or a bigger eyepiece?



**The Maximum Partial Eclipse—do things feel different?**

At **9:15**—think about how light it is and how warm it is

	Much lighter	A bit lighter	No difference	A bit darker	A lot darker
<b>At 9:30</b> compared to 9:15					
<b>At 9:45</b> compared to 9:30					
	Much colder	A bit colder	No difference	A bit warmer	A lot warmer
<b>At 9:30</b> compared to 9:15					
<b>At 9:45</b> compared to 9:30					

**Things to do and explore today**

There are lots of things for you to do today, but the main pieces of detective work are:

- to see how the shape of the Sun changes during the eclipse;
- to see how the Sun looks through two different types of special filters attached to telescopes.



The Sun will be disappearing and reappearing and changing shape, you can estimate how much of the Sun is covered by the Moon.

The **White Light Filters** and **Hydrogen Alpha Filters** allow us to look safely at the Sun as they remove 99.999% of the light and heat.

To make a proper a Observation you'll need to look closely through the telescope, think carefully about what you can see, and then draw what you see.



The view you see will be changing over time, so it is very important that you write down the time that you started to observe.

The different telescopes you use will have different magnifications, and you will see different detail on the Sun, so write that down as well (look out for the labels on the telescopes to give you this information).

You can compare your observations with other people in your class when you get back to school.



If the weather is cloudy then have a look at the screens in the tents which will show some pictures from other places instead.

The maximum eclipse here is at 9:29 so there are some things to look for between 9:15 and 9:45 (see page 6). Don't forget to go into a big tent at about 9:45 to watch pictures of the Total Eclipse from the Faroe Islands on the TV.

Remember to collect stickers as you try activities and stick them on the back page to show you are an excellent Solar Detective!

### WHITE LIGHT FILTER OBSERVATION

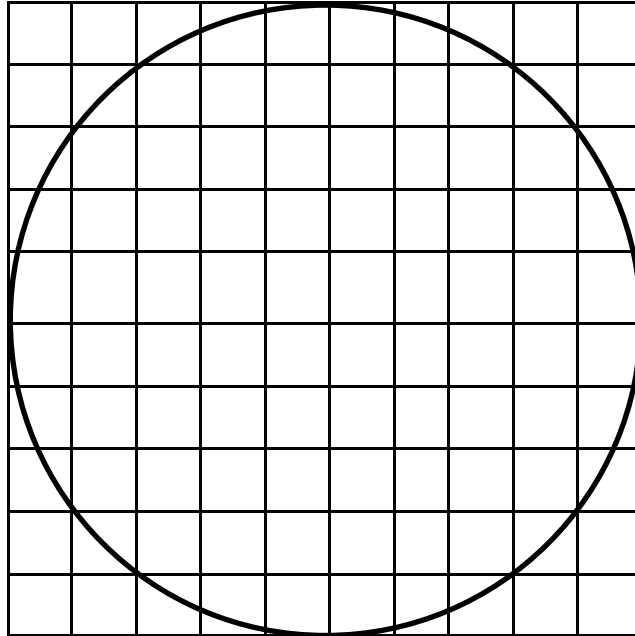
Type of Telescope:

Size of Telescope:

Magnification:

Date and TIME :

Weather:



Describe what you saw: (eg what colour was it, did you look through an eyepiece or on a screen, could you see sunspots, do the edges look rough or smooth?) :

Can you estimate how much (a percentage) of the sun was dark —was it more or less than last time you looked?

Did you like what you saw? Why or why not?

### HYDROGEN ALPHA FILTER OBSERVATION

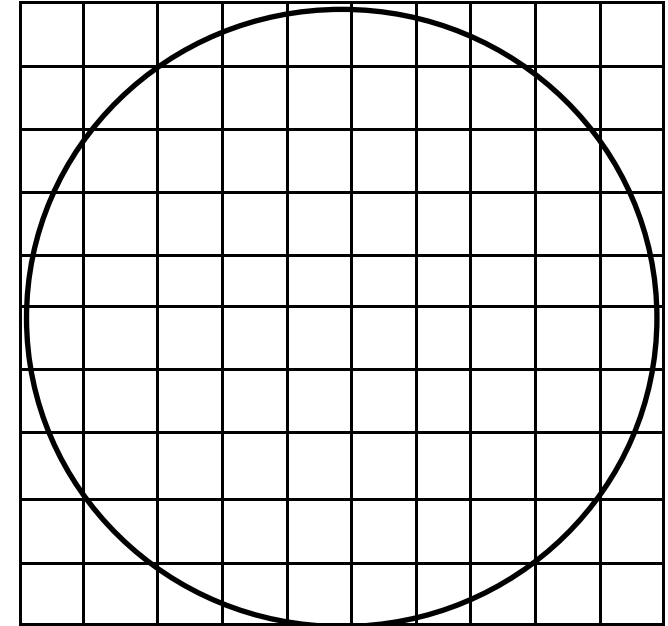
Type of Telescope:

Size of Telescope:

Magnification:

Date and TIME :

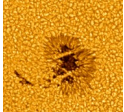
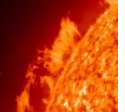
Weather:



Describe what you saw: (eg what colour was it, did you look through an eyepiece or on a screen, could you see sunspots, do the edges look rough or smooth?) :

Can you estimate how much (a percentage) of the sun was dark —was it more or less than last time you looked?

Did you like what you saw? Why or why not?

I've seen a sunspot <input type="checkbox"/>		I've seen a prominence <input type="checkbox"/>	
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