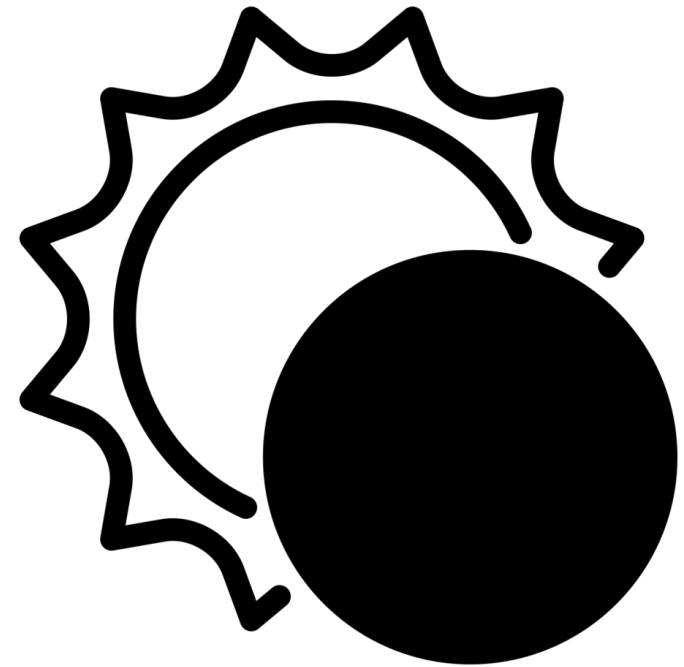




Solar Eclipse Astronomy



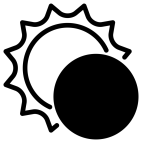
This student data book was created to support classrooms participating in the GLOBE Observer Eclipse project by Civil Air Patrol Solar Eclipse Mission volunteers.

To learn more about the GLOBE Observer go to: <https://www.globe.gov>

To learn more about Civil Air Patrol go to: <https://www.gocivilairpatrol.com>

Name: _____

Teacher: _____



Additional Solar Eclipse Activities



Have extra time between observations? Try one of these additional activities.

- **Play With Shadows** - Solar eclipses have unique effects on shadows. Play with the shadows and see what shapes and patterns you can produce. Try using different household items like a kitchen colander to see what types of shadows they will create.
- **Make Your Own Eclipse** - Using a ball, cast a shadow on the ground. Explore how the shadow changes based on the distance the ball is from the ground.
- **Create Eclipse Art** - Bring a little STEAM to your eclipse by creating art or poetry to capture your experience.
- **Make Additional Observations** - Grab a piece of paper and collect more data!

Welcome **Solar Eclipse Citizen Scientist**. Today you will be making observations of a very special astronomical event...a solar eclipse! Over the next 4 hours you will be able to collect both quantitative and qualitative data that will help us learn more about the effects that solar eclipses have on Earth.

Throughout the eclipse you will be collecting three different types of observations. Look for these symbols in the corners of your data book to help you flip to the correct page.



Air Temperature Observations



Direct Eclipse Observations

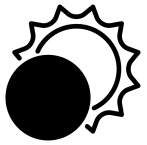


Indirect Eclipse Observations



Other Eclipse Info/Activities





Solar Eclipse Science

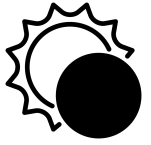
Solar eclipses happen when the Moon passes between the Sun and the Earth. This causes the Moon to cast a shadow on the Earth. During the solar eclipse on April 8, 2024, this shadow will cover most of North America.

Many scientists have been preparing for years so that they could be ready to collect science during this eclipse, but the path of the Moon's shadow is so large they can't collect the data they need alone.

That is where your class comes in! Today your class will join thousands of other students across North America collecting air temperature as part of the GLOBE Eclipse project. You will collect your data using this data book and your teacher will be uploading the data your class collects to NASA in real time using the GLOBE Observer App.



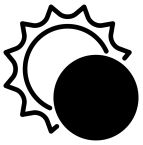
Solar Eclipse Word Search



This word search contains 15 terms and words related to the solar eclipse project. See how many you and your friends can find!

O	V	U	I	O	C	I	A	O	R	C	O	T	E
O	B	S	E	R	V	A	T	I	O	N	E	C	M
I	T	E	S	P	I	L	C	E	S	T	T	A	N
S	D	U	C	O	I	R	L	F	D	N	E	T	A
H	I	N	D	I	R	E	C	T	A	S	M	N	S
A	C	N	C	E	H	P	C	P	T	I	P	O	A
D	B	I	I	I	O	P	N	C	A	O	E	C	N
O	P	E	I	A	D	I	E	T	I	A	R	H	I
W	E	T	T	O	T	A	L	I	T	Y	A	T	T
F	D	V	E	I	T	T	R	O	D	T	T	R	S
M	T	D	N	O	O	M	C	T	D	T	U	U	U
L	P	E	N	U	M	B	R	A	T	O	R	O	N
O	B	S	C	U	R	A	T	I	O	N	E	F	I
N	O	F	I	R	S	T	C	O	N	T	A	C	T





Solar Eclipse Vocabulary

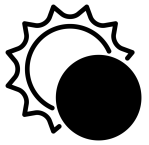
We have learned a lot of new scientific terms as part of this activity. This is a references sheet for your new astronomy vocabulary.

- **Citizen Scientist** - A member of the public who volunteers to collect scientific data for a project.
- **Eclipse** - When a moon or planet blocks the light from the local star casting a shadow on a neighboring planetary body.
- **Eclipse Obscuration** - The percentage of the sun that is covered by the moon during an eclipse.
- **First Contact** - When the Moon first starts to block the Sun and the solar eclipse begins.
- **Fourth Contact** - When the Moon stops blocking the Sun and the solar eclipse ends.
- **Penumbra** - A shadow caused by the Moon blocking some of the light from the Sun.
- **Totality** - The phase of an eclipse when the Moon completely blocks the sun producing an Umbra.
- **Umbra** - The darkest part of the Moon’s shadow where the Sun is completely blocked.

Explore more solar eclipse vocabulary using

NASA’s Solar Eclipse Glossary:

<https://eclipse.gsfc.nasa.gov/SEhelp/SEglossary.html>



Eclipse Meta Data

In order to be analyzed, data needs context. This information is called **Meta Data** and it helps scientists know who, how, and where the data was collected. Meta data is particularly important for this experiment, because we expect to see different effects based on where in the solar eclipse path the data is collected.

Members of your data collection team:

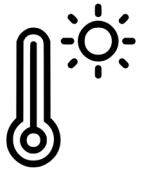
Location of your data collection site:

Latitude and longitude of your data collection site:

Latitude:

Longitude:





A lot of the Sun's energy arrives to the Earth in the form of visible light. When the light reaches the Earth, some of it is absorbed and readmitted as heat. By tracking changes in air temperature during an eclipse we can 'see' changes in the amount of solar energy reaching our planet.

Tracking Air Temperature

1. Time: Temp:	5. Time: Temp:	9. Time: Temp:	13. Time: Temp:	17. Time: Temp:	21. Time: Temp:	25. Time: Temp:	29. Time: Temp:
2. Time: Temp:	6. Time: Temp:	10. Time: Temp:	14. Time: Temp:	18. Time: Temp:	22. Time: Temp:	26. Time: Temp:	30. Time: Temp:
3. Time: Temp:	7. Time: Temp:	11. Time: Temp:	15. Time: Temp:	19. Time: Temp:	23. Time: Temp:	27. Time: Temp:	31. Time: Temp:
4. Time: Temp:	8. Time: Temp:	12. Time: Temp:	16. Time: Temp:	20. Time: Temp:	24. Time: Temp:	28. Time: Temp:	32. Time: Temp:



Indirect Observations



3rd Observation - Time:

Eclipse Maximum - Time:

5th Observation - Time:

6th Observation - Time:

Fourth Contact - Time:





Indirect Observations

Solar eclipses are not only a great opportunity to observe our closest star, but also a chance to make observations about the physics of light. During this eclipse we will experience a special type of shadow called a **Penumbra**. The Penumbra is caused when the Moon blocks some, but not all, of the light from the Sun.

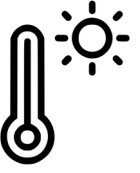
In this section of your data book you will make notes about how the behavior of light and shadow changes over the length of an eclipse.

First Contact - Time:

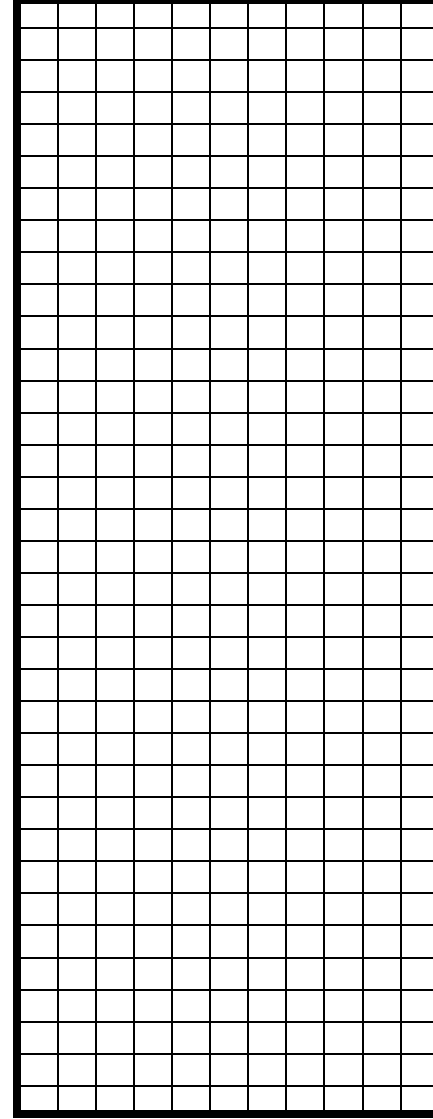
2nd Observation - Time:



Tracking Graphing Temperatures



Air Temperature Changes Over The Length of a Solar Eclipse



Observation

Using the graph paper above make a line graph that shows the changes in air temperature you observe during the length of the eclipse. A long the way, make sure to compare your graph with the one your teacher is creating as part of the GLOBE Eclipse citizen science project.

Temperature





Direct Observations

Through most of history, astronomers recorded their observations of solar eclipses by making drawings. While cameras now allow us to capture images of solar eclipses with greater detail, making sketches of what you see is still a great way of creating a record of your solar eclipse experience.

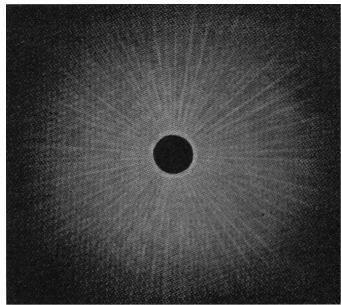
Direct Eclipse Observations Where Made Using... (circle equipment used)

Solar Glasses

Solar Telescope

Pinhole Viewer

Video Feed



Example of a solar eclipse sketch made by astronomer José Joaquin de Ferrer in 1806.

First Contact - Time:



Direct Observations

2nd Observation - Time:

5th Observation - Time:

3rd Observation - Time:

6th Observation - Time:

Eclipse Maximum - Time:

Fourth Contact - Time:

