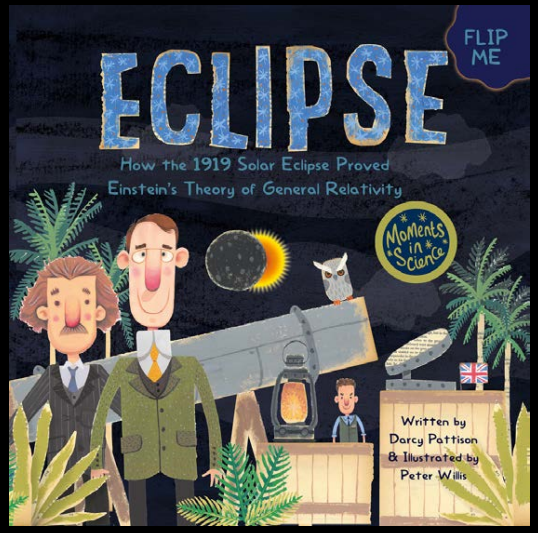
ECLIPSE

By Darcy Pattison, illustrated by Peter Willis



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DARCY PATTISON,

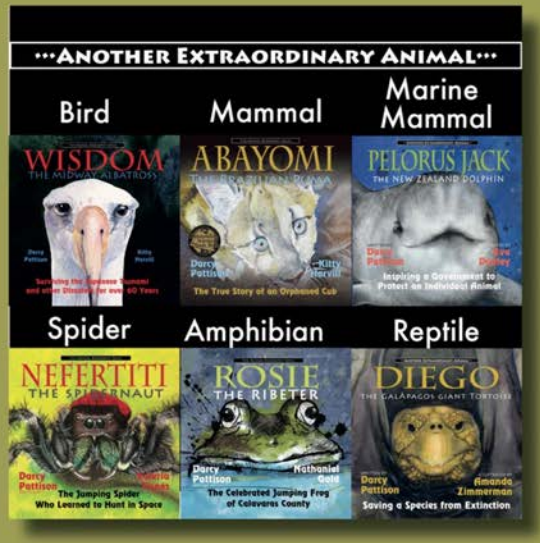
CHILDREN'S BOOK AUTHOR

Moments in Science

MOMENTS IN SCIENCE

Learn More

FOR THE KIDS WHO NEED TO KNOW—
BECAUSE THEY GROW INTO THE BOOKS THEY READ.
—Darcy Pattison



Extraordinary Animals

Learn More

Once in a Lifetime!

By chance, some locations are treated to total solar eclipses only a few years apart.

- A solar totality appears just once each 375 years, on average
- In the last 100 years, some areas have been in the path of multiple eclipses: New England, for example, saw five.
- In New York City, the last total solar eclipse was in 1925.
- Chicago has not seen a total solar eclipse in the last 100 years.
- On the west coast, San Diego was last eclipsed in 1923.
- The city of Los Angeles is in the midst of a “dry spell” of more than 1,500 years without a total solar eclipse.
- The location with the longest dry spell is near Tucson; the last solar eclipse was in the year 797.

https://www.almanac.com/total-solar-eclipses-how-often-do-they-happen

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OTHER TOTALITY DATES

June 16, 2178
August 12, 2045
April 8, 2024
August 21, 2017
August 1, 1860
June 16, 1806
July 7, 1442

April 8, 2024 – in St. Louis, MO

Eclipse Start: 12:42 PM CDT
Maximum Eclipse: 2:00 PM CDT
Eclipse End: 3:17 PM CDT

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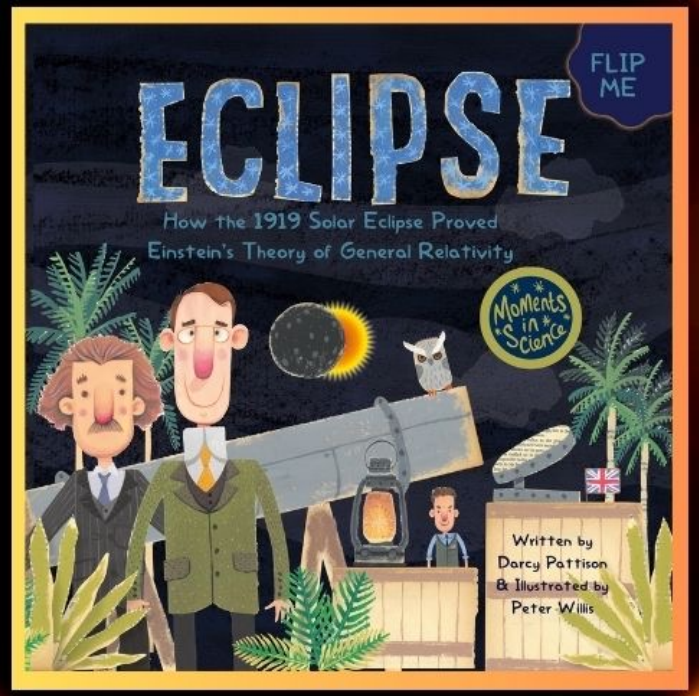
3 QUESTIONS ABOUT ECLIPSES

WHAT?
WHERE?
WHEN?

FOR EACH QUESTION, 2-3 ACTIVITIES

OBJECTIVES:
Students will learn about solar eclipses, with a focus on the April 8, 2024 eclipse, through hands-on activities aligned with CURRICULUM STANDARDS.



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WHAT

INTRODUCTION – WHAT IS AN ECLIPSE?
ACTIVITY #1 – SOLAR ECLIPSE MODEL
ACTIVITY #2 – ECLIPSE DIAGRAM
ACTIVITY #3 – REALLY SAFE GLASSES

INTRODUCTION

RESOURCE:
Watch Nasa's animation of a solar eclipse (30 sec):
https://youtu.be/woqqRtDQJbo

ALTERNATE RESOURCE: Watch animation of eclipse on TimeandDate.com:
https://www.timeanddate.com/eclipse/solar/2024-april-8

What Objects? Sun, Moon, Earth
Estimate sizes of each object.
From where is this happening?
What is happening?

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VIDEO DISCUSSION QUESTIONS

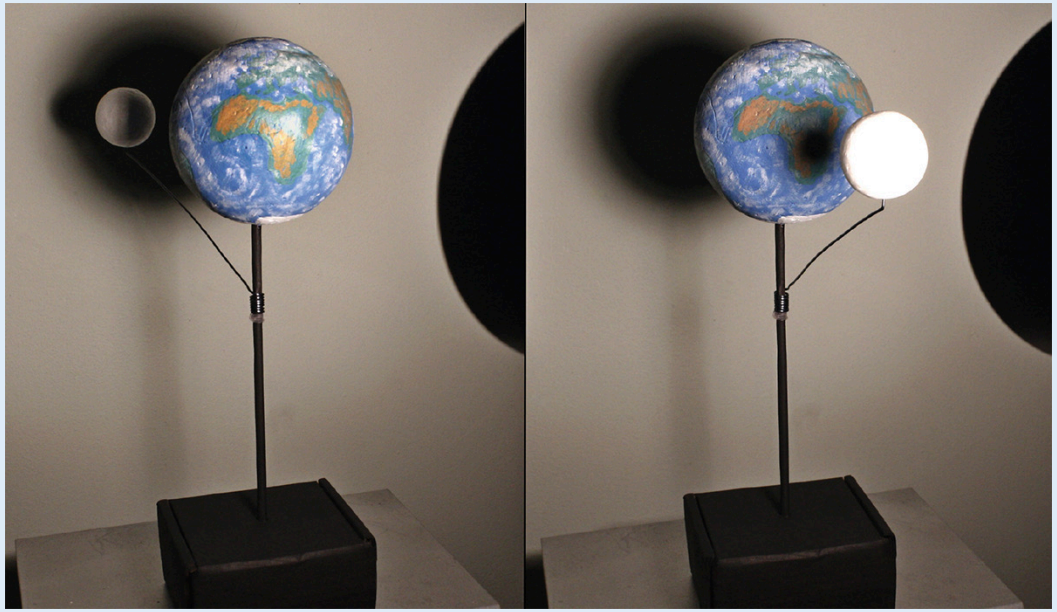
a.Where is the observation being made from?

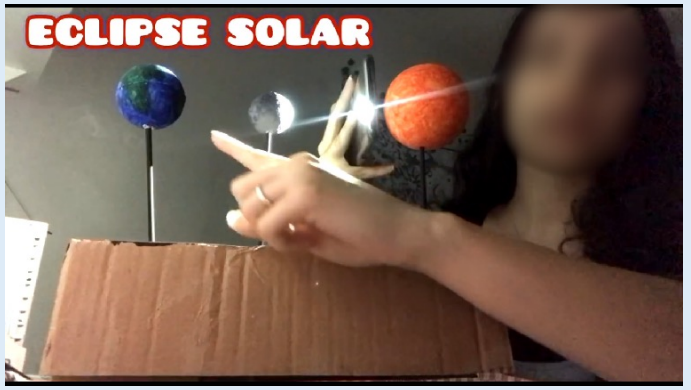
b.What objects are in the animation?

c.Estimate the size and distance of those objects.

d.Describe the motion of those objects. From this point of view can you tell when a person on Earth might see a totality?

WHAT? – ACTIVITY #1
SOLAR ECLIPSE MODEL





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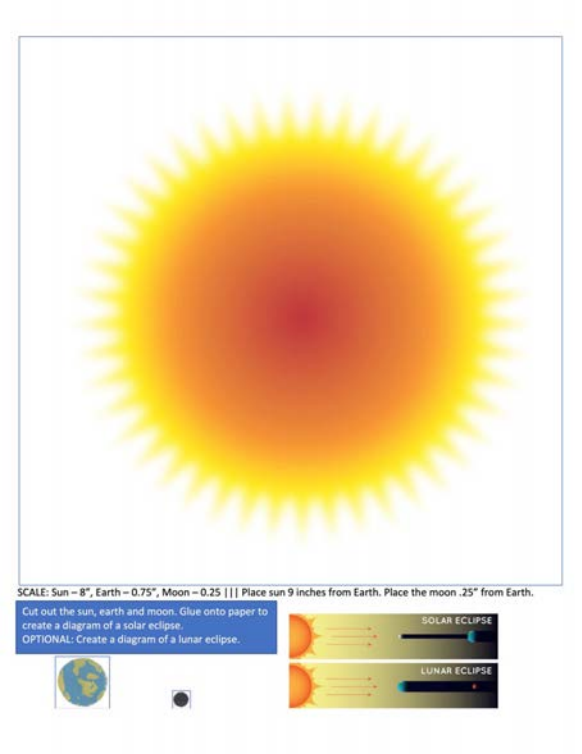
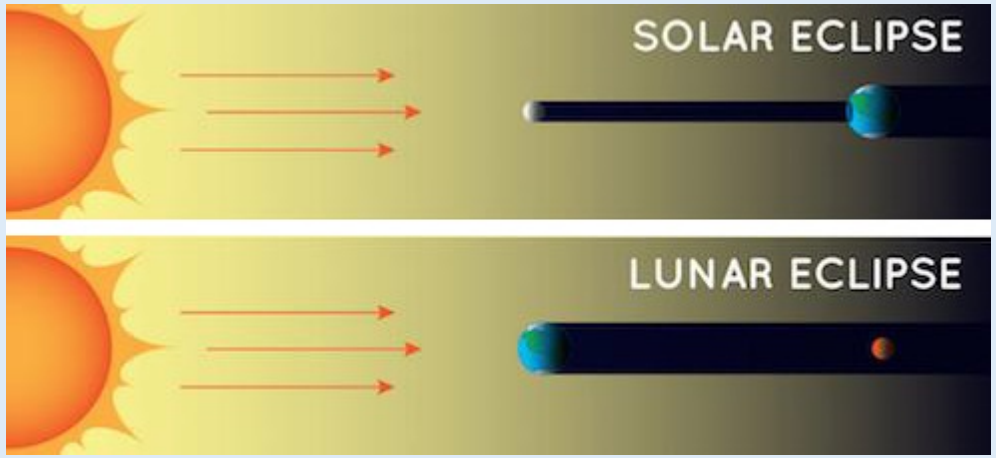
WHAT? – ACTIVITY #2
SOLAR ECLIPSE DIAGRAM

IN HANDOUT:
SCALE IMAGES OF SUN, MOON, EARTH





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WHAT? – ACTIVITY #3
VERY SAFE GLASSES

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WHERE

VIDEO FROM SPACE
PATH OF TOTALITY

WHERE? ACTIVITY #1
VIDEO FROM SPACE

The students watched animations of the eclipse.
ASK: Where is the observation being made from?
The animations are from the perspective of a person on Earth.

However, during the 2017 eclipse, NASA photographed Earth from a space satellite.
DISCUSSION: students to discuss what an eclipse might look like from space.

WATCH THE NASA VIDEO OF AN ECLIPSE FROM SPACE

WATCH THE VIDEO: https://svs.gsfc.nasa.gov/12690 (Downloadable)

Activity #1 - Discussion

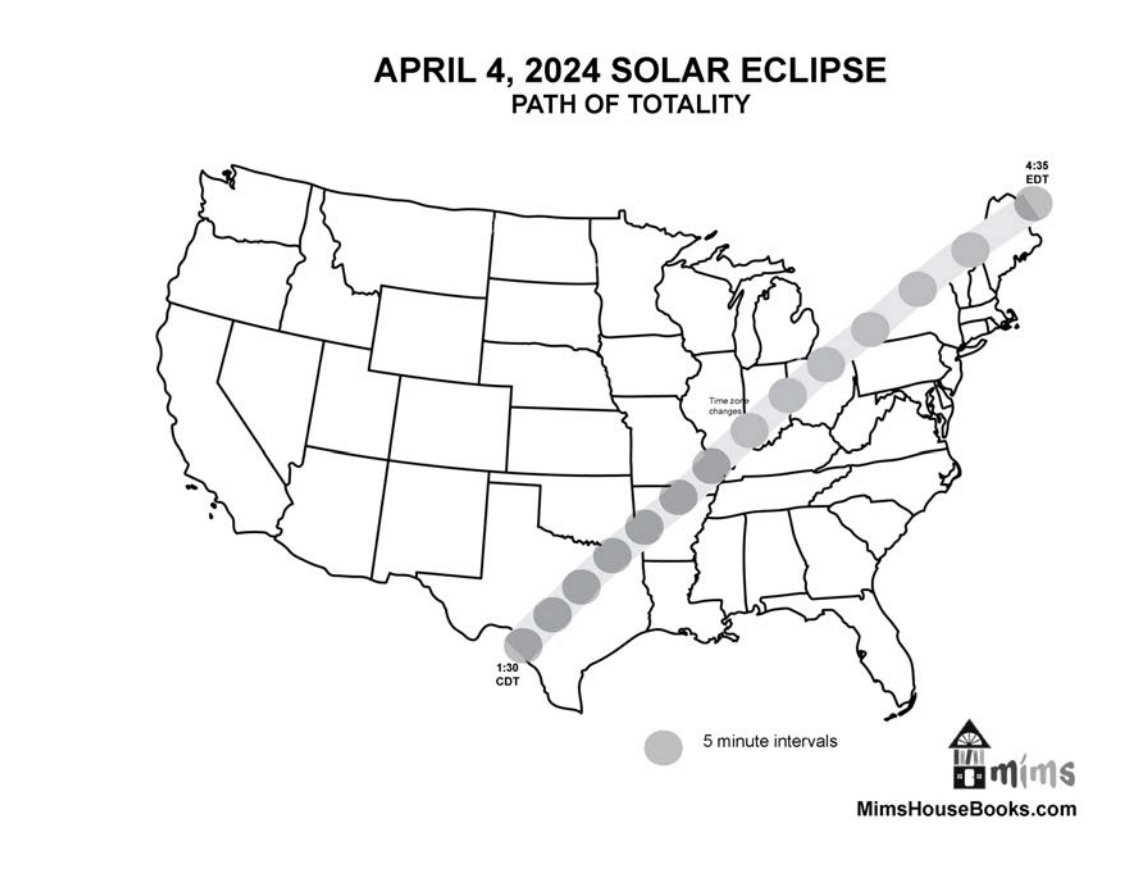
1. What objects are shown in this video? What objects are NOT shown? (sun)

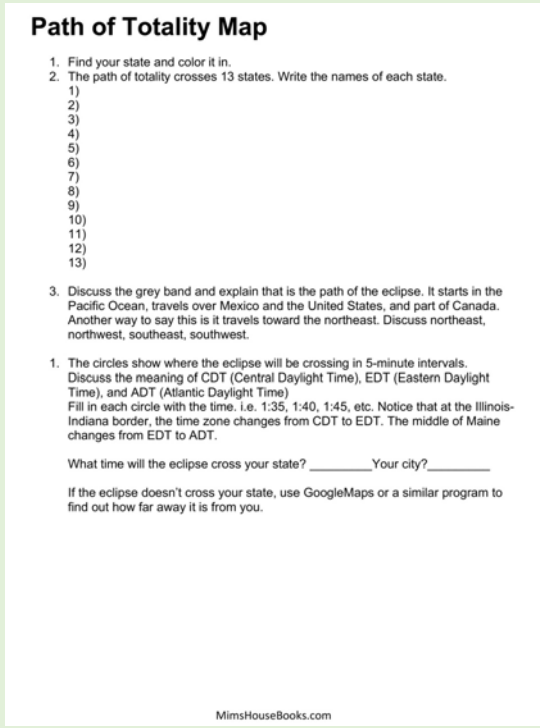
2. Did this video surprise you? How?

3. We know the eclipse is caused by the moon's shadow, but we haven't seen the shadow like this before. Does this video from space change your ideas about eclipses?

WRITE
Compare and contrast the view of an eclipse from Earth and from space.

WHERE? ACTIVITY #2
Path of Totality





Path of Totality Map

1. Find your state and color it in.
2. The path of totality crosses 13 states. Write the names of each state.
   1)
   2)
   3)
   4)
   5)
   6)
   7)
   8)
   9)
   10)
   11)
   12)
   13)

3. Discuss the grey band and explain that is the path of the eclipse. It starts in the Pacific Ocean, travels over Mexico and the United States, and part of Canada. Another way to say this is it travels toward the northeast. Discuss northeast, northwest, southeast, southwest.

1. The circles show where the eclipse will be crossing in 5-minute intervals. Discuss the meaning of CDT (Central Daylight Time), EDT (Eastern Daylight Time), and ADT (Atlantic Daylight Time)
   Fill in each circle with the time. i.e. 1:35, 1:40, 1:45, etc. Notice that at the Illinois-Indiana border, the time zone changes from CDT to EDT. The middle of Maine changes from EDT to ADT.

   What time will the eclipse cross your state? _____Your city?_____

   If the eclipse doesn't cross your state, use GoogleMaps or a similar program to find out how far away it is from you.

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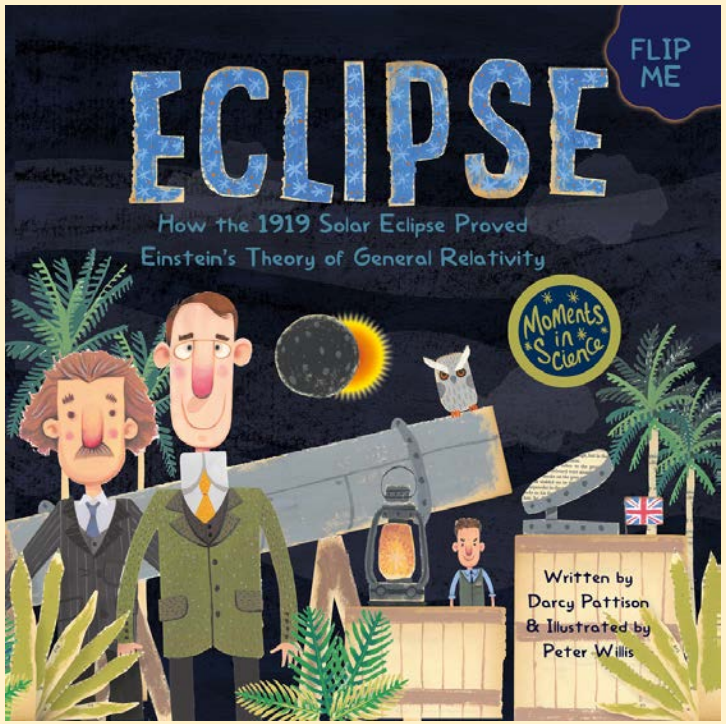
WHEN

READ *ECLIPSE*
COMPARE 1919 AND 2024 SOLAR ECLIPSES
WRITE ABOUT THE ECLIPSE

WHEN? ACTIVITY #1
Read ECLIPSE by Darcy Pattison



ECLIPSE: How the 1919 Solar Eclipse Proved Einstein's Theory of General Relativity

Hardcover: 9781629441252
Paperback: 9781629441269
eBook: 9781629441276
Audiobook: 9781629441412

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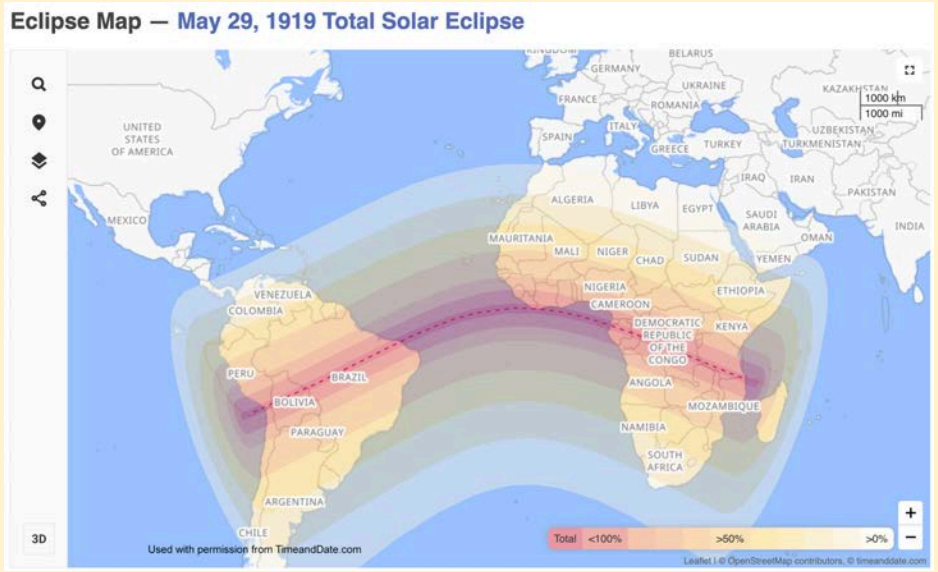
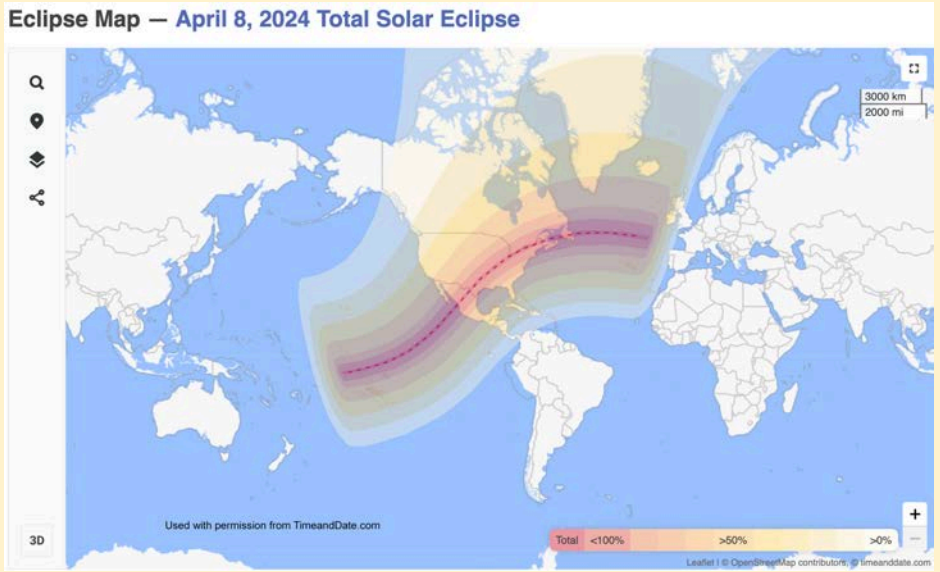
WHEN? ACTIVITY #2
COMPARE 1919 & 2024 ECLIPSES



1919



2024

Maps used with permission from TimeAndDate.com

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Activity #2 Questions

THINK: Why is only a small part of the Earth in the path of totality for each eclipse? Think about the video showing an eclipse from space?

Worksheet: What continents and countries are crossed by the 1919 and 2024 eclipses?

Einstein's theory of general relativity is a complicated theory, difficult for anyone to completely understand. What's important here is the cooperation between the astronomer and theoretical physicist. To prove his theory, Einstein needed Eddington.

DISCUSS: Is international cooperation among scientists important? Why or why not?

WHEN? ACTIVITY #3
WRITE ABOUT THE ECLIPSE

PREWRITING – Everything taught up to now is prewriting!

INFORMATIVE: Use worksheets for informative essay.
NARRATIVE: Use worksheets for narrative essays.
Compare and contrast – 1919 and 2024 eclipses.

ECLIPSE: _____'s Time Line

FIRST

NEXT

AFTER THAT

ALSO

FINALLY

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Name_____

ECLIPSE

Words to use: Because, and, also, therefore, since, for example, for instance, in order to, in addition

Introduction: Start with a sensory detail.

What happens next? Look at your time line to decide. Include some sensory details.

After that, what happened? Use interesting sensory details to tell this.

Also, this happened. Include more sensory details.

Finally, what happened at the end? Sensory detials make this more exciting. Use some!

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OTHER SUBJECTS

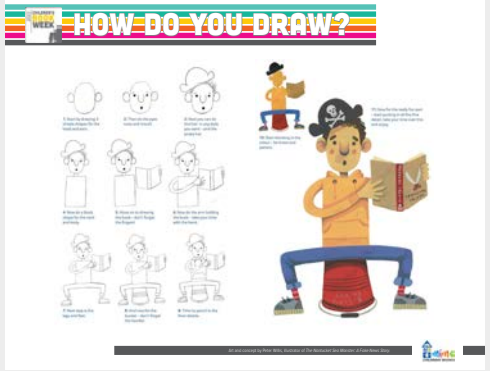
ART – Flip Book Pattern included in worksheets pdf.

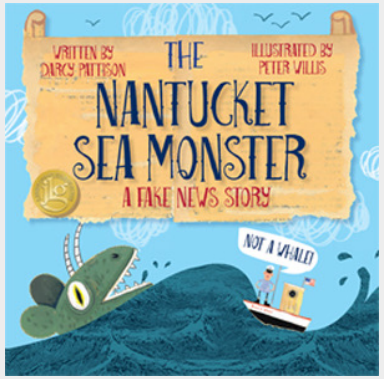
For 3-D Printer Enthusiast - https://nasa3d.arc.nasa.gov/detail/usa-eclipse-2024

ABOUT THE ARTIST: PETER WILLIS –

3 worksheets

ABOUT THE ILLUSTRATOR – Peter Willis





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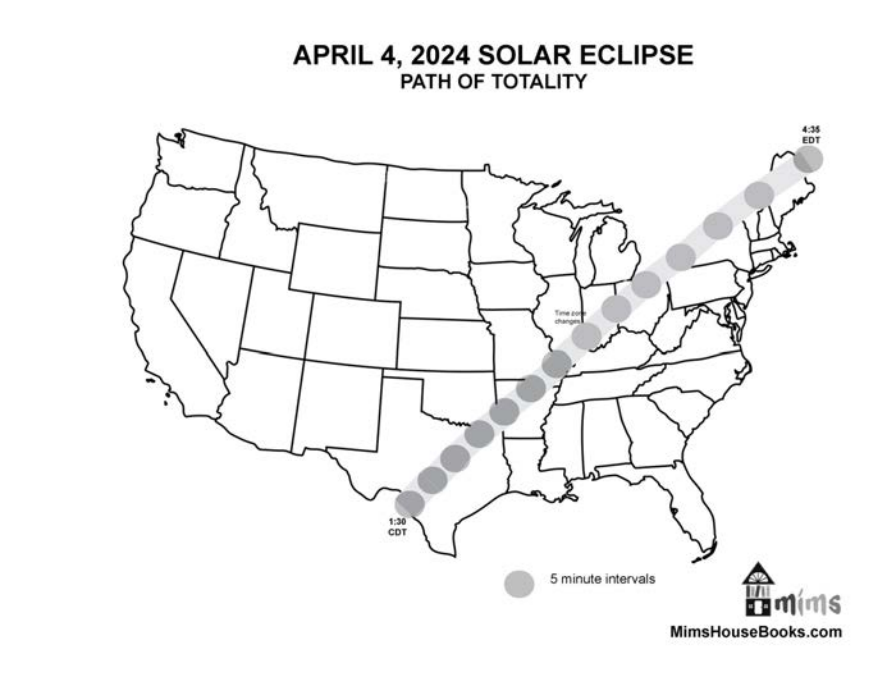
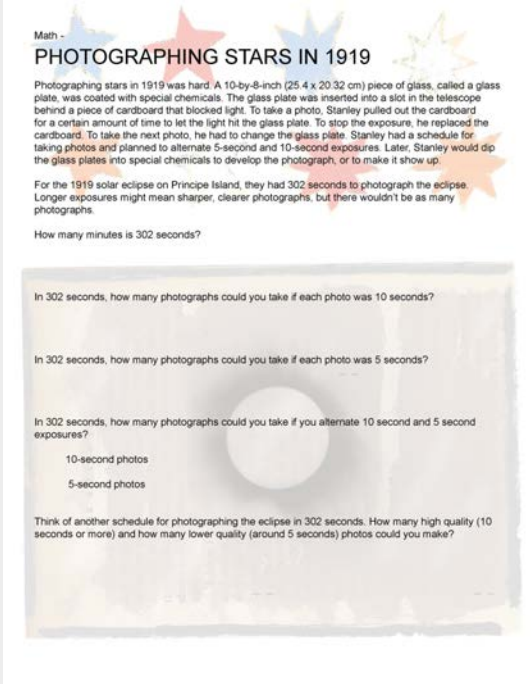
MATH

Skip Counting by 5s
Time zones



WORD PROBLEM
Division



Math -

PHOTOGRAPHING STARS IN 1919

Photographing stars in 1919 was hard. A 10-by-8-inch (25.4 x 20.32 cm) piece of glass, called a glass plate, was coated with special chemicals. The glass plate was inserted into a slot in the telescope behind a piece of cardboard that blocked light. To take a photo, Stanley pulled out the cardboard for a certain amount of time to let the light hit the glass plate. To stop the exposure, he replaced the cardboard. To take the next photo, he had to change the glass plate. Stanley had a schedule for taking photos and planned to alternate 5-second and 10-second exposures. Later, Stanley would dip the glass plates into special chemicals to develop the photograph, or to make it show up.

For the 1919 solar eclipse on Principe Island, they had 302 seconds to photograph the eclipse. Longer exposures might mean sharper, clearer photographs, but there wouldn't be as many photographs.

How many minutes is 302 seconds?

In 302 seconds, how many photographs could you take if each photo was 10 seconds?

In 302 seconds, how many photographs could you take if each photo was 5 seconds?

In 302 seconds, how many photographs could you take if you alternate 10 second and 5 second exposures?

10-second photos

5-second photos

Think of another schedule for photographing the eclipse in 302 seconds. How many high quality (10 seconds or more) and how many lower quality (around 5 seconds) photos could you make?

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MUSIC - Play a song related to the eclipse in some way, and then ask kids to create percussion instrument patterns to interpret the music. Example: "Eclipse" John Denver

PHYSICAL EDUCATION

Create an eclipse dance with these motions:

spin (Earth's rotation)
circle arms overhead (moon orbiting)
reach upward (sun's rays).

OTHER RESOURCES

MOECLIPSE.ORG
https://moeclipse.org/prepare/resource-links

WATCHING THE ECLIPSE TOGETHER – APRIL 8

WEAR YOUR SAFETY GLASSES. Remember! Safety first!

BEFORE THE ECLIPSE: Draw a picture or write a poem about how it feels to wait to see the eclipse.

OBSERVATION DURING THE ECLIPSE: WATCH the eclipse. Don't look around or get distracted. It will only last for seconds.

AFTER THE ECLIPSE: Immediately after the eclipse fill in the sensory details worksheet on the writing handouts. What did you see, hear, touch, taste, or feel (temperature/texture, not emotions)?

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CITIZEN SCIENCE ECLIPSE PROJECT:

https://observer.globe.gov/do-globe-observer/eclipse

For the Citizen Science Project, you'll need a thermometer. You can't just use your smart phone because it will give you temperatures from the closest weather observation station. If you want the temperature in your location, you must have a thermometer.

MOMENTS IN SCIENCE

Learn More

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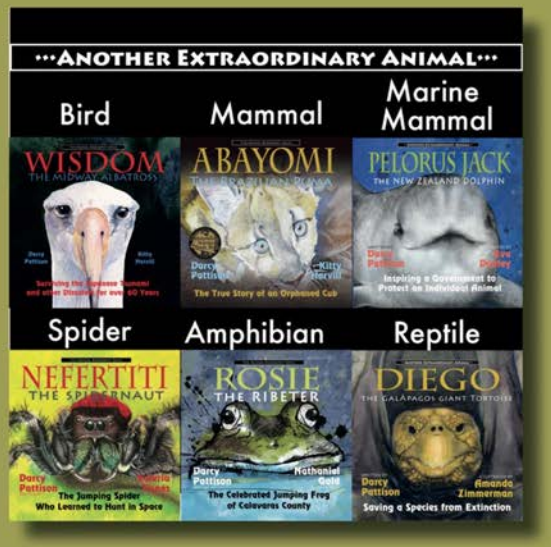

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