

Primary Source Lesson: Women in Science and the Total Solar Eclipse

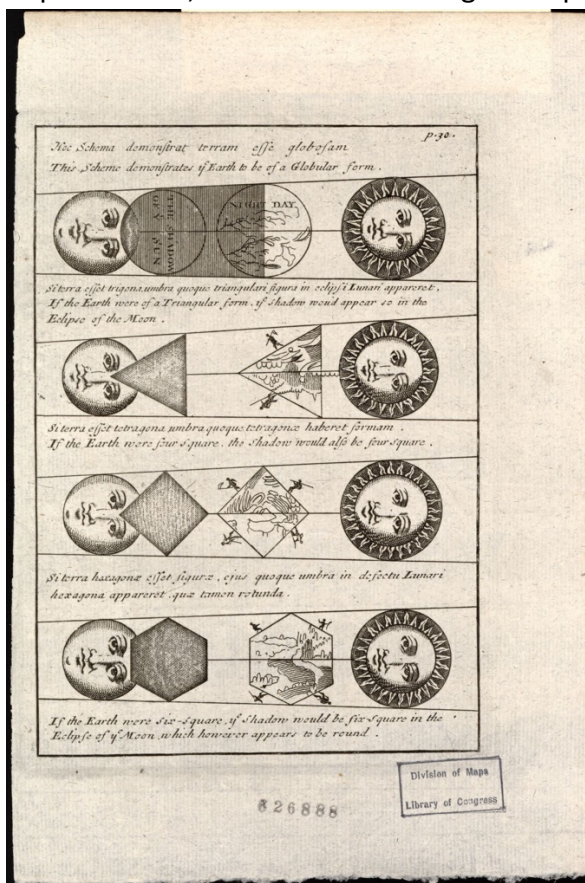
Grade Level: Middle and High School

Standards: CCSS.6.11-12: Evaluate author's differing points of view on the same historical event or issue by assessing the authors' claims, reasoning, and evidence.

Source Used: The Total Solar Eclipse in Watertown Republican, August 07, 1878
<http://chroniclingamerica.loc.gov/lccn/sn85033295/1878-08-07/ed-1/seq-2/#date1=1875&index=12&rows=20&words=Maria+Mitchell&searchType=basic&sequence=0&state=&date2=1880&proxtext=maria+mitchell&y=0&x=0&dateFilterType=yearRange&page=1>

Source Information:

A total solar eclipse occurs when the sun's light is completely obstructed by the moon's path. The location of the shadow of darkness depends on the position of the Earth and its moon. The phenomenon has provided a unique opportunity for viewing the solar system with telescopes and calculating other measurements. The article describes preparation for viewing the total solar eclipse in 1878, the scientists making these preparations, and their observations.



Four Diagrams of Solar Eclipses
 Library of Congress Geography and Map Division
 Washington DC
<https://www.loc.gov/item/2013593159/>

Suggested Procedures and Scoring Guide:

What follows are suggestions for different approaches to this lesson to make accommodations for students with varied learning needs.

Level 1: Student struggles to state the author’s point of view

Materials	Procedures
- Watertown Republican Article	1. Teacher reads article with students
- POV Graphic Organizer 1	2. Teacher leads group discussion about prompt
- Authors Point of View Paragraph Frame 1	3. Teacher guides students through article highlighting supporting details that support POV in yellow
- Small group instruction	4. Teacher guides students through article highlighting details that go against POV
	5. Students fill in graphic organizer with supporting details
	6. Students complete structured paragraph worksheet to formulate extended response answer.

Level 2: Student can describe author’s point of view, but struggles with concept of supporting details

Materials	Procedures
- Watertown Republican Article	1. Students read article independently.
- POV Graphic Organizer1	2. Students highlight supporting details that support POV yellow
- Authors Point of View Paragraph Frame 1	3. Students highlight supporting details that go against POV pink
	4. Students fill in graphic organizer with supporting details
	5. Students complete extended response answer using sentence starters.

Level 3: Student can describe author’s point of view, but still needs assistance with supporting evidence

Materials	Procedures
- Watertown Republican Article	1. Students will read article independently.
- POV Graphic Organizer 2	2. Students will fill in graphic organizer with supporting details
- Authors Point of View Paragraph Frame 2	3. Students will complete extended response answer using paragraph structure handouts

Level 4: Student can describe author’s point of view with sufficient supporting evidence, but needs help justifying or clarifying why the evidence supports these insights

Materials	Procedures
- Watertown Republican Article	1. Students will read article independently.
- POV Graphic Organizer 2	2. Students will fill in graphic organizer with supporting details
- Prompt & answer sheet 1	3. Students will complete extended response answer

Level 5: Student can state author’s point of view, provides supporting evidence, and connects evidence to claim.

Materials	Procedures
- Watertown Republican Article	1. Students will read article independently.
- POV Graphic Organizer 3	2. Students will fill in graphic organizer with supporting details
- Prompt and Answer Sheet 2	3. Students will complete extended response answer that includes justification statements that connect evidence to the authors POV

1878 Newspaper Article: Total Solar Eclipse (Introduction)

1878 Aug 7 Ill
Watertown Republican.

Vol. XVIII.

WATERTOWN, WIS., WEDNESDAY, AUGUST 7, 1878.

No. 41

THE TOTAL ECLIPSE.

A Denver special to the *Inter Ocean* gives the following graphic description of the eclipse and the observers: The cloudy afternoons and daily rains which have prevailed up to to-day, have brought anxious forebodings to the scientific men who have assembled to witness the total eclipse of the sun. This morning, however he arose into a perfectly cloudless sky, and grave professors boldly asserted that their intention of standing on their heads if the heaven continued to smile. At Prof. Brinker's academy, a little northwest of Denver, were located by the Rev. Dr. Swazey and Professor Burnham, of Chicago, the former of whom might have been seen, in the convenient shadow of the barn with a table of logarithms, figuring intently. At the same place were professor Ingersoll, of Columbia college; president Rogers, of Christian college, Missouri; and professor Turner, of Kentucky. Universally a smile of cheerful content illuminated their faces when the subject of the weather was broached. Next, half a mile north, was the tent of the Chicago astronomical society, with Prof. Colbert presiding. The Princeton college, led by the distinguished astronomer, Prof. Young, and assisted by Profs. Brackett and Rockwood, of Princeton; Professor Grant, of Chicago, and nine young men from the college, was located two miles further northwest, near Cherry Creek. This party was by far the best equipped of any in the vicinity, and has spent nearly a month on the ground in preparation.

Their instruments were a large telescope with connected spectroscope, used by Professor Young; a comet seeker; several good smaller telescopes; a double telescope with prism, used by Profs. Rockwood and Grant, four photographic instruments, and a prismatic spectroscope, besides many smaller instruments. Mr. Ranyard, secretary of the Royal Astronomical Society, also made independent observations in connection with this party at Pike's Peak. Our universal friend, Old Probabilities, had taken his station; also Prof. Langley with a large supply of instruments. The prevailing belief was that their station was poorly selected, on account of danger from haze and clouds. It is now thought that their view was unobstructed owing to the wonderful clearness of the day. At Schuyler, Prof. Stone, of the Cincinnati observatory, selected an eligible location, while Mr. Edison, the great genius of the age, with his party, located at Ravlins, Wyoming Territory. Special observations were also taken by Professor Stockwell, the well-known mathematician of Cleveland; Professor Gove, formerly of Chicago, now superintendent of schools here; Mr. Nelson, of the *Railway Review*; Professor Snow, of Sacramento, and Professor Snow, of Lawrence, Kan.

Article Continues on Next Page

1878 Newspaper Article: Total Solar Eclipse, cont. (Observations)



At 2:19 all eyes were directed eagerly to the sun, and, according to prediction, in a few seconds the first contact was seen to take place. Nothing of special interest was developed until the appearance of Venus, and later of Mercury, which was to-day seen for the first time by hundreds of people. As the totality approached, search was made by parties not interested in watching the corona for Encke's comet, which was calculated to be above the horizon. The mountains on the edge of the moon were very plainly visible about half an hour after the first contact. Madame Gretner, a spiritualist went last night to the sun in spirit, to find the position of Vulcan. So far, however, it has not been reported as seen by the eye of science.

1878 Newspaper Article: Total Solar Eclipse, cont. (Science & Gender)

1878 177 911
Watertown Republican.

Vol. XVIII.

WATERTOWN, WIS., WEDNESDAY, AUGUST 7, 1878.

No. 41

The Vassar college scientists, directed by Professor Maria Mitchell, observed from the Sisters' Hospital Hill, the highest prominence northwest of the city. This distinguished instructress was aided by four coryphees, all alumnae of the college, and the manner in which three of them warmed as many excellent glasses, while a fourth took rapid sketches in oils of the great phenomenon was an attraction to the gaping, yet respectfully distant, multitude of masculines, almost as absorbing as the eclipse. Prof. Mitchell herself, as with iron-gray curls fluttering under a broad-brimmed Leghorn, she swept the heavens with a four-inch telescope, or directed with native majesty and grace the operations of her assistant nymphs, was a figure, and perfectly commanding. No one on seeing her unsparing exertions, which insured the signal success of the observations, would have imagined her physical strength equal to the masterly lecture delivered by the lady in the evening before a theorizing audience, upon the astronomer Herschel. The party was successful in fixing the time of the beginning and end of the obscuration, and also with great nicety, the exact duration of totality, on which point the labors of the Chicago observatory explorers were not so satisfactory. Three planets discovered their beauties to the ladies—Mercury, Venus, and Mars—and a perfect myriad of stars.

The great result of this eclipse cannot be fully known until the professors can compare notes, but all express satisfaction. Many very perfect photographs were taken of the crescent and corona, and the spectroscopic observations were specially successful.

Professor Colbert reports that his observations tend to show that the moon's path in the heavens lay a little farther to the southward than indicated by the lunar tables, or else that the estimate of the moon's diameter is too large.

Perhaps the measures made by Mr. Easterday indicated that the corona extended out on an average about twenty-six minutes of an arc corresponding to a distance of fully seven hundred thousand miles all around the sun. It was strongly striated, and in the direction of the ecliptic the rays were nearly straight, while above and below that line they were markedly spiral in their character, and some of the lines at the base formed an angle of not less than thirty degrees with a prolongation of the sun's rays.



Author's Point of View Graphic Organizer 1

Prompt: The author of this article supports and/or respects female scientists.

Evidence the author supports and/or respects female scientists	Evidence the author doesn't support and/or respect female scientists
Conclusion	



Author's Point of View Paragraph Frame 1

Name _____

The article, _____, shows that the author (circle one) supports / does not support female scientists. There are several reasons why.

First, _____

Second, _____

Finally, _____

In conclusion, I think that the author _____

because _____



Authors Point of View Graphic Organizer 2

Prompt: The author of this article supports and/or respects female scientists.

Evidence the author supports and/or respects female scientists	Evidence the author does not support and/or respect female scientists	Personal Knowledge

Conclusion



Author's Point of View Paragraph Frame 2

Name _____

At the end of the article, _____, the reader can draw the conclusion that _____

_____ (*Topic Sentence*)

This conclusion is based on information in the article and personal knowledge. First, the author says that _____

_____ (*Supporting Detail # 1*).

Second, _____

_____ (*Supporting Detail # 2*). Another detail (fact, statement) that leads me to this conclusion is _____

_____ (*Supporting Detail # 3*). Personal experience and knowledge of the world also tells me that _____

_____ (*personal knowledge-Detail # 4*).

The reader can draw the conclusion that _____

This is because of _____

_____ (information), and

_____ (information)

Personal experience and general knowledge about _____

_____ help

the reader to arrive at this conclusion.

Authors Point of View Graphic Organizer 3

Prompt: The author of this article supports and/or respects female scientists.

Supporting Evidence 1:

Evidence:
How does it support POV?

Supporting Evidence 2:

Evidence:
How does it support POV?

Contradicting Evidence 1:

Evidence:
How does it contradict POV?

Contradicting Evidence 2:

Evidence:
How does it contradict POV?

