Articles and Questions

Each **free article** of ***What in the World?*** includes:   
  
1) a PDF file

*and*

2) a Word file

These files contain **only** the article and questions. They do **not** contain Answer Keys.

This **Word** file allows students to complete assignments using a computer either at school or at home. Teachers can assign all or parts of the file by email attachment or a school website. The **Word** file also allows teachers to:

• easily modify and format content including changing *fonts* and text sizes

• create a PDF document and use Adobe Reader's 'Read Out Loud Mode'

• save paper and copying costs and help protect the environment

• promote and encourage students’ computer skills

What Else Can You Do With The Word File?

#1) You can easily upload the file to Google Docs and share it with students or other teachers. **See how here:**

<https://support.google.com/drive/answer/2424368?hl=en>

#2) Translate the uploaded document into another language. (see **Tools>Translate document**).Google Docs will create a new copy of the original file but you will need to edit the document to suit your requirements. Google Docs can translate into over 100 languages including Spanish, Mandarin, German, etc. **See how here:**

<https://support.google.com/docs/answer/187189?hl=en&co=GENIE.Platform=Desktop>

**The Disappearing Sun**



If April 8 is a clear day, many Canadians will watch the Sun vanish. The reason? The Moon will line up perfectly between the Earth and the Sun. This will block the Sun and cast a shadow on parts of Earth. Such an event is called a total solar eclipse.

**A place-specific event**

An eclipse is place-specific. It is only visible along the path where the Moon blocks the Sun. The path where a solar eclipse is complete is called the “path of totality.”

Imagine holding a dinner plate between you and a lamp. Line things up so that it looks like the lamp and plate are about the same size. If you’re directly behind the plate, the lamp will not be visible. Your friend standing beside you may see part of the lamp past the edge of the plate. Someone a few steps away will see the lamp normally. The plate will not affect their view.

For places far from the path of totality, there will be no sign of the eclipse. Places outside the path but near it will see a partial eclipse that dims the sky like twilight. A total eclipse brings near-complete darkness along the path.

Imagine how scary a total solar eclipse seemed to people long ago. To the ancient Greeks, who believed the gods were angry, it **heralded** disaster. The word eclipse comes from the Greek word “ekleipsis.” That translates to “being abandoned.”

**A rare total eclipse**

The diameter of the Sun is about 400 times that of the Moon. How can something so much smaller block the Sun? Because the Sun is about 400 times farther away from the Earth than the Moon is.

If the Moon was only 273 kilometres smaller in diameter, a total eclipse would not be possible. The same is true if it were any farther from Earth. As it is, the Moon’s orbit around Earth is **elliptical**. When an eclipse happens with the Moon at the far point of its orbit, it can’t block the Sun completely. Instead, a halo of light appears around the Moon. This is called an annular eclipse.

In the far future, total eclipses may no longer occur because the Moon is slipping away from the Earth by a tiny amount (about 3.8 centimetres) each year.

A solar eclipse can happen only during a new moon phase when the Moon is between Earth and the Sun. At such times the Moon appears dark to us.

Why don’t we get an eclipse with every new moon? If the orbit of the Moon around Earth were on exactly the same plane as the orbit of Earth around the Sun, we would. But the orbit of the Moon tilts about five degrees relative to Earth’s orbit around the Sun. Usually, when the Moon passes in front of the Sun, the Moon’s shadow reaches into space and doesn’t fall on Earth.

**A path of darkness**

The April 8 solar eclipse will create a line of darkness through parts of Mexico, the United States, and Canada. There won’t be another total solar eclipse in North America until 2044.

In Canada, the path of totality will travel through the eastern provinces. Some Ontario cities to be plunged into shadow include Port Dover, Niagara Falls, Hamilton, Belleville, Kingston, and Cornwall. In Québec, Sherbrooke, Saint-Georges, and parts of southern Montréal will experience the full eclipse. So will residents of Fredericton, Miramichi, and the northern tip of Cape Breton Island.

Cities closest to the centre of the path of totality will have the longest eclipses. The total eclipse may last just a few seconds or as long as three and a half minutes.

**NASA** calculates that the eclipse will peak in Canada along the north shore of Lake Erie just before 3:15 pm. Minutes later, it will darken cities along Lake Ontario. It will reach residents of central New Brunswick and western Prince Edward Island after 4:30 their time. Canada’s final glimpse of it will be at 5:10 local time in Newfoundland,

**A big opportunity**

Total solar eclipses occur about every 400 years or so. The last time Kingston, Ontario, was in the path of totality was nearly 700 years ago, in 1349. The next time will be 375 years from now, in 2399. So cities in the path of totality can expect many visitors on April 8. As the eclipse approaches, they'll see the sky darken. Temperatures may drop by more than five degrees.

Meanwhile, scientists will use this chance to study the Sun’s corona, or outer atmosphere. It's usually impossible to see because the Sun is so bright. They want to better understand why the corona can reach temperatures of millions of degrees. Yet the Sun's surface hovers at around 5500 degrees Celsius. They are also planning experiments involving animal noises. What do they expect to hear? More cricket sounds because many cricket species search for mates in twilight.

They aren’t sure exactly what else the eclipse will bring. But unlike the ancient Greeks, they see it as a learning experience – not something to fear.

**Staying Safe**

As amazing as the eclipse will be, it’s not safe to look at it without protection. The infrared radiation can cause permanent eye damage. Sunglasses aren’t enough. Looking through dark material such as a garbage bag won’t cut it, either. The same goes for using binoculars or a telescope that don't have a solar filter. You need to wear special eclipse glasses to view an eclipse.

If you don’t have eclipse glasses, you can build a pinhole camera to observe the shadow cast by the Moon in miniature.

You can also experience the eclipse with your ears! One free app, Soundscapes, includes an interactive “Rumble Map.” It transforms the eclipse into a touch- and sound-based experience. Another option is to build a LightSound Device, developed at Harvard University. It outputs sound based on detected brightness. As the Moon blocks the Sun, the sound levels decrease.

The tools were developed for the Blind and Low Vision community, but anyone can use them to safely enhance the eclipse experience.

**elliptical:** shaped like an oval

**herald:** to be a sign that (something) is about to happen

**NASA:** National Aeronautics and Space Administration – an independent agency of the U.S. federal government responsible for the civil space program, aeronautics research, and space research

**Comprehension Questions**

1. Describe the shape of the Moon's orbit around the Earth;

2. When the Moon fully blocks the Sun and casts a shadow on part of the Earth, this is called a(n):

3. What is the **path of totality**?

4. When Sun, Moon, and Earth line up and the Moon is at the far point of its orbit and does not fully block the Sun, this is called a(n):

5. The Moon looks slightly different each night and there are four main lunar phases: a) new moon, b) first quarter, c) full moon, and d) last quarter. In which phase does a solar eclipse occur?

6. Why is there no eclipse every time the Moon is in this phase?

7. Where in Canada will the path of totality travel during the total solar eclipse on April 8, 2024?

8. Describe what will happen as the eclipse approaches. How long will the eclipse last?

9. What do scientists plan to study during the eclipse?

10. Why are people in the path of the eclipse warned not to look at the Sun without proper protection?

**Questions For Further Thought**

1. The article tells us that the origin of the word “eclipse” comes from the Greek word “ekleipsis” which means ‘being abandoned’. What reasons can you suggest to explain why the ancient Greeks might have used this word to describe a total solar eclipse? Explain.

2. A number of school boards in Ontario and Quebec have switched their school calendar to provide a professional activity day for teachers so that students can stay at home on April 8. They are concerned that the projected time of the total solar eclipse will correspond to the student dismissal time for many of their schools. As you see it, why might these school boards have made this decision? Do you agree or disagree with this decision? Give reasons to support your response.

**Questions For On Line Exploration**

*Note:* The links below are listed at **www.lesplan.com/links** for easy access.

1. What is a solar eclipse?  
**https://www.asc-csa.gc.ca/eng/astronomy/eclipses/solar-eclipses.asp**

Explain what a solar eclipse is in your own words to a peer.

2. What can we expect on April 8, 2024?  
**https://www.yout-ube.com/watch?v=fojT0byNJB8** [2:48] **https://www.yout-ube.com/watch?v=DUCLzPInVLQ** [1:10]  
**https://www.theweathernetwork.com/en/news/science/space/how-to-prepare-for-the-april-8-total-solar-eclipse-across-eastern-canada**

What did you learn?

3. Where and at what time will the 2024 total solar eclipse be the most visible?  
**https://www.asc-csa.gc.ca/eng/astronomy/eclipses/total-solar-eclipse.asp   
https://science.nasa.gov/eclipses/future-eclipses/eclipse-2024/where-when/  
https://www.yout-ube.com/watch?v=AwlGxVcVNNw** [1:08]

4. Explore the Harvard University LightSound Project site and learn how to build a LightSound Device:  
**https://astrolab.fas.harvard.edu/LightSound.html#about**

What did you find interesting?

5. Check out these classroom resources for educators on different types of eclipses:  
**https://www.asc-csa.gc.ca/eng/youth-educators/toolkits/solar-and-lunar-eclipses/   
https://letstalkscience.ca/search/site?keys=eclipse&op=Search**

**Putting It All Together**

**A. Write the letter that corresponds to the best answer on the line beside each question:**

\_\_\_\_\_\_ 1. **Which of the following is TRUE about a total solar eclipse?** a) it often recurs in the same place b) the Moon blocks the view of the Sun  
 c) it cans last up to 10 minutes d) it occurs with each new moon phase

\_\_\_\_\_\_ 2. **The Sun's outer atmosphere is called the:** a) corona b) sunspot region  
 c) ring of fire d) solar flare band

\_\_\_\_\_\_ 3. **Why will total eclipses no longer occur in the distant future?** a) the Moon's orbit is slowing b) space dust will hide the eclipse  
 c) the Sun is moving farther away d) the Moon is becoming more distant each year

**B.** Mark the statements **T** (**True**) or **F** (**False**). If a statement is True, write one important fact to support it on the line below. If a statement is False, write the words that make it true on the line below.

\_\_\_\_\_\_ 4. **True** or **False?** A solar eclipse can only occur during a full moon phase.

\_\_\_\_\_\_ 5. **True** or **False?** The surface of the Sun is hotter than its atmosphere.

\_\_\_\_\_\_ 6. **True** or **False?** Infrared radiation from the Sun can cause permanent eye damage.

**C. Fill in the blanks to complete each sentence.**

7. The path of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ is the location on Earth where a solar eclipse is complete.

8. The Moon's orbit around Earth is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ shaped.

9. NASA: National Aeronautic and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Administration.

**D. Respond to the following question in paragraph form. *(Use a separate sheet of paper if necessary.)***

10. What is your understanding of how a solar eclipse occurs? Explain.

**Assessment Rubric**

This rubric may be helpful in providing students with formative, strength-based feedback and/or assessing students’ responses holistically. This easy-to-modify activity is included in the doc file which you can download from:   
**www.lesplan.com/subscribers**

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| --- | --- | --- | --- | --- |
|  | **Emerging** | **Developing** | **Proficient** | **Extending** |
| **Supports thinking** | Answers or reflections are brief and include obvious facts/details/ evidence. | Answers or reflections are general and supported with some relevant facts/details/evidence. | Answers or reflections are clearly supported with specific, relevant facts/details/evidence. | Answers or reflections are insightful and supported with specific, relevant facts/details/evidence. |
| **Shows understanding** | Responses show a basic understanding of the text, topic, issue or message. | Responses are thoughtful and show a general understanding of the text, topic, issue or message. | Responses are thoughtful and show a complete understanding of the text, topic, issue or message. | Responses are insightful and show a deep understanding the text, topic, issue or message. May synthesize ideas or explain the ‘so what’. |
| **Thinks  critically** | Makes straightforward connections or inferences. Focuses on retelling. | Makes logical connections to self (T:S) and/or background knowledge (T:S). Inferences are logical | Makes meaningful connections to self. Considers ideas between texts (T:T).  Inferences are plausible. | Makes powerful connections that go between texts and/or beyond the text (T:W).  Inferences are plausible and insightful. |

