
What Causes a
Lunar Eclipse?
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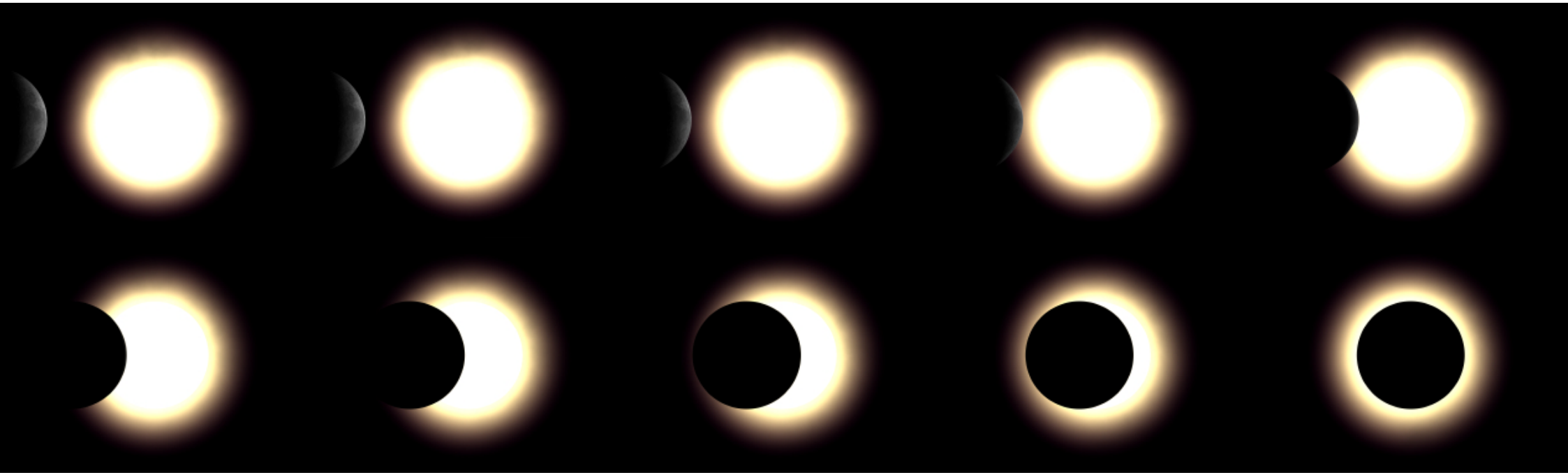
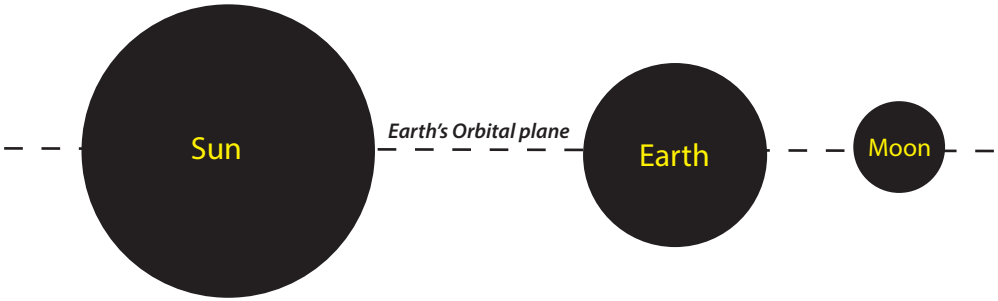
A Lunar Eclipse



An eclipse of the Moon (lunar eclipse) occurs when a full moon moves into the shadow of the Earth. The Earth blocks some of the sunlight that would otherwise shine on the face of the Moon.

From our position on Earth it looks as though a dark spot is moving across the Moon.

The Moon travels once around the Earth every month. Why don't we see an eclipse every month?



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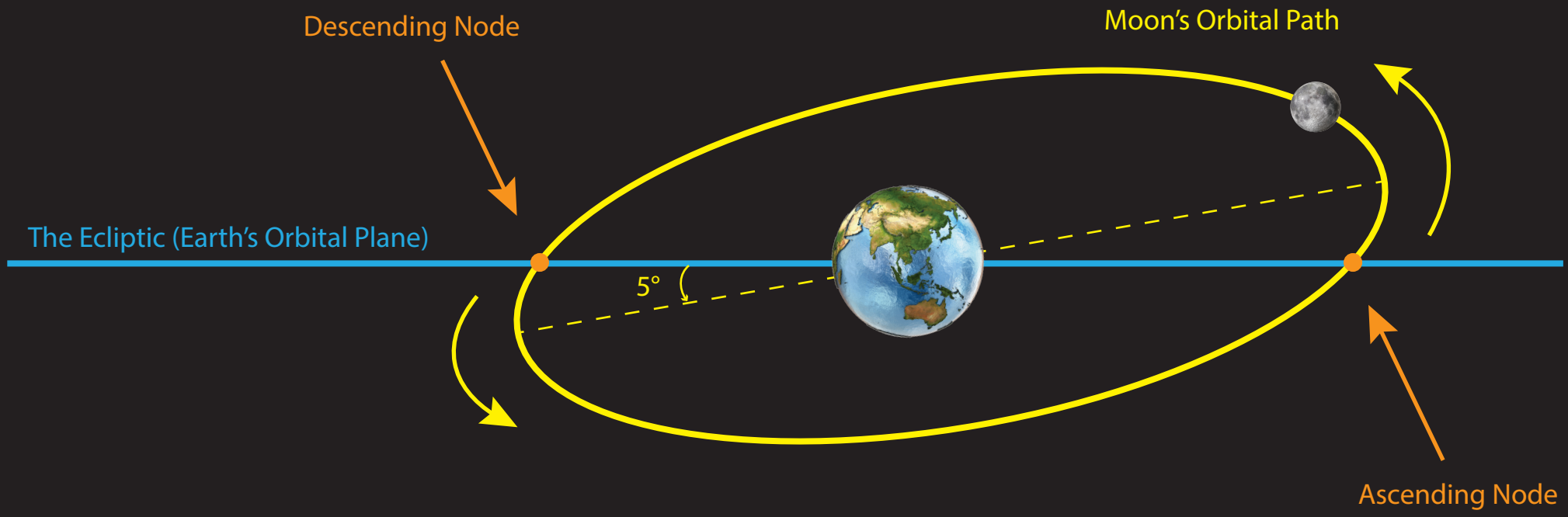
The Earth orbits in a plane called ***the ecliptic***. The Moon's orbit is tilted slightly at 5 degrees. This means that there are only two points where the Moon crosses the ecliptic plane. These spots, called nodes, are the only places where the Moon will line up with the Earth and the Sun. The rest of its orbit is either above or below the Earth's orbital plane.



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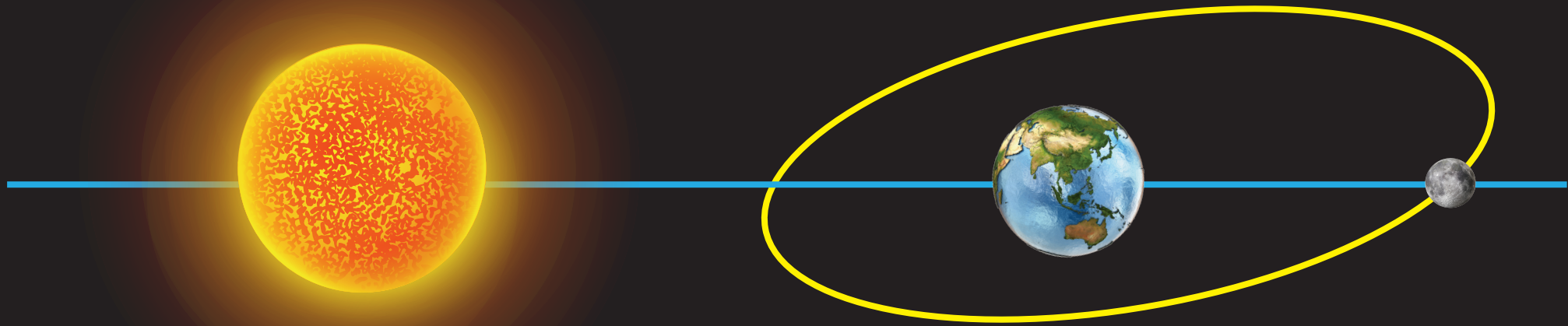

An eclipse only occurs when the Moon, the Earth and the Sun all line up in the same plane.

If the Earth is between the Sun and the Moon and the Moon is full when it crosses a node, a ***lunar eclipse*** can occur. The Earth will cast a shadow on the Moon.

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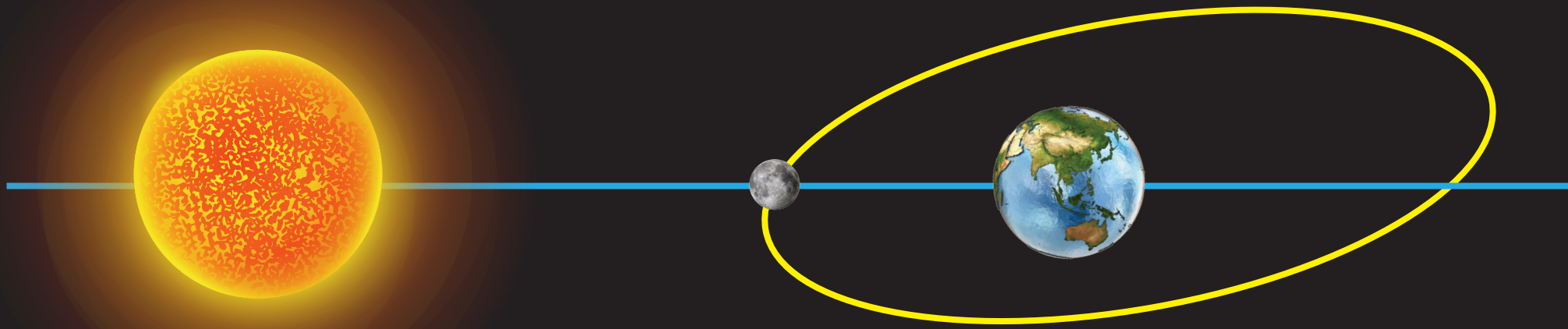
Solar Eclipse



However, another type of eclipse will occur if the Moon lines up with a node between the Sun and the Earth.

A ***solar eclipse*** will take place in this event. The Moon blocks the Earth's view of the light of the Sun. It looks like a black spot moving across the face of the Sun. (Reminder: NEVER look directly at the sun as it will damage your eyes.)

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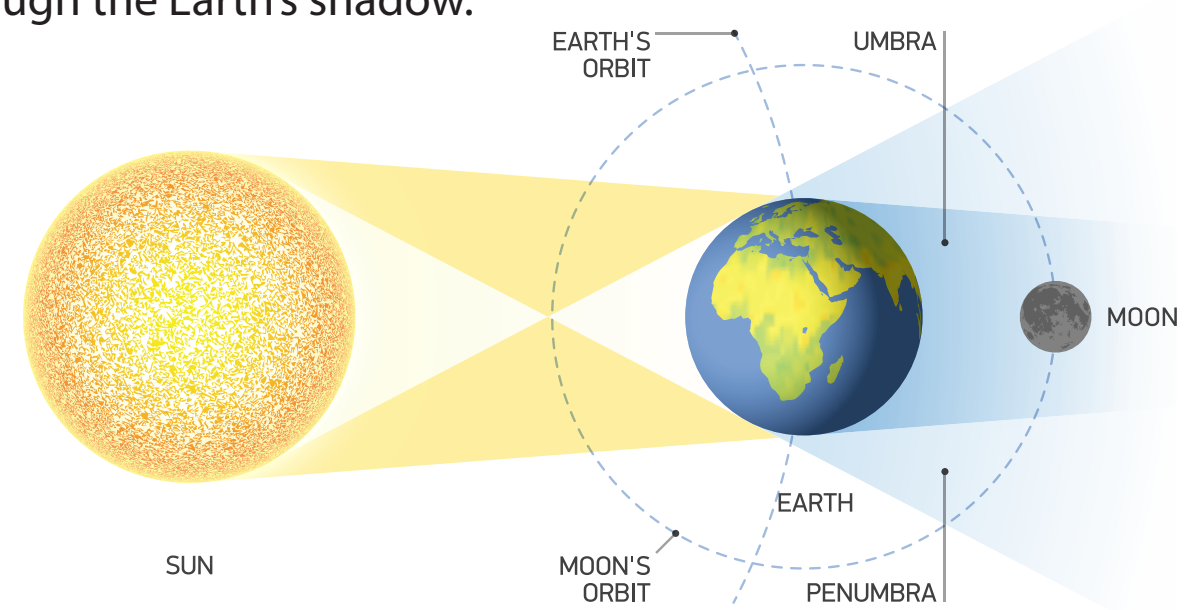
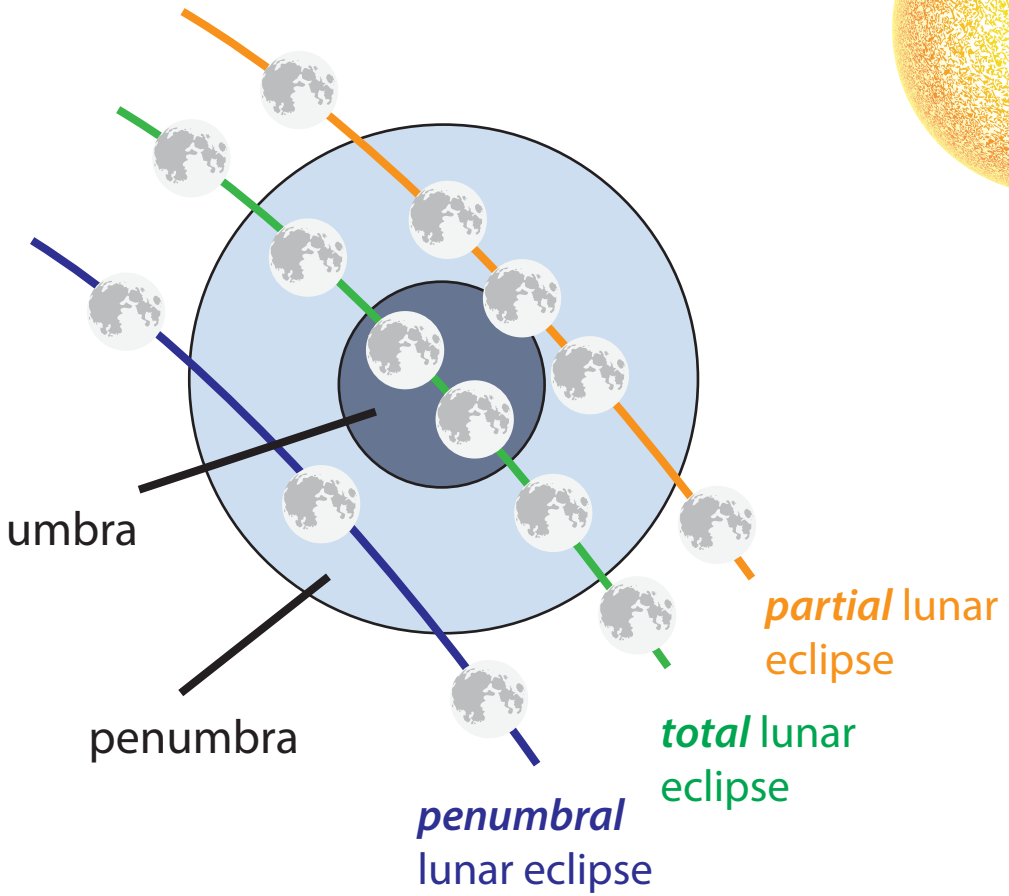
The Earth casts a shadow over the Moon. The umbra is the darkest part of the shadow. The penumbra contains more diffused, refracted light from the Earth. Not every lunar eclipse will be a total eclipse. It depends on the path the Moon takes through the Earth's shadow.





When just a part of the Moon passes directly through the umbra (and the rest passes through the penumbra) a ***partial lunar eclipse*** occurs.

When the Moon passes directly through the umbra a ***total lunar eclipse*** occurs.

When the Moon only passes through the penumbra a ***penumbral lunar eclipse*** occurs.

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A dark spot will begin to appear on the surface of the Moon as it crosses into the penumbra of the Earth's shadow. As it crosses into the umbra, the darkest part of the Earth's shadow, the Moon appears to turn a red/brown colour. The Moon will then cross into the penumbra again.

The Moon often turns reddish brown during a total eclipse. This is caused by the Earth's atmosphere. Blue light is easily scattered by particles in the atmosphere. Red light is not easily scattered and passes through the atmosphere. It is this red light that we can see reflecting on the Moon.

A total eclipse of the Moon is often referred to as a "blood moon" because of this rusty red/brown hue.

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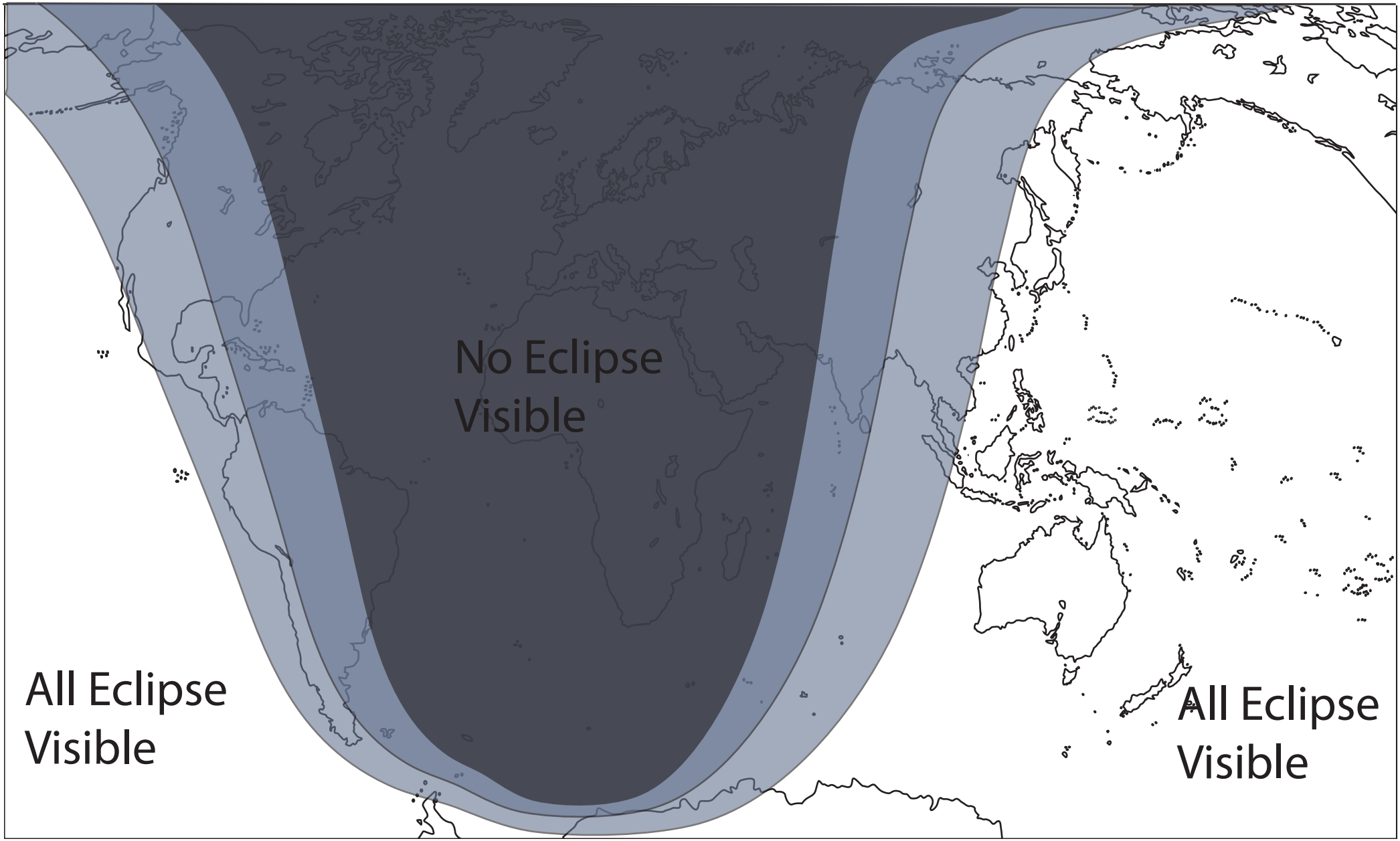

Scientists can work out which parts of the world will be able to see an eclipse. These can be marked on a map of the world. Next time an eclipse is due, look for a map to see if you will be able to view it. Remember, it is only safe to look at a lunar eclipse. NEVER look at the Sun.