

3D PAPER CRAFT

[Natural Science Series]

How Eclipses Work



What is this strange thing called an "eclipse?" How is it that the sun or moon can be hidden?

The Earth is a planet which orbits around the Sun, a journey that takes a year. The Moon orbits around the Earth, a trip that takes about a month.

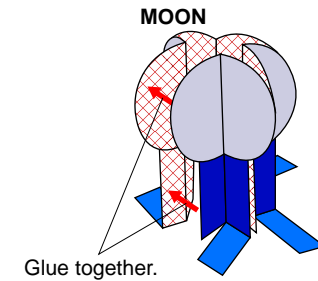
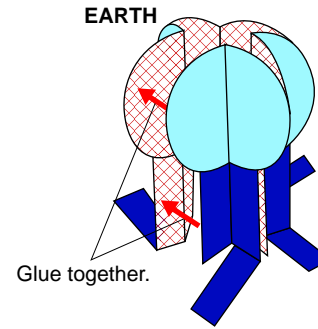
An eclipse of the sun, or solar eclipse, occurs when the Moon is aligned exactly between the Earth and the Sun. Looking up from a part of the Earth that's in the Moon's shadow, you can see the Sun vanish in the middle of the day! The Moon's orbit around the Earth is tilted about 5.2 degrees from the orbit of the Earth around the Sun. As a result of this tilt, a solar eclipse occurs somewhere on the Earth about two to five times a year.

A lunar eclipse occurs when the Earth is aligned exactly between the Sun and the Moon, so that the moon falls within the Earth's shadow and thus vanishes from sight. Lunar eclipses are more rare than solar eclipses, typically occurring three times a year or less.

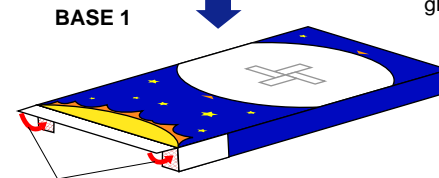
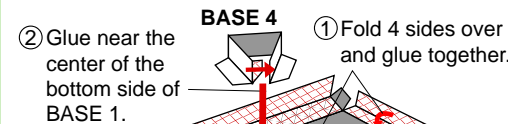
This Papercraft model will let you see for yourself how eclipses work.

Directions

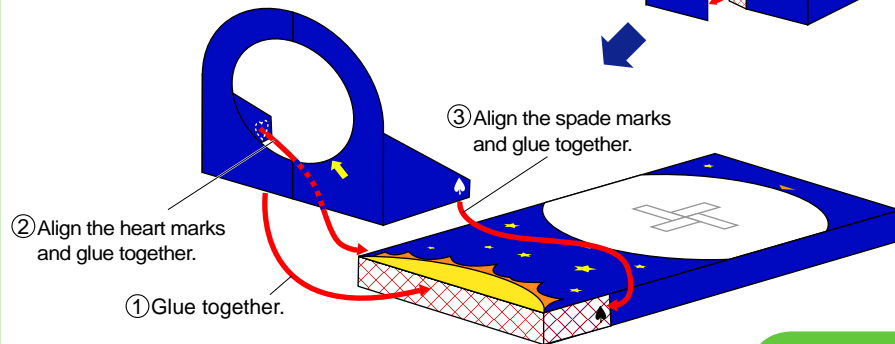
Build the EARTH and MOON 1



2 Build the BASE

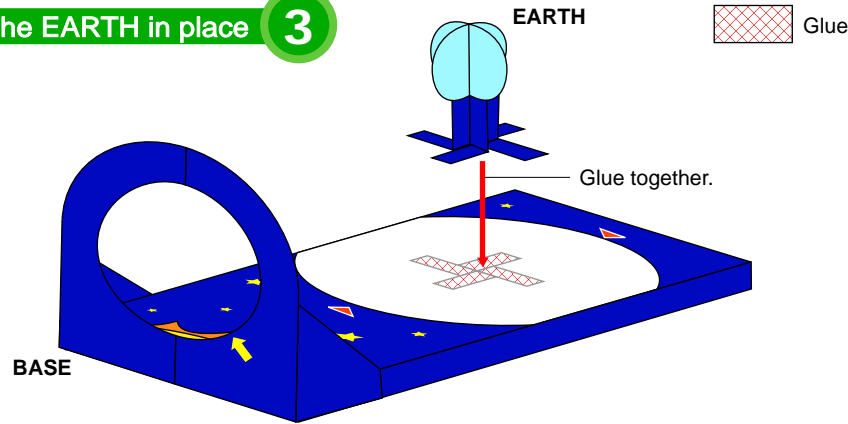


Glue together.

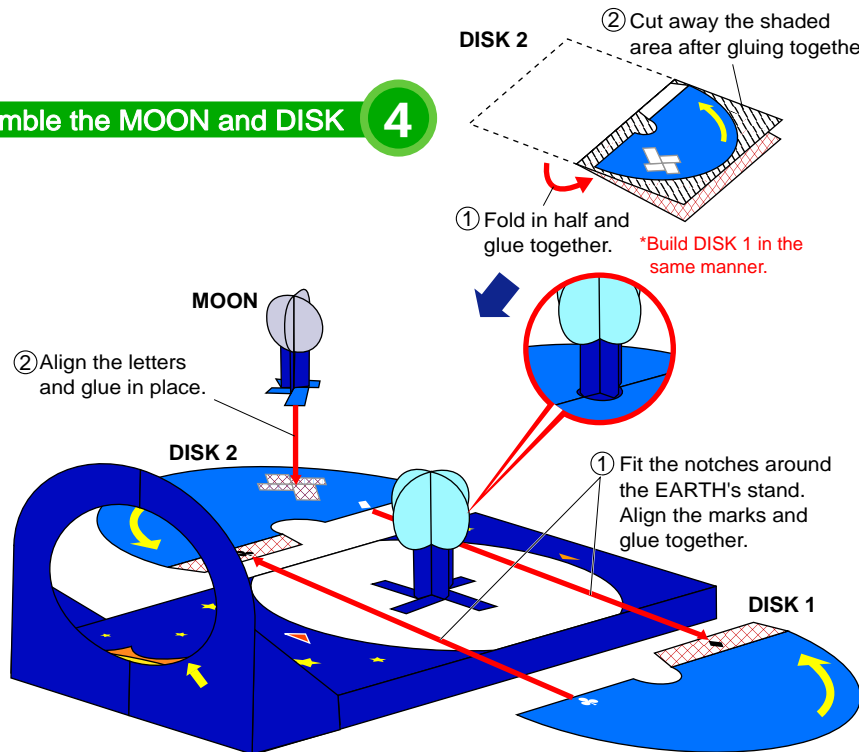


Directions

3 Glue the EARTH in place

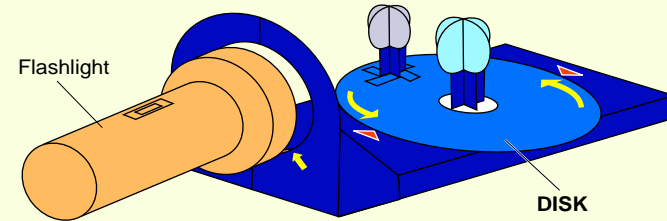


4 Assemble the MOON and DISK

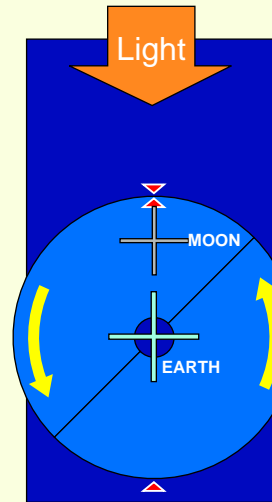


★ How to use the model

- 1 Use a flashlight or similar light source to shine light through the hole. Turn the disk in the direction indicated by the yellow arrows. The light from the flashlight represents the light from the Sun. The turning of the disk recreates the orbit of the Moon around the Earth. Note: Don't use the real Sun as your light source for your experiments!

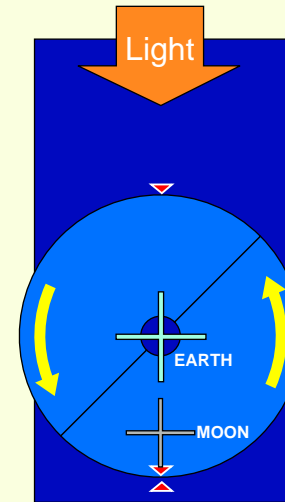


- 2 Align the red triangle mark on the disk with the triangle marks on the BASE, as shown in the figure. When the triangle marks are aligned, look at where the light is striking, and where the shadows fall, on the Earth and the Moon.



● Solar eclipse

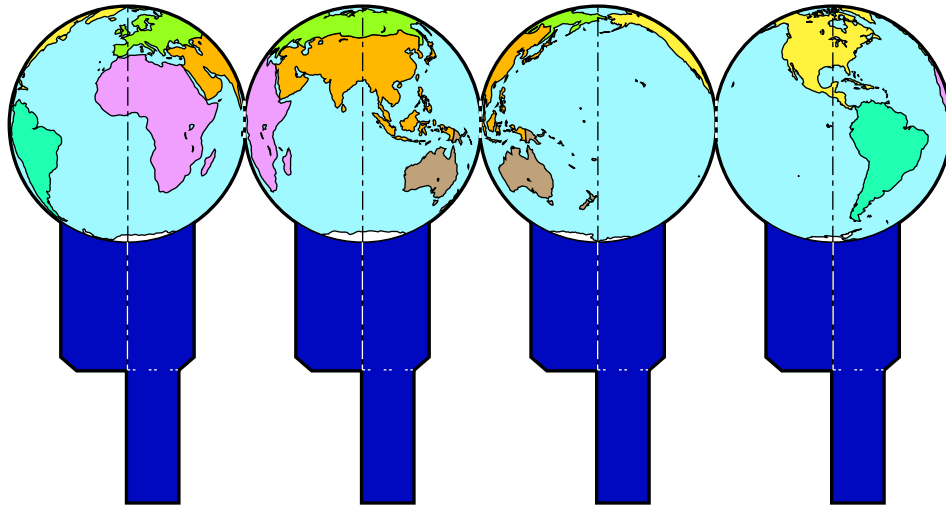
The Moon blocks the light from the Sun, and the shadow falls on the Earth.



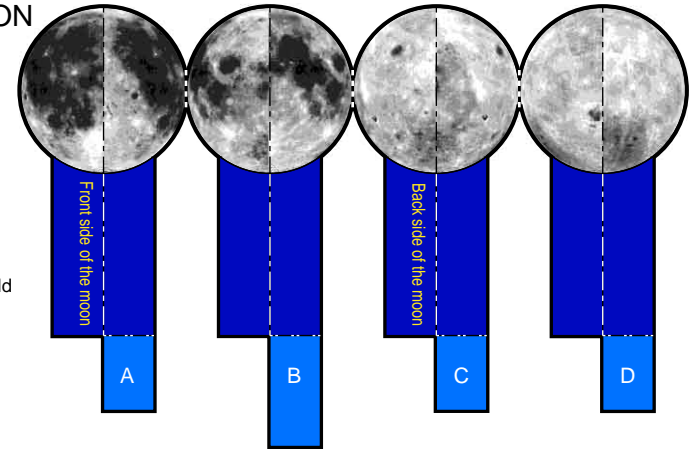
● Lunar eclipse

The Earth blocks the light from the Sun, and a shadow falls on the Moon.

EARTH

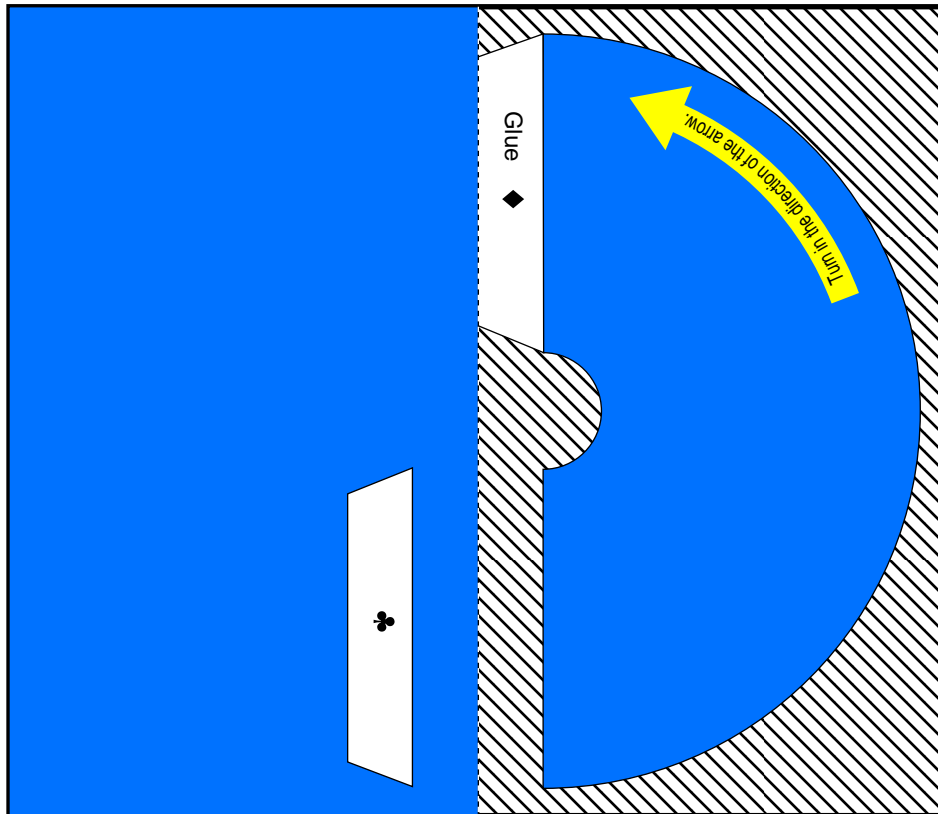


MOON

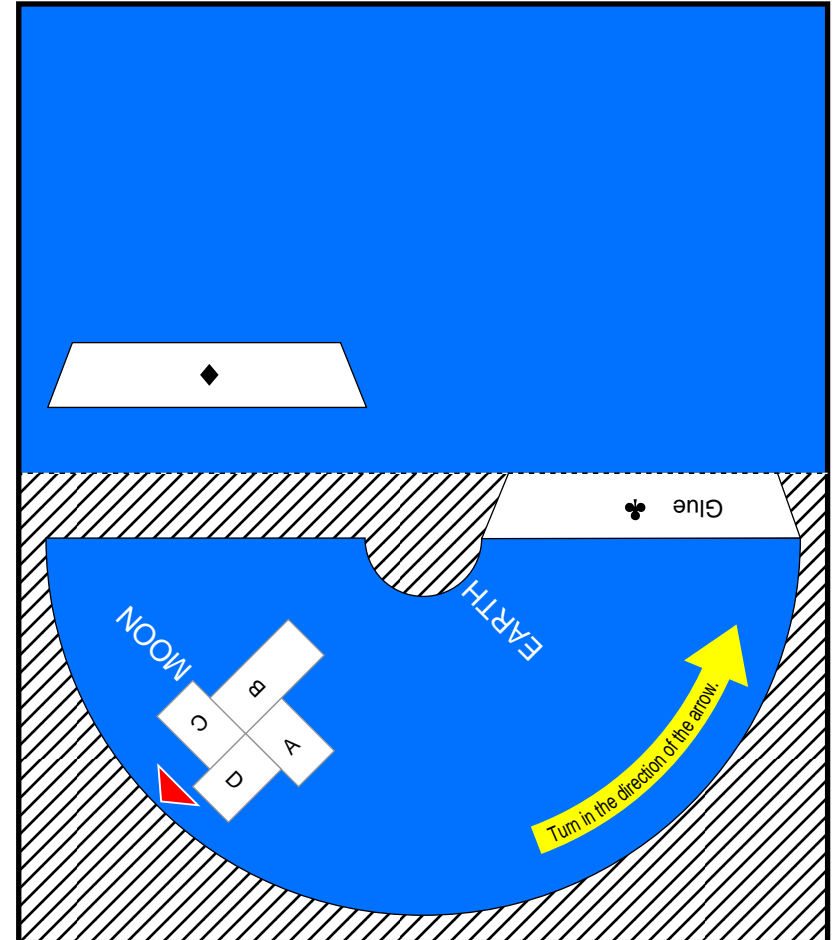


- Cut line
- - - Mountain fold
- · - Valley fold

DISK 1

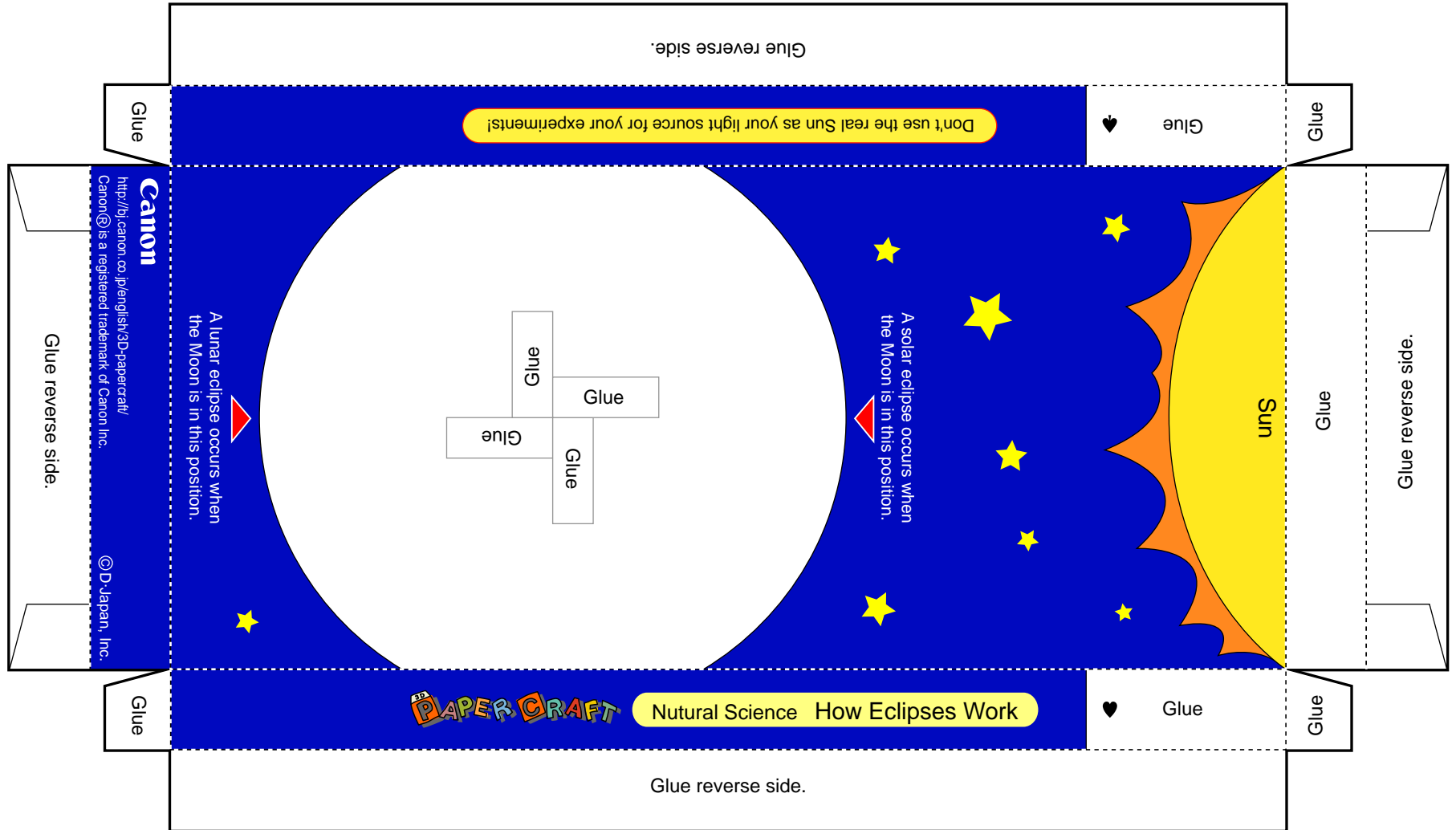


DISK 2



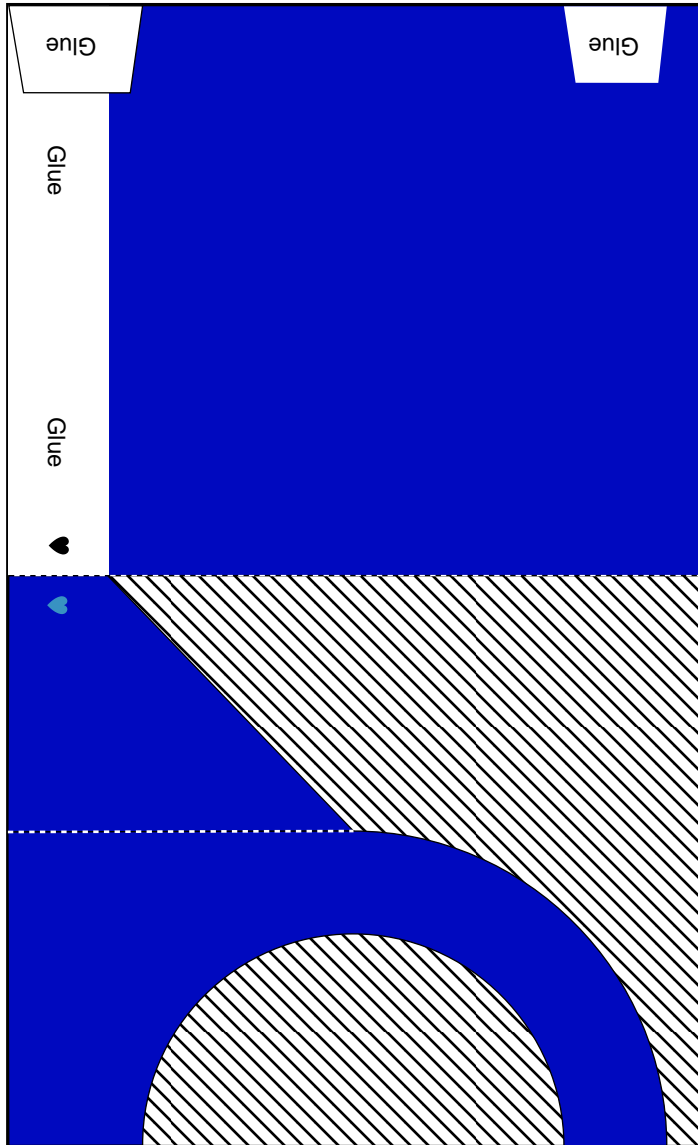
- Cut line
- - - Mountain fold
- · - · - Valley fold

BASE 1

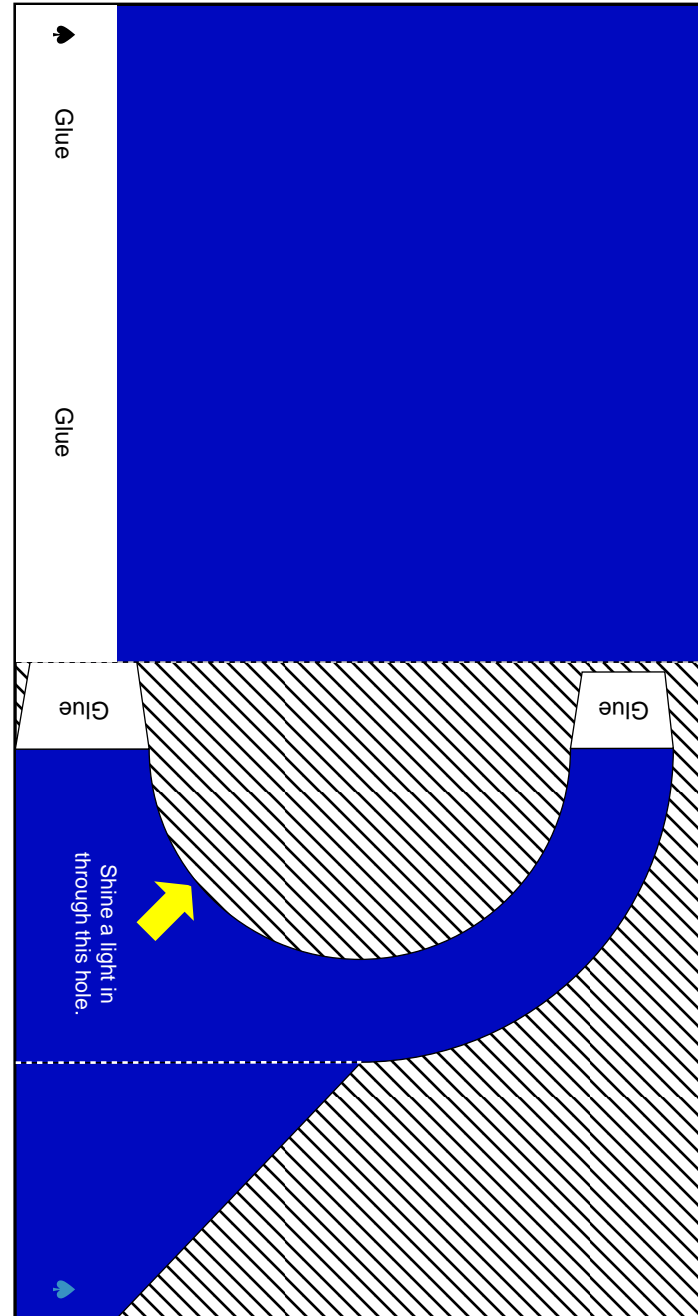


- Cut line
- - - Mountain fold
- · - · Valley fold

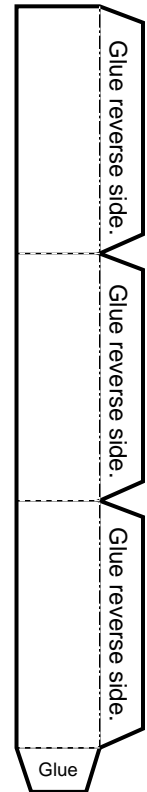
BASE 2



BASE 3

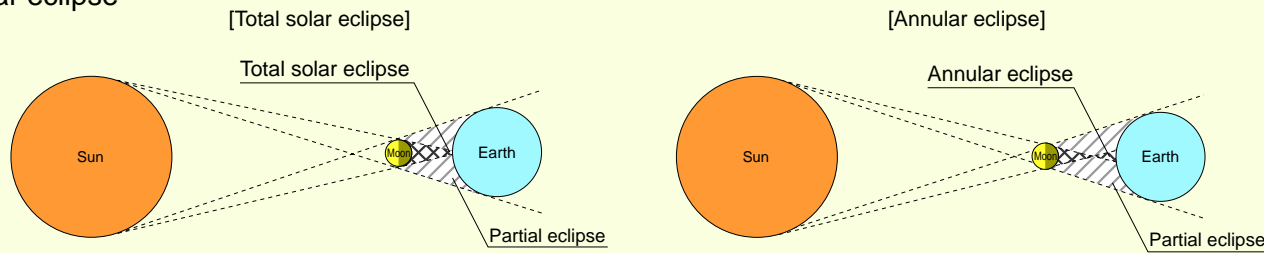


BASE 4

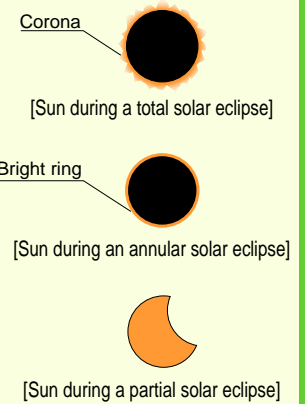


★Solar eclipses, lunar eclipses, and the new moon

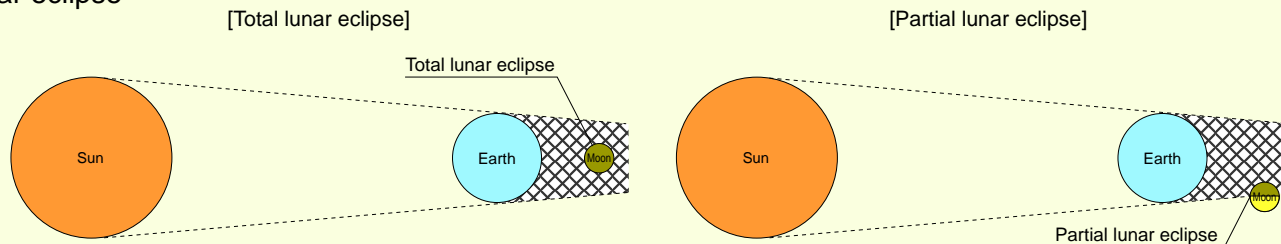
Solar eclipse



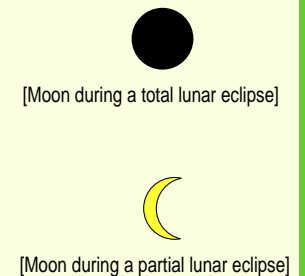
An eclipse of the sun, or solar eclipse, occurs when the Moon is aligned exactly between the Earth and the Sun. The Moon's shadow falls on the Earth, and from within that shadow, the Sun appears to vanish in the middle of the day. There are three types of solar eclipse. During a "total eclipse," the Sun's disk is completely hidden by the Moon. An "annular eclipse" occurs when the Moon is farther enough from the Earth that the Sun is not completely hidden, and the outer edge of the Sun's disk is visible as a ring, or "annulus." When the Moon covers only part of the Sun's disk, it is called a "partial eclipse." Solar eclipses occur two to five times per year somewhere on the Earth. (During a total eclipse, the Sun's outer atmosphere, called the "corona," is visible around the Moon.)



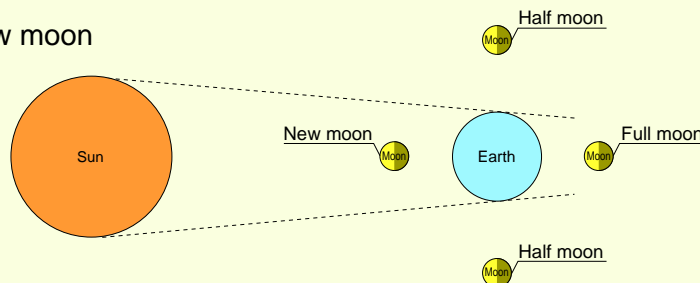
Lunar eclipse



A lunar eclipse occurs when the Earth is aligned exactly between the Sun and the Moon, so that the moon falls within the Earth's shadow and thus vanishes from sight. There are two types of lunar eclipse. A "total eclipse" occurs when the Moon falls completely within the Earth's shadow. A "partial eclipse" occurs when only part of the Moon falls within the Earth's shadow. Lunar eclipses occur up to three times a year, but some years may not occur at all.



New moon



A "new Moon" occurs when the Moon is between the Earth and the Sun. In this position, the surface of the Moon seen from the Earth is not lit by the Sun's light, and thus is not visible. A new Moon occurs about once a month. (Note: in the figure above, the Earth, Moon, and Sun appear to be directly aligned; however, they are not exactly in alignment.)