Eclipse model

This model helps a group (usually young, but adults can also enjoy this and will recognize how it works to help them learn) understand the physics and geometry of eclipses. Participants will understand on a physical level how eclipses work.

Ask for 3 volunteers from the group to play the roles of Sun, Earth, and Moon.

Explain to the Earth and Moon how to rotate clockwise while revolving clockwise in their orbits. After the principals understand the principles, rotation is not important for this model.

Have the Moon orbit to its full phase. Show how, at Full Moon, the Sun, Moon, and Earth align, allowing the Moon's shadow to hide the Sun from a observer on the Earth. This means no sunlight travels from the Sun to the Earch, which we perceive as an eclipse of the Sun.

Ask why this does not happen at every Full Moon. Explain how tilt in the orbits of Earth and Moon cause the Moon's shadow to miss the Earth on most revolutions. Only occasionally do the two orbits line up precisely enough for the Moon's shadow to cause an eclipse.

Ask why we do not experience total darkness at the total point of an eclipse. Explain how the Moon's shadow covers only a fraction of the Earth, and sunlight illuminates the atmosphere outside the shadowed area.

Have the Moon orbit to its new phase. Show how, at New Moon, the Sun, Earth, and Moon align, allowing the Earth's shadow to hide the Sun from an observer on the Moon. This means no sunlight is reflected from Moon to Earth, which we perceive as an eclipse of the Moon. The observer on the Moon would also perceive it as an eclipse of the Sun.

Ask why this does not happen at every New Moon. Explain how tilt in the orbits of Earth and Moon cause the Earth's shadow to miss the Moon on most revolutions. Only occasionally do the two orbits line up precisely enough for the Earth's shadow to cause an eclipse.

Point out that this is an application of geometry. Point out that the solar and lunar eclipses work in the same way. Only the order of the three bodies lining up is different.

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