

# Earth-Moon Model

*Adapted by Mary Urquhart from The Universe at Your Fingertips,  
original activity by David Arnett*

- Use half a standard-sized container of play dough.
- Divide into 50 roughly equal pieces.

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- Put 49 of the pieces back together.
- With a bit less than four times the diameter of the Moon, the Earth has ~49 times the volume of the Moon.

# Make a Prediction

Extension by Mary Urquhart, University of Texas at Dallas

- You have made a *scale model in size* of the Earth and Moon.
- **How far apart should the Earth and Moon be on the same scale?** (If you could shrink the real Earth and Moon to the size of your model, how far apart would they be?)

# Make Measurements to Compare with Prediction

*Extension by Mary Urquhart, University of Texas at Dallas*

- The Moon is ~30 Earth diameters from the Earth.
- Measure the Earth ball with your ruler.
- How far is 30 times the diameter of the Earth ball?
- Try and measure out that distance, and place the Moon ball 30 Earth ball diameters away from the Earth ball.

# Where will CINDI be?



CINDI has an orbit that at its lowest point is similar to the International Space Station. Where would this be on your Earth-Moon scale model?

# Low Earth vs. Geosynchronous Orbit

- The International Space Station, the space shuttle and the orbit of C/NOFS carrying CINDI are all in what is known as low Earth orbit.
- Communication satellites in geosynchronous orbit are much farther away from the Earth, and out of Earth's atmosphere. But, at an orbital altitude of about 36,000 km these satellites are still much closer to the Earth than to the Moon.

# How High is Space: Combine with the Earth-Moon Model

- How many sheets of paper are in your model of the Earth's atmosphere?
- The Moon is about 384,000 km from the Earth. How many sheets of paper would you need to add the Moon to your atmospheric model?
- The Earth has a diameter of 12,756 km. How many sheets of paper would you need to add the size of the Earth to your scale model?
- The Moon has a diameter of 3476 km. How many sheets of paper would you need to include the size of the Moon to scale on your model?

## Earth and Moon sharing the same phase



An illusion of closeness...

When viewed from a distance, as in this image from the Galileo spacecraft taken on its way to Jupiter, the Earth and Moon share the same phase.

In this image they also look remarkably like a double planet, but this is primarily due to the perspective from which Galileo took the image.