



Level 5 • Module 3

Orbit and Rotation with Capstone Project on Forces and Energy

Lesson Overview

Your student is studying the motion of the Earth and Moon to understand celestial navigation and the changing appearance of objects in Earth's sky over time. In a capstone project on forces and energy, your student is studying the forces and energy involved in operating a light rail train system and designing an accessible transit solution.

Classroom activities for this module include:

- Investigating how the angle and direction of a light source affect shadows
- Modeling the rotation of Earth on its axis in the Earth–Sun system
- Analyzing moonrise and moonset times and modeling the Moon's orbit around Earth
- Analyzing star maps from different times of the year
- Investigating how forces of different strength affect the speed of a model train
- Developing a circuit to model the flow of electricity through a light rail system

Conversation Starters

Support your student's learning with these talking points:

- Discuss how observations of the sky in other locations would compare to observations in your location.
- Imagine you are lost without a map. What landmarks could you use to get back home?
- Discuss the advantages and disadvantages of exploring outer space.
- Talk about energy indicators that you notice in your home.

Activities

Have fun with these related activities at home:

- Observe shadows on a sunny day. Explain what can make shadows look different.
- Look for moving objects in the night sky and try to identify if they are human-made or natural objects.
- Observe the Moon's shape and location in the sky at the same time for several days. Explain why the Moon's shape and location change.
- Choose a place in your community and take photos or draw features that make it accessible.



ADDITIONAL RESOURCES

Visit your local library or use an online library to explore topics related to the module, such as Earth, the Sun, the Moon, stars, electricity, and light rail.



Explore different projects about space at <https://www.jpl.nasa.gov/edu/learn/>.

Explore gravity and orbit simulations at <https://phet.colorado.edu/en/simulations/gravity-and-orbits>.