

Newton, Kepler, and Planetary Motion Lab

Objective: Create an explanation of why objects in space orbit in an elliptical pattern around an object of greater mass. Make sure to include Newton's laws: Law of Universal Gravitation, 1st, 2nd, and 3rd Laws of Motion, and mention of Kepler's Laws.

You can create a model, diagram, or any other type of visual representation to show why and how the planets orbit in an ellipse instead of a perfect circle. You must use a large piece of butcher paper for your final project. You must also include a written explanation of what you have created.

If you answer the following questions in order you'll be able to complete the main objective. Make sure to include diagrams, models, or other visuals along with your written explanations.

1. Why do planets orbit the sun?
 - a. Think: why doesn't the sun orbit planets?
 - b. Think: why don't planets fly off into space?
2. Why do planets accelerate as they get closer to the sun and decelerate as they get farther from the sun?
3. Why does the sun have very little movement throughout space, while the planets move significant distances? (the sun only wobbles slightly)
4. Now put it all together to model and explain:
 - Why is the shape of planetary orbit an ellipse, not a circle?