

## 9.6: Thinking about the material

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### 9.6.1: Reflect and research

1. When you look at the night sky, how can you tell the difference between a planet and a star?
2. What was the relationship between Tycho Brahe and Johannes Kepler?
3. How did Tycho Brahe collect all the data that Kepler used?
4. How much time elapsed between Kepler publishing his laws and Newton publishing his Universal Theory of Gravity?
5. What was Kepler's original intention when he synthesized Tycho Brahe's observations? What was he hoping to show?
6. What was Ptolemy's theory of gravity based upon?
7. Who was the first to suggest that planets revolved around the Sun instead of the Earth?
8. Explain how the force of gravity from the moon results in tides on both sides of the Earth.
9. Explain what an L1 Lagrange point is, and how it does not violate Kepler's Third Law.
10. How did Eddington confirm that light follows a curved path in a gravitational field?

### 9.6.2: To try in the lab

1. Theory project: Prove, based on Newton's Universal Theory of Gravity, that the motion of orbiting bodies is given by a conic section.
2. Write a computer simulation to plot the orbit of two bodies, and explore how the total mechanical energy of one object affects its motion. If the two bodies have the same mass, and both move, where is the focus of the conical section describing their respective paths?
3. Propose an experiment to model and map the position of a planet in the night sky.

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