

Ancient Astronomy

1. How did ancient monuments and buildings mark the seasons?
2. When and where will you see the Sun go thru the zenith at noon?
3. How did Greek astronomers deduce that the Earth is round?

Copernican Revolution (Astropedia Ch. 3; Reader 25.)

1. Describe the contributions of Copernicus and Galileo to astronomy.
2. Explain three arguments that were used in favor of Copernicus's theory before the invention of the telescope.
3. How is the principle of **Occam's Razor** used?
4. Discuss how the observations that Galileo made using the telescope supported the Sun-centered theory.
5. What is **stellar parallax**? What was the reason why astronomers could not detect it prior to the invention of the telescope?

Kepler's Laws (Astropedia Ch. 3; Reader 26. Lecture-tutorial "Kepler's 2nd Law", "Kepler's 3rd Law")

1. State Kepler's 3 Laws and explain what they say about the shape of a planet's orbit, its speed, and its orbital period.
2. Illustrate the parts of the **ellipse: focus, major axis, semiaxis major (s.a.m.)**.
3. Define the **eccentricity** of an ellipse. Draw ellipses with $e = 0$ and 0.999
4. What is the **astronomical unit (AU)**? How much is it in km?

Gravity (Astropedia Ch. 3; Reader 28 including worksheet 28.7 to 28.12)

1. What is the **Law of Inertia**?
2. Discuss the Pisa Principle and the acceleration due to gravity (g). How much is it on the Earth's surface? Discuss how it varies on other planets.
3. Explain the difference between **mass** and **weight**.
4. Explain how to put a satellite in orbit. Explain why the Moon doesn't fall to the Earth.
5. Compare the orbital speed for spacecraft in low Earth orbit with the **escape speed**.
6. Explain what we mean by **weightlessness** in orbit and why the astronauts seem weightless.
7. How do the circular speed and the escape speed depend on the mass of the *satellite*?
8. Give an example of the **inverse square law**.
9. Define the **Gravitational constant** and explain how it is measured.
10. Describe the 4 kinds of paths an orbiting spacecraft can move on. Show how its speed determines the kind of path.