

Gravitation review task:

For your assessment for this unit, you will write a summary 'study guide' describing what we have done so far. In the list below are the major topics your study guide must cover. The purpose of this is to help you process your notes and solidify your understanding of the topics we have covered. This will be collected on Monday. You are welcome to reference other materials to help you solidify your understanding (I have posted two videos on my website that are good resources).

- Energy in Orbits:
 - What are the shapes of orbits? What is at the focus? Draw an example
 - Identify the locations of min/max KE and GPE
 - Explain how the velocity of an object varies (both the increasing and decreasing regions) as it travels through its orbit:
 - In terms of forces (draw an orbit and show forces at multiple points in the orbit)
 - In terms of total conserved energy
- Explain: how is potential visualized? Why is it useful to visualize that way? Draw an example of visualizing the potential due to one mass, and another with multiple masses. Explain your pictures.
- How are field and force connected to the potential?
- How are gravitational field and force related? Explain the similarities and differences
- Explain the equations for force, potential, and field.
- How does our old equation for F_g ($F_g = mg$) fit into our new equation for F_g ($F_g = GMm/R^2$)?
 - What does g depend on? When will it change from 9.81 m/s^2 ?
- How does our old equation for U_g ($U_g = mgh$) fit into our new equation for U_g ($U_g = -GMm/R$)?
- Distance to the moon: If the mass of the earth is about $6 \times 10^{24} \text{ kg}$, and the moon completes an orbit in about 29.5 days, approximating the orbit of the moon as circular, how far away must the moon be? Hint: this is a circular motion problem, but we don't know R . Use the period of rotation to find ω (radians per second), and use the version of $a = v^2/r$ that has ω in it (this is a good review of your circular motion problem solving skills).