Worksheet 5.5 Escape Velocity
*Before starting this worksheet, google the mass and radius of **the Earth**, the **Sun**, and the **Moon**.*

Mass of Earth =	Mass of Sun =	Mass of Moon =
Radius of Earth =	Radius of Sun =	Radius of Moon =

1) What is the gravitational potential energy (relative to infinite) of a 5.00×10^3 kg satellite that is in orbit with a radius of 9.90×10^6 m around the Earth?   (-2.0×10^{11} J)

2) How much work is done against gravity in lifting the satellite in problem #5 from Earth's surface to its orbital height?
          (1.11×10^{11} J)

3) A 1750 kg meteorite is 15000 m above the surface of the moon, heading directly towards the moon at 1.00×10^3 m/s. What is its speed on impact?

          (1.02×10^3 m/s)

4) What is the gravitational potential energy of a 10.0 kg object when it is sitting on Earth's surface?
          (-6.25×10^8 J)

5) What is the escape velocity of a 1300 kg shuttle taking off from the moon?
          (2.37×10^3 m/s)

6) What is the mass of a planet that has an escape speed of 9.0×10^3 m/s and a radius of 7.2×10^6 m?
          (4.37×10^{24} kg)

7) A 12500 kg satellite is in Earth orbit at an altitude of 3.60×10^6 m. What is its **total** energy?

HINT: Total Energy = $E_p + E_k$ (-2.50×10^{11} J)