

**Definitions**

Electric Dipole (118)	Field Line (117)
Electric Field (117,118)	Field Map (117)
Electric Field Strength (116)	Gravitational Field (112,116)
Electron Volt (119b)	Gravitational Field Strength (Two definitions: 112,116)

**Discoveries**

- How can the strength of a gravitational field be determined by observing a satellite's motion? (112)
- State Newton's Universal Law of Gravitation. (113, 114, 116)  
Define all of your symbols clearly and give the value and units of the proportionality constant.
- How can the strength of a planet's gravitational field be calculated from its mass and the distance from the center of the planet? (113, 114, 116)
- How does orbit period depend upon orbit radius? (Kepler's third law, p. 112, 114)  
For our solar system the proportionality constant is \_\_\_\_\_.
- Gravitational Potential Energy: (115)
  - Where do we choose to put the zero point of our scale of gravitational potential energy? (We are free to choose any location, but one is a bit more convenient than the others.)
  - If we use the zero point mentioned in 5a, all gravitational potential energies for ordinary matter must have what sign?
  - Sketch a graph of gravitational potential energy vs. distance (from the center) for an object being lifted from the surface of a planet or star.
  - How can the equation of that graph be discovered? (115b, 115c)
- Describe gravitational field maps for each of the following regions:
  - In our laboratory. (117)
  - In the region around an isolated planet. (117)
  - In the neighborhood of a pair of similar planets. (117)
- State Coulomb's Law. (116, 119b)  
Define your symbols clearly and give the value and units of the proportionality constant.
- How can the strength of the electric field produced by a charged sphere be predicted from the charge of the sphere and the distance from its center? (116)
- By glancing at a field map one can easily see where the field is strongest and where the field is weakest. How? (118)
- Describe the electric field produced by: (118,119)
  - A charged particle.
  - A long, straight, uniformly charged wire.
  - A uniformly charged plane.
- How can you calculate the strength of the electric field in a parallel-plate capacitor from the plate voltage and the plate separation? (119)
- Suppose a particle coasts from point A to point B. How can the potential difference between those two points be used to predict the particle's change in kinetic energy? (119)
- The electric field produced by a positively charged object points \_\_\_\_\_ the object. (118)
- How can an electric field be measured? (116, 118)
- How can plate area and plate separation be used to predict capacitance? (119b)