

## Physics 161

1. Electric Force and Field: Student will be able to solve problems involving electric forces and electric fields. Examples would include problems such as calculating forces using Coulomb's Law, using superposition to add forces, using Gauss' Law to solve for electric fields or charge distributions, and interpreting information from sketches of electric field lines.  
(Relates to UNM/HED Area III, Competencies 3 & 4)
2. Magnetic Fields: Students will be able to understand magnitudes and directions of magnetic fields. Examples would include finding the magnitude and direction of a magnetic force on a moving charge or a current carrying wire, recognizing how we know that a current carrying wire produces a magnetic field, calculating the magnetic field due to a current carrying wire, and determining if a particular field would affect a compass.  
(Relates to UNM/HED Area III, Competencies 1, 4, & 5)
3. Ohm's Law and Simple Circuits: Students will be able to make calculations involving simple circuits. Examples would include recognizing series and parallel resistors, calculating current, resistance, voltage and power, and showing where a voltmeter or ammeter is connected to a circuit to measure voltage or current.  
(Relates to UNM/HED Area III, Competencies 2 & 4)
4. Faraday's and Lenz' Law: Students will be able to determine the magnitude and direction of induced currents and voltages. Examples of applications could include generators or transformers.  
(Relates to UNM/HED Area III, Competencies 2, 4, & 5)
5. Thermodynamics: Students will be able to recognize and apply the first and second law of thermodynamics. Examples for the First Law of Thermodynamics would include the connection between heat, work and the conservation of energy, specific heat, phase changes, PV diagrams and thermodynamic graphs, and the determination of the amount of heat and work added to a system for various processes. Examples for entropy and the Second Law of Thermodynamics would include understanding entropy at a conceptual level as disorder, calculating changes in entropy for several processes, recognizing the Second Law of Thermodynamics in several forms, and stating whether a particular process violates the second law of thermodynamics.  
(Relates to UNM/HED Area III, Competencies 2, 3, 4, & 5)