Stockton Unified School District
2014 – 2015 Instructional Guide for Physics
Semester 2, Traditional Schedule

Instructional Window	***Content Standards (abbreviated) with Tier***	***Academic & Content Vocabulary***	***Curriculum:*** *If unavailable check Moodle. Contact your Dept Chair for Moodle codes.*	***Resources for Struggling Readers/EL***
Chapter 12 sections 1 & section 2 *Thermal Energy* and **Chapter 13, section 1** ***States of Matter*** **16 Days** **1 Day** **1 Day**	**Heat and Thermodynamics** **3a**. *Tier 1* – Students know heat flow and work are two forms of energy transfer between systems. **3b**. *Tier 1* – Students know that the work done by a heat engine that is working in a cycle is the difference between the heat flow into the engine at high temperature and the heat flow out at a lower temperature (first law of thermodynamics) and that this is an example of the law of conservation of energy. **3c**. *Tier 1* – Students know the internal energy of an object includes the energy of random motion of the object's atoms and molecules, often referred to as thermal energy. The greater the temperature of the object, the greater the energy of motion of the atoms and molecules that make up the object. **3d**. *Tier 1* – Students know that most processes tend to decrease the order of a system over time and that energy levels are eventually distributed uniformly. **3e**. *Tier 2* – Students know that entropy is a quantity that measures the order or disorder of a system and that this quantity is larger for a more disordered system. *3f. *Students know the statement "Entropy tends to increase" is a law of statistical probability that governs all closed systems (second law of thermodynamics).* *3g. * Students know how to solve problems involving heat flow, work, and efficiency in a heat engine and know that all real engines lose some heat to their surroundings.* **Assess for reteaching** **Standards and vocabulary review**	<u>Chapter 12</u> 12.1 thermal energy, p. 313-314 internal energy, p. 313-314 temperature, p. 315 thermal equilibrium, p. 315 temperature scales, p. 316 heat and flow of thermal energy, p.317 conduction, p. 315, p. 317 convection, p. 317 radiation, p. 317 *12.2* *First Law of Thermodynamics, p. 326-327* *heat engine, p. 326-327* *heat pump, p. 328* *Second Law of Thermodynamics, p. 328-331* *entropy, p. 328-329* *change in entropy, p. 329* *<u>Chapter 13</u>* *13.1* *pressure, p. 342* *combined gas law, p. 345*	*Physics Principles and Problems* *Supplemental Problems*, pg. 23& 24 *Additional Challenge Problems*, pg 12 *Supplemental Problems*, pg. 25& 26 *Additional Challenge Problems*, pg 13	*Chapters 11 - 15 Resource Book*, pg 35 - 66 <u>physicspp.com</u> • problems of the week • section self –check quiz • chapter reviews • standardized test practice • vocabulary puzzle maker • multilingual science glossary • internet physics labs *Chapters 11-15 Resource Book*, pg 69-102

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Sections 1 & section 2 of: **Chapter 20** *Static Electricity* **Chapter 21** *Electric Fields* **Chapter 22** *Current Electricity* **Chapter 23** *Series and Parallel Circuits* **Chapter 29, section 2** *Solid State Electronics* **15 Days** **1 Day** **1 Day**	**Electric and Magnetic Phenomena** **5a**. *Tier 1* – Students know how to predict the voltage or current in simple direct current (DC) electric circuits constructed from batteries, wires, resistors, and capacitors. **5b**. *Tier 1* – Students know how to solve problems involving Ohm's law. **5c**. *Tier 2* – Students know any resistive element in a DC circuit dissipates energy, which heats the resistor. Students can calculate the power (rate of energy dissipation) in any resistive circuit element by using the formula Power = IR (potential difference) × I (current) = I^2R. **5d**. *Tier 2* – Students know the properties of transistors and the role of transistors in electric circuits. **5e**. *Tier 2* – Students know charged particles are sources of electric fields and are subject to the forces of the electric fields from other charges. *5l. * Students know how to calculate the electric field resulting from a point charge.* *5m. * Students know static electric fields have as their source some arrangement of electric charges.* *5o. * Students know how to apply the concepts of electrical and gravitational potential energy to solve problems involving conservation of energy.* **Assess for reteaching** **Standards and vocabulary review** *Italicized topics may be abbreviated due to time constraints.*	*20.1* *electrostatics, p.541* *electric charges, p. 541-542* *conductors and insulators, p. 544-543* *20.2* *electric force, p.546* Coulomb's law, p.549 *21.1* *electric field, p. 563-567* *electric field line, p. 567-568* 21.2 electric potential difference, p. 569-571 volt, p. 569 *22.1* *electric current, p. 591-592* *electric circuits, p. 592* *ampere, p. 593* *resistance/resistor, p. 595-596* *Ohm's law, p. 595-506* *series/parallel circuits, p. 600* *power, p. 593* *22.2* *energy transfers in circuits p. 601-605* *power, p. 601-605* *23.1* *Series circuits, p. 618-622* *parallel circuits, p. 623-626* *circuit breaker and other safety devices, p. 627* *ammeters, p. 631* 29.2 transistors, p. 787	*Physics Principles and Problems* *Supplemental Problems*, pg. 39& 40 *Additional Challenge Problems*, pg 20 *Supplemental Problems*, pg. 41& 42 *Additional Challenge Problems*, pg 21 *Supplemental Problems*, pg. 43& 44 *Additional Challenge Problems*, pg 22 *Supplemental Problems*, pg. 45& 46 *Additional Challenge Problems*, pg 23	*Chapters 16 - 20 Resource Book*, pg 139 - 170 *Chapters 21 - 25 Resource Book*, pg 5 - 34 *Chapters 21 - 25 Resource Book*, pg 37 – 68 *Chapters 21 - 25 Resource Book*, pg 71 – 102 *Chapters 26 - 30 Resource Book*, pg 107 – 136

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Chapter 24 *Magnetic Fields* **Chapter 25, section 1** *Electro-magnetic Induction* and **Chapter 13, section 2** ***States of Matter*** **8 Days** **Review Days** *2 days*	**Electric and Magnetic Phenomena** **5f**. *Tier 2* – Students know magnetic materials and electric currents (moving electric charges) are sources of magnetic fields and are subject to forces arising from the magnetic fields of other sources. **5g**. *Tier 2* – Students know how to determine the direction of a magnetic field produced by a current flowing in a straight wire or in a coil. **5h**. *Tier 2* – Students know changing magnetic fields produce electric fields, thereby inducing currents in nearby conductors. **5i**. *n/a* – Students know plasmas, the fourth state of matter, contain ions or free electrons or both and conduct electricity. *5j. * Students know electric and magnetic fields contain energy and act as vector force fields.* *5k. * Students know the force on a charged particle in an electric field is qE, where E is the electric field at the position of the particle and q is the charge of the particle.* *5n. * Students know the magnitude of the force on a moving particle (with charge q) in a magnetic field is qvB sin(a), where a is the angle between v and B (v and B are the magnitudes of vectors v and B, respectively), and students use the right-hand rule to find the direction of this force.* **3rd Quarter Assessment standards review** *Italicized topics may be abbreviated due to time constraints.*	*24.1* *magnets, p. 643-645* *magnetic fields, p. 645-647* *electromagnetism (magnetic fields around current-carrying conductors), p. 648-650* *24.2* *magnetic forces on current-carrying wires, p. 652-654* *force on charged particles, p. 657-655* *25.1* *electromagnetic induction, p. 672-676* *right hand rule and the direction of the induced current, p. 679-681* 13.2 plasma, p. 348	*Physics Principles and Problems* *Supplemental Problems*, pg. 47 & 48 *Additional Challenge Problems*, pg 24 *Supplemental Problems*, pg. 49 & 50 *Additional Challenge Problems*, pg 25	*Chapters 21 - 25 Resource Book*, pg 107 – 136 *Chapters 21 - 25 Resource Book*, pg 139 – 178 *Chapters 11 - 15 Resource Book*, pg 69 - 102
Quarter 3 Assessment Day	**Quarter 3 Assessment Standards:** 3 a-3; 5 a-g & i			

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Chapter 14 *Vibration and Waves* **Chapter 15** *Sound* **17 Days** **2 Days** **Chapter 16** *Fundamentals of Light* **Chapter 17** *Reflection & Mirrors* **Chapter 18** *Refraction & Lenses* **Chapter 19** *Interference & Diffraction* **14 Days** **2 Days**	***Waves*** **4a**. *Tier 1* – Students know waves carry energy from one place to another. **4b**. *Tier 1* – Students know how to identify transverse and longitudinal waves in mechanical media, such as springs and ropes, and on the earth (seismic waves). **4c**. *Tier 1* – Students know how to solve problems involving wavelength, frequency, and wave speed. **4d**. *Tier 2* – Students know sound is a longitudinal wave whose speed depends on the properties of the medium in which it propagates. **Assess for reteaching; Standards and vocabulary review** ***Waves*** **4e**. *Tier 2* – Students know radio waves, light, and X-rays are different wavelength bands in the spectrum of electromagnetic waves whose speed in a vacuum is approximately 3×108 m/s (186,000 miles/second). **4f**. *Tier 1* – Students know how to identify the characteristic properties of waves: interference (beats), diffraction, refraction, Doppler effect, and polarization. **Assess for reteaching; Standards and vocabulary review** *Italicized topics may be abbreviated due to time constraints.*	*14.2* *waves, p381* *mechanical, transverse & longitudinal waves, p381* *wave speed, p382* *amplitude, p375, 382-383* *wavelength, p383-384* *period, p. 375, 383* *frequency, p383-384* *14.3* *incident and reflected waves, p. 387, 391* *interference, p388-389* *standing waves, p389* 15.1 sound waves, p. 403-405 pitch, p406 loudness, p406 Doppler Effect, p407-409 beat, p 418 *16.1* *ray model of light, p. 432* *speed of light, p. 437* *diffraction, p. 439* *polarization, p. 443* *17.1 reflection, p. 457* *18.1* *refraction, p. 485-489* *total internal reflection, p. 489* *19.1 interference, p. 515* *19.2* diffraction, p. 524	*Physics Principles and Problems* *Supplemental Problems*, pg. 27 & 28 *Additional Challenge Problems*, pg 14 For Chapters 16 - 19 *Supplemental Problems*, pg. 29 - 38 *Additional Challenge Problems*, pg 15 - 19	*Chapters 11 - 15 Resource Book*, pg 105 - 136 *Chapters 11 - 15 Resource Book*, pg 141 -172 *Chapters 16 - 20 Resource Book*, pg 5 - 136

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Investigation & Experimentation and Selected Topics: **10 Days** **Review Days**	***Investigation & Experimentation and Selected Topics:*** **IEi**. Analyze the locations, sequences, or time intervals that are characteristic of natural phenomena (e.g., relative ages of rocks, locations of planets over time, and succession of species in an ecosystem). **IEm**. Investigate a science-based societal issue by researching the literature, analyzing data, and communicating the findings. Examples of issues include irradiation of food, cloning of animals by somatic cell nuclear transfer, choice of energy sources, and land and water use decisions in California. All IE standards are Tier 3 *1h** Students know *Newton's laws are not exact but provide very good approximations unless an object is moving close to the speed of light or is small enough that quantum effects are important.* **Semester 2 Assessment: Review and reteach standards as needed** *⊕Italicized topics may be abbreviated due to time constraints.*	*Suggested Topics* *1. Physics and Environmental Science (geology, ecosystem, global warming and sea level rise, lidar technology and pollution detection, energy sources, land and water use)* *2. Nuclear Physics (food irradiation),* *3. Relativity* *4. Physics and Genetic engineering (cloning)* *5. Physics in Theater Arts* *6. Simple Machines (Torque, Angular momentum)*	*Physics Principles and Problems*	
Semester 2 Assessment 6/4	**Semester 2 Assessment Standards:** 3 a, b, c, e; 4 a – f; 5 a, b, c, e, g, f			