Science Curriculum: Middle School Physical Science, GSE based Pacing; 4.21.18 DRAFT v.1

Some Schools have opted to follow the state Curriculum Map start with Energy

(There is no mandatory pacing for individual lessons or task in this course, but this expectation will support collaboration and transient students)

First 18 Weeks (Semester) Scientific Inquiry in 3D		
Unit 1: Atomic Structure & The Periodic Table	**Unit 2: Properties of Matter**	**Unit 3: Heat, Temperature, & Energy**
S8P1	**S8P1**	**S8P2**
3 Weeks	**4 Weeks**	**7 Weeks**
Focus: ● *Atomic Structure* *no models* ● *Periodic Table* - *Common names and labels (first 20) elements and common compounds* *-Locations of metals, non-metals, metalloids* ● *Periodic trends* ● *~~# of Valence electrons~~* ● *Ions formed* ● *Average weighted atomic mass* *~~● Average atomic diameter~~*	**Focus***:* ● *Properties of Matter* - *Phases of Matter (all 4)* - *Density* - *Conductivity* - *Predict properties based on location on periodic table* - *Physical/Chemical Properties & Changes* ● *Mixture & Pure Substances* ● *Conservations of Matter* ***~~Radioactivity~~*** *~~● Gas Laws~~* ● *Solutions* - *Solute* - *Solvent* - *Conductivity* - *~~Concentration~~* - *Factors affecting rate of dissolution in different solvents* - *Read solubility curve to interpret effects of temperature on solubility*	**Energy** ● *Matter* - *Structure* - *Composition* ● *Molecular Motion* ● *Transformations* - *gPE, ME, KE* ● *Conservation* ● *Heat Transfer* - *conduction* - *radiation* - *convection* ● *Conductors & Insulators* ● *Temperature vs. heat*

Second 18 Weeks (Semester) Scientific Inquiry in 3D

Unit 4: Transformation of Energy;Radioactivity;	Unit 5: Waves	Unit 6: Electricity	Unit 7: Magnetism	Unit 8: Force and Motion	
S8P2.	S8P4	S8P4	S8P5	S8P3	Capstone
3 Weeks	2 Weeks	3 Weeks	2 Weeks	6 Weeks	3 Weeks
Focus: **Energy** ● *Transformations* - *gPE, ME, KE* ● *Conservation* >>Be alert for opportunities to connect *transformations* to *electricity/magnetism* << **Focus:** ~~**Radioactivity**~~ ~~● *Nucleus*~~ ~~- *Fusion vs. Fission (Element b)*~~ ~~- *Alpha, Beta, & Gamma radiation (Element a)*~~ ~~- *Half-life (Element c)*~~ ~~▪ *Definition*~~ ~~▪ *Calculations*~~ ~~● *Practical application of nuclear energy and related problems (Element d)*~~	**Focus:** ● *Types & Characteristics* - *Mechanical* - *Electromagnetic* - *Longitudinal* - *Transverse* ● *Wavelength & Wave speed* - *Different media* - *Energy Transformations* ● *Waves Propogation* - *Reflection, Refraction, Interference, Diffraction* - *absorption, transmission* ● *Light , Lenses, & Sound* >>Be alert for opportunities to connect *transformations* <<	**Focus:** [Capstone prep begins] ● *Static Electricity* - *Friction* - *Induction* - *Conduction* ● *Electron flow* - *AC vs. DC* - ~~*Tesla vs. Edison (NS)*~~ - *Current* ▪ *Resistance* ▪ *Voltage* - *Circuits* ▪ *Simple* ▪ *Parallel* ● *Difference of potential energy* - *Current (resistance and voltage)* - *Conductor (force →friction)* - *Induction* - *Chemical cell* - *Conductivity through solutions* **Focus:** ~~● *Work & Power*~~ ~~- *Simple machines (8e)*~~ ~~- *Mechanical advantage (8e)*~~ ~~- *Efficiency*~~ ~~- *Calculate*~~ ~~▪ *Power*~~ ~~▪ *Mechanical advantage*~~ ~~▪ *Efficiency*~~ ~~▪ *Work*~~	**Focus:** ● *Domains* ● *Induced magnetic fields* - *Energy transformation* ▪ *Motors* ▪ *Generators* ● *Permanent magnets* ● *Electromagnets* **Energy** ● *Transformations* - *gPE, ME, KE* ● *Conservation* >>Be alert for opportunities to connect *transformations* to *electricity/magnetism* << **EOC Review Begins** Keep in mind to emphasize Chemistry in final reviews before EOC.	**Focus:** ● *Speed & Velocity* ● *Transformations of Energy gPE, ME, KE* - *Kinetic* - *Potential* ● *Acceleration* ● *Graphing velocity & acceleration* ● *Momentum – conservation of momentum* ● *Force* - *Balanced and unbalanced* - *Net force* ● *Friction* - *Surface/surface* - *Air resistance* ● *Gravity (10 m/s/s)* ● *Newton's Laws* - *Inertia* - *F=ma* - *Free-fall & weight* - *Third law*	

EOC given in early May. Keep in mind to emphasize Chemistry in final reviews before EOC.The final two weeks will be utilized for Capstone presentations and longer investigations.

These skills should **not** be taught as one separate unit, but rather incorporated inside of other units as they are addressed in the Science and Engineering Practices (SEP).

- *Lab Safety*
- *Significant figures*
  - *Precision*
  - *Accuracy*
- *Scientific notation*
- *SI and Metric units*
- *Conversions*
- *Science and Engineering Practices*
  - Asking questions (for science) and defining problems (for engineering)
  - Developing and using models
  - Planning and carrying out investigations
  - Analyzing and interpreting data
  - Using mathematics and computational thinking
  - Constructing explanations (for science) and designing solutions (for engineering)
  - Engaging in argument from evidence
  - Obtaining, evaluating, and communicating information
- Understanding Science
  - *Theories vs. Laws (CER)*
  - *Variables (Plan & Carry Out)*
  - *Inference vs. Observation (Models and Designs)*
- *Graphing Skills (When to use which one)*
  - *Line graphs*
  - *Pie (circle) graphs*
  - *Bar graphs*