Mastery Assessment Standards

2017-2018 ***Mr. Daniel Lee, Ed.M.***

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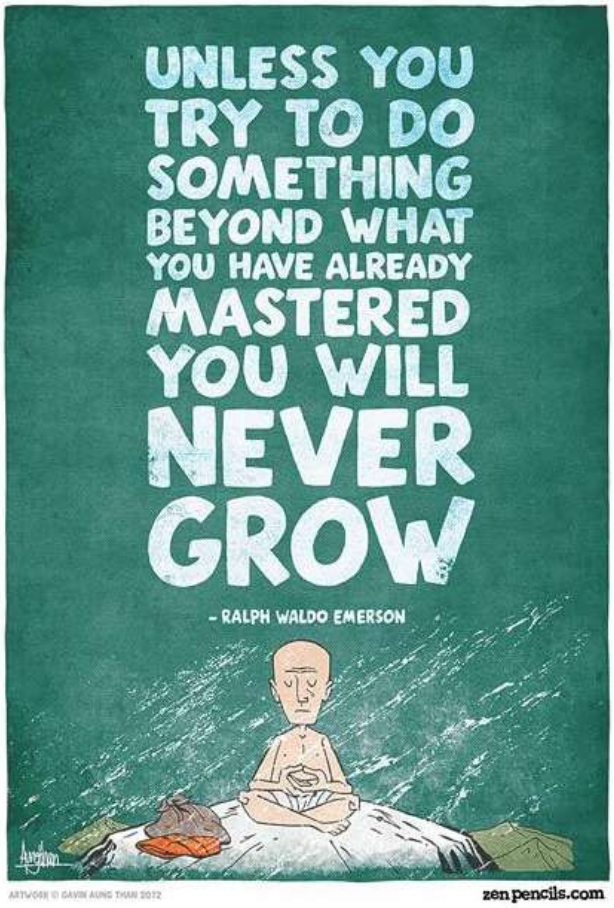
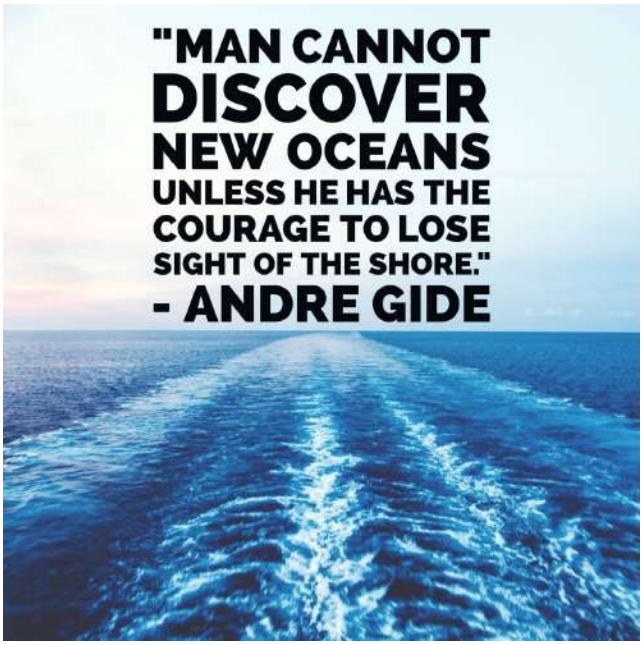
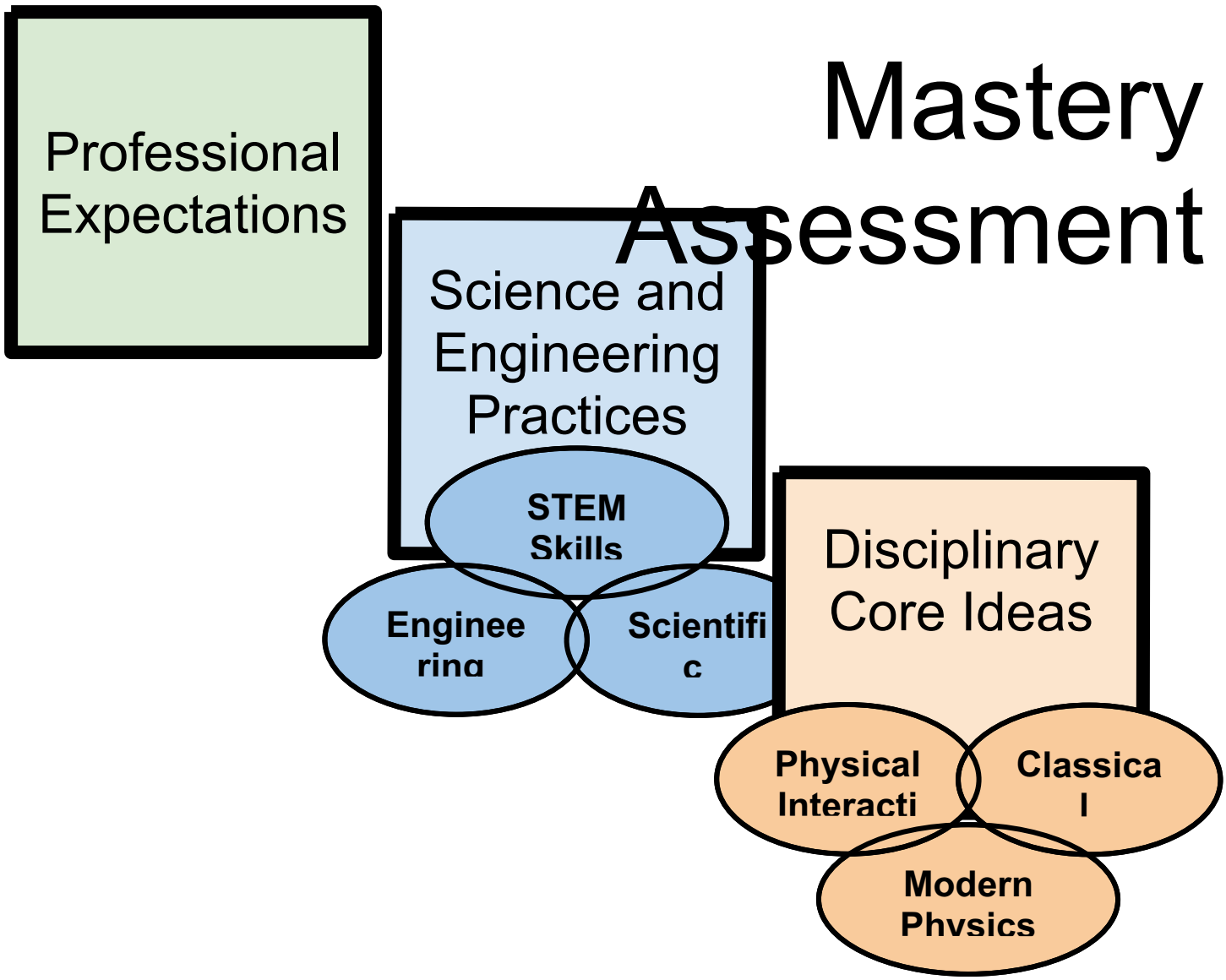


Standard Categories



Professional Expectations	Science and Engineering Practices	Disciplinary Core Ideas
Professional Expectations delimit aspects of a successful person in their working and personal lives, setting levels of excellence and integrity in professional situations.	*Science and Engineering Practices describe what scientists do to investigate the natural world and what engineers do to design and build systems to solve problems.*	*Disciplinary Core Ideas are the key ideas in science that have broad importance within or across multiple science or engineering disciplines.*

Mastery Assessment



Standards

Professional Expectations

Expectation	Standard	Statement of Mastery
Independent Thinker	**Thk.I** Independent Thinker	I am responsible for my own work and I am punctual in person and in my academic responsibilities. I take initiative when it comes to my academics and classroom conduct. I am cognizant of my demeanor in and out of class and in the clarity of my work.
Collaborative Thinker	**Thk.C** Collaborative Thinker	I work equitably and collaboratively with my peers. Together we share responsibilities for our work and conduct inside and outside of class. I readily switch group roles (leader, note-taker, etc…) as a way to facilitate group learning.
Metacognitive Thinker	**Thk.M** Metacognitive Thinker	I think critically about my own work, conduct, and that of my peers. I am accurate in my self-evaluations and use these to better my understanding of the content of the course and how to best approach my personal learning.

Science and Engineering Practices

Practice	Standard	Statement of Mastery
Scientific Process	**ScQ** Scientific Questions	I can formulate empirically answerable questions about phenomena; to establish what is already known and determine what questions have yet to be satisfactorily answered.
	ScM Scientific Modeling	I can develop explanations about natural phenomena through use of a model. I can use models to make predictions of the results of investigations that seek to test hypothetical explanations.
	Inv.G Model Generation Investigation	I can design a systematic investigation for the purpose of deriving a model that can be used to explain a scientific phenomenon. This model is based on physical evidence and trends in data.
	Inv.T Model Testing Investigation	I can design a systematic investigation for the purpose of testing a model that can be used to explain a scientific phenomenon. A prediction is made from the hypothesized model and compared with real results.
	Inv.A Model Application Investigation	I can design a systematic investigation for the purpose of using a model to solve a scientific problem; needing the collection of **real data** in problem solving.
STEM Skills	**Dta** Data Visualization & Analysis	I can tabulate, graph, and visualize data from an investigation and use patterns in the data to draw conclusions about the system being studied.
	XUn Experimental Uncertainty	I can identify sources of error in measurements and calculate the range of uncertainty of a numeric result.

	EbA Evidence-based Argumentation	I can use evidence to defend my scientific explanation or engineering solution against my peers and revise my opinion as new evidence emerges. I use argument as a tool for collaboration - not confrontation - with my peers.
	REv Resource Evaluation	I can take in information from scientific texts and digital sources, identifying relevant information and evaluating the scientific validity of this information and its source.
	Mth.A Algebra	I can algebraically manipulate relevant equations to determine an unknown quantity or to relate variable quantities.
	Mth.V Vectors	I can use the mathematics of geometry and trigonometry to perform vector math calculations and represent vector quantities appropriately.
	Mth.S Mathematical Sense Making	I can evaluate a mathematical relationship or result through limiting case analysis and/or dimensional analysis while considering the limitations of a mathematical relationship or a result based on the variable quantities and develop new mathematical relationships when necessary based on data collected. *This extends to being able to state if the relationship created is reasonable.*

Disciplinary Core Ideas

Idea	Standard	Statement of Mastery
Physical Interactions	**Int.S** Elastic Interaction	I can define and apply physical quantities related to elastic forces and energy between two objects or within an object. I can use my understanding to calculate and explain phenomena related to the elastic interaction and the properties of elastic materials.
	Int.D Drag/Friction Interaction	I can define and apply physical quantities related to the drag/friction force and thermal energy between two solid surfaces or a solid object and a fluid (liquid or gas). I can use my understanding to calculate and explain the effect of the drag/friction interaction on a system.
	Int.G Gravitational Interaction	I can define and apply physical quantities related to the gravitational force and energy between two objects and the gravitational field of a source mass. I can use my understanding to calculate and explain phenomena related to the gravitational interaction and the properties of materials with mass.
	Int.E Electric Interaction	I can define and apply physical quantities related to the electric force and energy between two objects and the electric field of a source charge. I can use my understanding to calculate and explain phenomena related to the electric interaction and the properties of materials with charge.
	Int.M Magnetic Interaction	I can define and apply physical quantities related to the magnetic force between two objects and the magnetic field of a source current. I can use my understanding to calculate and explain phenomena related to the magnetic interaction and the properties of magnetic materials.
Classical Physics	**Sys** The System	I can define a system appropriately for analysis, including modeling the system as a point particle or incorporating its mass or charge distribution.
	Mot Defining Motion	I can quantify a system's motion appropriately for a chosen from of reference, including constant velocity motion, constantly accelerated

		motion, projectile motion, simple harmonic motion, and wave motion. *This extends to other non-constantly accelerated motions when appropriate*
	NtL Newton's Laws	I can define and apply Newton's Laws to explain and calculate the motion of a system based on the forces exerted on it and how multiple systems interact. I can use reference frames to limit the scope of Newton's Laws and explain phenomena from multiple frames of reference. *This extends to forces in 2D and torque when appropriate.*
	MnC Momentum Conservation	I can identify the momentum of a system and use the model of momentum conservation to calculate or explain the behavior of the system. *This extends to angular momentum when appropriate.*
	EnC Energy Conservation	I can identify the energies of a system and use the model of energy conservation to calculate or explain the behavior of the system. *This extends to reasoning about thermodynamics, fluid dynamics, circuits, and other topics in physics when appropriate.*
Wave Physics		I can define and apply each of Maxwell's Equations to investigate electric and magnetic field behavior for a variety of sources and situations. I can explain the relationship between these equations and the wave nature of light.
	STR Special Theory of Relativity	I can define and apply the postulates of Einstein's STR to reason, represent, and calculate time dilation, length contraction, mass-energy equivalence, and other consequences of STR. I can represent events in space-time diagrams, comparing different inertial frames of reference.
	QmT Quantum Theory of Light & Matter	I can define and apply the conditions of wave-particle duality to reason, represent, and calculate physical quantities related to the behavior of quantum-sized phenomena.

Standard Mastery Levels

NEXT GENERATION SCIENCE STANDARDS

Standards are scored on a mastery scale ranked from 'Missing' to 'Advanced Proficient'.

Each standard's rank shows your level of understanding of that standard.

Advanced Proficient - 4

Proficient - 3

Developing - 2

Basic - 1

Missing - 0

Advanced Proficient $\geq$ 3.5

Proficient $\geq$ 2.5

Developing $\geq$ 1.5

Basic $\geq$ 0.5

Missing < 0.5

When multiple assignments have the same standard, THAT is averaged across ALL ASSIGNMENTS for a total