




Essential Outcomes Chart: What is it we expect students to learn?

GRADE:	9-12	SUBJECT:	Physical Universe	SEMESTER:	1 & 2	TEAM MEMBERS:	Her, Smith, & Coyne
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Standard Description	Example Rigor	Prerequisite Skills	Common Assessment	When Taught?	Extension Standards
<p>What is the essential standard to be learned? Describe in student-friendly vocabulary.</p>	<p>What does proficient student work look like? Provide an example and/or description.</p>	<p>What prior knowledge, skills, and/or vocabulary is/are needed for a student to master this standard?</p>	<p>What assessments will be used to measure student mastery?</p>	<p>When will this standard be taught?</p>	<p>What will we do when students have learned the essential standard(s)?</p>
<p>1-Scientific Method:</p> <p><u>Scientific Method & Laboratory Skills</u></p> <p>Apply the Scientific Method to conduct scientific investigations.</p> <p>[SEP 1, SEP 4, SEP 5, SEP 6 (NGSS)]</p> <p>Students will carry out the Steps of the Scientific Method including: designing experiments, creating hypotheses, collecting and analyzing data, and developing conclusions based on the data.]</p>	<p>EXAMPLE:</p> <p>Using the following description, Students should be able to identify and deconstruct the independent variable (action), dependent variable (effect), control group, and experimental group to construct a hypothesis + scientific experiments.</p> <p>Conduct a scientific experiment including all the essential components.</p> <p>“Students plant seeds in different soils to measure the growth (height) of the plants.”</p> <p>Control Group: Experimental Group:</p>	<p>Common Content Key Terms or Vocabulary for each standard:</p> <ul style="list-style-type: none"> • Variable: Independent & dependent • Hypothesis • Data • Observation • Control Group • Experimental Group • Pie Chart • Line Graph • Bar Graph • X-axis • Y-axis <p>Academic Vocabulary</p> <ul style="list-style-type: none"> • Describe • Compare • Contrast • Differentiate • Explain <p>Focused note taking Paragraph Summaries</p>	<p>Informal & Formal Assessments</p> <ul style="list-style-type: none"> • Student Portfolios & or Interactive Notebooks • Summary Paragraphs, • Inquiry Labs (performance task) • Lab Reports • CER Writing Activities • Critical Reading (Chunking the Paragraphs & Marking The Text) • Common Formative Assessments • Common Summative Assessments 	<p>[Content Taught Quarter 1]</p> <p>[Continual practice: Quarters 1-4]</p>	<p>Extension Activities</p> <ul style="list-style-type: none"> • Projects that are standard specific • Enrichment activities • Additional literature readings related to the standard • Virtual Labs • Graphing Analysis • CER Activities

	<p>Independent Variable:</p> <p>Dependent Variable:</p> <p>Controlled Variable:</p>	<p>Steps of the Scientific Method</p> <p>Metric Measurement using a rulers, balances and glassware.</p> <p>(continued)</p> <p>Conduct /Complete:</p> <ul style="list-style-type: none"> ● Simple measurement ● Data Collection ● Data Analysis including finding averages ● Identify sources of error ● Graph data 			
<p>2-Physics:</p> <p><u>Forces and Motion:</u></p> <p>Student will explain how to use mathematical data to support Newton’s 2nd Law of motion to calculate and describe the relationship among the net force, mass, and its acceleration.</p> <p>$F_{net} = m \times a$</p>	<p>EXAMPLE:</p> <p>A 1000 kg car is moving with a speed of 25 m/s. After applying its brakes, it stops after 5 seconds. What is the average resistive force acting on the car?</p> <p>Daisy has a mass of 35 kilograms. How much does she weight? Use the formula: $F = m \times 9.8 \text{ m/s}^2$</p>	<p>Content vocabulary</p> <ul style="list-style-type: none"> ● Distance ● Speed ● Acceleration ● Newton’s Second Law ● Gravitational force ● Friction ● Force ● mass ● Net Force ● Newton (N) ● Inertia ● Newton’s 1st law of motion ● Newton’s 2nd law of motion ● Newton’s 3rd law of motion <p>Academic Vocabulary</p> <ul style="list-style-type: none"> ● Describe 	<p>Informal & Formal Assessments</p> <ul style="list-style-type: none"> ● Student Portfolios & or Interactive Notebooks ● Summary Paragraphs, Inquiry Labs ● Lab Reports ● Common Formative Assessments ● Common Summative Assessments 	<p>[Content Taught Quarter 1-2]</p>	<p>Extension Activities</p> <ul style="list-style-type: none"> ● Projects that are standard specific ● Enrichment activities ● Additional literature readings related to the standard ● Virtual Labs

		<ul style="list-style-type: none"> • Compare • Contrast • Differentiate • Model • Kilometer • Seconds • Rate • Unit • Conservation 			
<p>3-Physics: <u>Gravitation and Motion of Orbiting Objects:</u> Use mathematical representation of Newton’s Law to predict and describe gravitational and electrostatic forces between objects</p>	<p>EXAMPLE: Find the gravitational force between two persons (100 kg and 50 kg) who are 1 meter away from each other. $F_{12} = (m_1 * m_2) / \text{distance}^2$</p>	<p>Content vocabulary</p> <ul style="list-style-type: none"> • Distance • Speed • Acceleration • Newton’s Second Law • Gravitational force • Friction <p>Academic Vocabulary</p> <ul style="list-style-type: none"> • Describe • Compare • Contrast • Differentiate • Model 	<p>Informal & Formal Assessments</p> <ul style="list-style-type: none"> • Student Portfolios & or Interactive Notebooks • Summary Paragraphs, • Inquiry Labs • Lab Reports • Common Formative Assessments • Common Summative Assessments 		
<p>4- Chemistry: Students will be able to analyze the Periodic Table to determine the properties of elements Students will describe relationship between bonds, energy, and reactions [HS-Ps1-1]</p>	<p>EXAMPLE: Determine the number of protons, neutrons, and electrons for the following element: </p>	<p>Content Vocabulary:</p> <ul style="list-style-type: none"> • Matter • Atom • Protons, neutrons, and electrons, • Mass number • Periodic Table • Atomic Number • Periodic Table <p>Academic Vocabulary</p> <ul style="list-style-type: none"> • Describe • Compare • Contrast • Differentiate • Model 	<p>Informal & Formal Assessments</p> <ul style="list-style-type: none"> • Student Portfolios & or Interactive Notebooks • Summary Paragraphs, • Inquiry Labs • Lab Reports • Common Formative Assessments • Common Summative 	<p>[Continual practice: Quarters 3</p>	<p>Extension Activities</p> <ul style="list-style-type: none"> • Projects that are standard specific • Enrichment activities • Additional literature readings related to the standard • Virtual Labs.

			Assessments		
<p>5-<u>Earth Science:</u> Students will understand the chemical and physical processes of Earth's geosphere and how it leads to a model with a hot but solid iron inner core, a liquid iron-nickel outer core, solid molten mantle, and rigid crust.</p> <p>Students will understand how plate tectonics shape and transform the dynamic features of the Earth.</p>	<p>Students demonstrate the ability to investigate the role of interactions between Earth systems. Students will construct an interactive graphical model that demonstrates seafloor spreading over time, and shows shifts in the magnetic fields of rocks, from a divergent oceanic-oceanic tectonic plate boundary.</p>	<p>Common Key Terms or Vocabulary for each standard --Earthquake, lithosphere, asthenosphere, divergent, convergent, transform, ridge, trench, boundary, conduction, paleomagnetism, continental, oceanic, seafloor spreading, --metamorphic, sedimentary, igneous, magma, lava, --Modified Mercalli Scale, P-wave, S-wave, surface wave, tremor, magnitude, fault, tsunami, epicenter, focus</p> <p>Academic Vocabulary</p> <ul style="list-style-type: none"> • Describe • Compare • Contrast • Differentiate • Model 	<p>Informal & Formal Assessments</p> <ul style="list-style-type: none"> • Student Portfolios & or Interactive Notebooks • Summary Paragraphs, • Inquiry Labs • Lab Reports • Common Formative Assessments • Common Summative Assessments 	<p>Quarter 3-4</p>	<p>Extension Activities</p> <ul style="list-style-type: none"> • Projects that are standard specific • Enrichment activities • Additional literature readings related to the standard • Virtual Labs
<p>6- <u>Wave and electromagnetic energy:</u> Students will be able to describe the characteristics of waves (HS-PS4a,- PS4.b)</p>	<p>Example: At 6:34am on Tuesday, an earthquake is recorded by three different seismographs in three cities. The seismograph in Sacramento says the earthquake is a 5.3. The one in Stockton says the earthquake is a 6.0. The reading in San Francisco says 8.2 Which city is closer to the epicenter and how do you know? If Sacramento experienced a mini</p>	<p>Common Content Key Terms or Vocabulary for each standard Transverse, longitudinal, crest, trough, wavelength, amplitude, frequency, P wave, S wave, surface wave, electromagnetic spectrum, Doppler shift</p> <p>Academic Vocabulary</p> <ul style="list-style-type: none"> • Describe • Compare • Contrast • Differentiate • Model 	<p>Informal & Formal Assessments</p> <ul style="list-style-type: none"> • Student Portfolios & or Interactive Notebooks • Summary Paragraphs • Critical Reading • Common Formative Assessment • Common Summative Assessment 	<p>Quarter 3 (Earth Science: Seismic Waves) Quarter 4 (Space Science: Electromagnetic Spectrum)</p>	<p>Extension Activities</p> <ul style="list-style-type: none"> • Projects that are standard specific • Enrichment activities • Additional literature readings related to the standard • Virtual Labs • Model and nonlinguistic representation

	earthquake followed by a more violent earthquake, what type of waves was the first earthquake?				
<p>7- Astronomy:</p> <p>Students will be able to explain the Big Bang Theory and be able to provide scientific evidence to support the theory as well other natural phenomenons that come after</p>		<p>Common Content Key terms or Vocabulary for each standard</p> <p>Universe, Big Bang Theory, Redshift, Doppler Effect, Galaxy, spiral galaxy, elliptical galaxy, irregular galaxy, milky way, nuclear fusion, nebula, red giant, white dwarf, neutron star, blackhole, background radiation, Supernova, Dwarf star, Red Giant,</p>	<ul style="list-style-type: none"> ● Student Portfolios & or Interactive Notebooks ● Summary Paragraphs ● Critical Reading ● Common Formative Assessment ● Common Summative Assessment 	Quarter 4	<p>Extension Activities</p> <ul style="list-style-type: none"> ● Projects that are standard specific ● Enrichment activities ● Additional literature readings related to the standard ● Virtual Labs ● Model and nonlinguistic representation