Victor Valley Union High School District
Instructional Guide

Earth Science: Quarter I

TIME FRAME	BIG IDEA TOPIC	STANDARDS	ASSESSMENTS	INSTRUCTIONAL MATERIALS	VOCABULARY	NOTES
	Scientific Method Embedded throughout instruction	f. Distinguish between hypothesis and theory as scientific terms.		*Earth Science (E S),* Prentice Hall, 2006 Page 23-25, 728-731	Hypothesis Theory	
		g.Recognize the usefulness and limitations of models and theories as scientific representations of reality.		*Earth Science (E S),* Prentice Hall, 2006 Page 23-25, 728-731	Models Theories Scientific representations	
		h. Know that when an observation does not agree with an accepted scientific theories, the observation is sometimes mistaken or fraudulent (e.g., the Piltdown Man fossil or unidentified flying objects) and that the theory is sometimes wrong (e.g., the Ptolemaic model of the movement of the Sun, Moon, and planets).		*Earth Science (E S),* Prentice Hall, 2006 Page 23-25, 728-731	Observation Scientific theory	
		i. analyze the locations, sequences, or time intervals of natural phenomena (e.g., relative ages of rocks, locations of planets over time, and succession of species in an ecosystem). Read and Interpret topographic maps		*Earth Science (E S),* Prentice Hall, 2006 Page 23-25, 728-731	Sequences Time intervals Relative Natural phenomena	
Qtr 1 18 days	Structure and Composition of the Atmosphere	8a. Students know the thermal structure and chemical composition of the atmosphere.		*E S,* Prentice Hall, 2006 17.1 Graphic organizers Pie chart Film segments	Gases (trace gases) Nitrogen 78% Oxygen 21% Argon 1 % Carbon dioxide Temperature gradient thermal structure chemical composition atmosphere Troposphere Stratosphere Mesosphere Ionosphere Thermosphere ionizes atoms solar radiation Dissociates oxygen Ozone Ultraviolet radiation illustration	Teach students mnemonic for Layers of the atmosphere "The mean stranger tripped" Have students identify placement of –spheres and –pauses. Students associating atmosphere composition with pie chart will have an easier time learning percentage of each gas. Chemistry- atom, periodic table, ions and ionic bonds, O, O2, O3
		8 b. Students know how the composition of Earth's atmosphere has evolved over geologic time and know the effect of out-gassing, the variations of carbon dioxide concentration, and the origin of atmospheric oxygen.		*E S,* Prentice Hall, 2006 *13.1* *Flow Chart*	Geologic time out gassing volcanic action oxidation of iron based minerals methane ammonia hydrogen predominance photosynthesis significant increases fossil fuels primitive atmosphere decaying lightning solar winds	Students should be able to flow chart the geologic development of earth's atmosphere to the present. Chemistry-N2, H, O2,CO2, CH4, NH4
		8 c. Students know the location of the ozone layer in the upper atmosphere, its role in absorbing ultraviolet radiation, and the way in which this layer varies both naturally and in response to human activities.		*E S,* Prentice Hall, 2006 4.3, 17.1, 17.3 Formulas Refer back to flow chart.	Ozone layer Ultraviolet radiation Diatomic molecules Triatomic molecules O^2 O^3 Equilibrium concentration Chlorofluorocarbons CFCs Rate of Reaction Photochemical pollutions Global warming Air pollution Halogen Catalysts artificial lighting	Students should be taught the importance of reducing ozone in the troposphere and in maintaining the concentration of that gas in the stratosphere. O2 to O3 to O2 Cycle, CFS role as a catalyst to disrupt O3 while not being consumed.

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Qtr 1 17 days	Biogeochemical Cycles	7a. Students know the carbon cycle of photosynthesis and respiration and the nitrogen cycle		*E S*, Prentice Hall, 2006 3.4, 5.2	Nitrogen cycle Biogeochemical carbon cycle hydrological cycle respiration biosphere carbonate bicarbonate ions nitrite nitrate nitrogen nutrient decomposer cynobacteria metamorphic rock sediment limestone acid rain precipitate transpiration subducted decomposed graphite petroleum coal elemental nitrogen inert nitrogen fixation	
		7b. Students know the global carbon cycle: the different physical and chemical forms of carbon in the atmosphere, oceans, biomass, fossil fuels, and the movement of carbon among these reservoirs.		*E S, Prentice Hall, 2006* *3.4*	global carbon cycle climatic conditions H20 SO2 N2 H2 CO3 Cl2 Ar Biomass fuels bicarbonate carbonate ions organic molecules geologic cycle biosphere compounds	
		7c. Students know the movement of matter among reservoirs is driven by Earth's internal and external sources of energy.		*E S*, Prentice Hall, 2006 3.4	Reservoir Photosynthesis Subduction Earth's Core	
Benchmark Assessment Window: TBA Standards Assessed: TBD 1st Quarter ends 10/24						

Earth Science: Quarter 2

TIME FRAME	BIG IDEA TOPIC	STANDARDS	ASSESSMENTS	INSTRUCTIONAL MATERIALS	VOCABULARY	NOTES
Qtr 2 36 days	Energy in the Earth System	4a. Students know the relative amount of incoming solar energy compared with Earth's internal energy and the energy used by society.		*E S*, Prentice Hall, 2006 4.2	Electromagnetic radiation Infrared Visible Ultraviolet wavelengths radioactive decay photosynthesis embargo Hydroelectric Geothermal Tidal power kilowatt joules crustal rocks consumes	
		4b. Students know the fate of incoming solar radiation in terms of reflection, absorption, and photosynthesis.		*E S*, Prentice Hall, 2006 *17.2*	Reflection Wave-length chlorophyll spectrum Photosynthetic Conduction convection Reflection Scattering greenhouse effect	
		4c. Students know the different atmospheric gases that absorb the Earth' s thermal radiation and the mechanism and significance of the greenhouse effect.		*E S*, Prentice Hall, 2006 *4.3, 21.3*	thermal radiation phenomenon blackbody radiation Infrared imaging wavelength visible range reradiated constituents greenhouse gas ocean algal blooms Venus terrestrial planets sulfuric acid nitrogen oxide	
		5a. Students know how differential heating of Earth results in circulation patterns in the atmosphere and oceans that globally distribute the heat.		*E S*, Prentice Hall, 2006 16.1, 19.1, 19.2, 20.1	Differential heating conduction radiation convection density crystallization Circulation cells equatorial descent transport Deflection Gulf stream Salinity relative humidity Poles regulates ascending latitudes thermal currents	
		5b. Students know the relationship between the rotation of Earth and the circular motions of ocean currents and air in pressure centers.		*E S*, Prentice Hall, 2006 16.1, 19.1, 19.2	rotates axis oblate shape orbital plane global deflection deflected Coriolis Effect centrifugal force convective air region/cell convection	
		5c. Students know the origin and effects of temperature inversions.		*E S*, Prentice Hall, 2006 *18.3*	inversion marine layer upwelling Convection heat sinks inversion	
		5d. Students know properties of ocean water, such as temperature and salinity, can be used to explain the layered structure of the oceans, the generation of horizontal and vertical ocean currents, and the geographic distribution of marine organisms.		*E S*, Prentice Hall, 2006 15.1, 15.2, 16.1	ocean currents distribution marine upwells midlatitudes dry-latitudes concentrates climatic belt specific heat solid phase phytoplankton zooplankton decomposition depletes vs enriches stratified zones Gulf Stream density-driven icebergs oxygenated	

Earth Science: Quarter 2

TIME FRAME	BIG IDEA TOPIC	STANDARDS	ASSESSMENTS	INSTRUCTIONAL MATERIALS	VOCABULARY		NOTES
		5e. Students know rain forests and deserts on Earth are distributed in bands at specific latitudes.		*E S*, Prentice Hall, 2006 *19.3, 21.2*	Latitudinal Hadley cells ideal gas law	relative humidity vegetation rain forest	Determining Latitude and Longitude
		6 a. Students know weather (in the short run) and climate (in the long run) involve the transfer of energy into and out of the atmosphere.		*E S*, Prentice Hall, 2006 17.2, 21.1 Graphic Organizer	Climate weather transfer of energy absorption transmission solar energy pressure	air mass reflection evaporation precipitation humidity condenses	Venn Diagram to differentiate between weather and climate. Flow chart hydrologic cycle. Provide weather maps student should learn to use and read them. Energy transfer between atmosphere and ocean. Source of winds.
		6 b. Students know the effects on climate of latitude, elevation, topography, and proximity to large bodies of water and cold or warm ocean currents.		*E S*, Prentice Hall, 2006 19.3, 21.1, 21.2 Globe World map Internet Graphic Organizer	Latitude elevation topography rainforest deserts rain-shadow effect climatic regions Gulf stream Leeward winds	prevailing winds monsoon cycle Santa Ana winds oceanic currents specific heat tempered climate advection fogs orbital velocity Brazilian Current	Science Lab-Heating Land and water. Role of latitude between rain-forest and deserts. Map out major Gulf Streams and direction. Teach effect of topography on wind currents. Winds effect on climate and weather.
		6c. Students know how Earth's climate has changed over time, corresponding to changes in Earth's geography, atmospheric composition, and other factors, such as solar radiation and plate movement.		*E S*, Prentice Hall, 2006 *13.2, 21.3* *Globe*	plate tectonic geologic eras Cenozoic era ice sheets astronomical millennia	Earth tilt axis of rotation circulation rainfall patterns tropical rain forest Antarctica catastrophic	
Qtr 2 8 days	California Geology	9a. Students know the resources of major economic importance in California and their relation to California's geology.		*E S*, Prentice Hall, 2006 4.2, 13A.1	Natural resources agricultural oil natural gas deposition of sediments faulting Sierra Nevada Mts Central Valley Ore deposits	igneous intrusions injected geothermal energy rifting magma hydroelectric nuclear power solar energy	
		9b. Students know the principal natural hazards in different California regions and the geologic basis of those hazards.		*E S*, Prentice Hall, 2006 5.3, 11.3, 13A.3	Active fault zones San Andreas Fault uplifted areas landslides Cascade Mts dormant erosion	wave energy eroding Pacific Rim seismic sea waves tsunamis Long Valley Caldera gas emissions aquifer levels	

TIME FRAME	BIG IDEA TOPIC	STANDARDS	ASSESSMENTS	INSTRUCTIONAL MATERIALS	VOCABULARY	NOTES
		9c. Students know the importance of water to society, the origins of California's fresh water, and the relationship between supply and need.		*E S*, Prentice Hall, 2006 6.3, 13A.2	snowpack watersheds Sierra Nevada runoff distributed Aquifers arid semiarid canals Reservoirs	
Benchmark Assessment Window: TBA **Standards Assessed: TBD** Winter Break: 12/19-1/2 Second Quarter Ends January 16th						

Earth Science: Quarter 3

TIME FRAME	BIG IDEA TOPIC	STANDARDS	ASSESSMENTS	INSTRUCTIONAL MATERIALS	VOCABULARY		NOTES
3rd Qtr 25 days	Earth's Place in the Universe	1a. Students know how the differences and similarities among the sun, the terrestrial planets, and the gas planets may have been established during the formation of the solar system.		*Earth Science (E S),* Prentice Hall, 2006 23.1-23.3	Astronomy Solar system Jovian Planet Solar winds Nebula rotation Nebular cloud solar nebula Gravity terrestrial planets Moons Asteroids	Radius Astronomical Unit Vacuum Trillion Kilometer Meters Light-hours Planetesimal comets fusion Orbital planes	Students can make a scale model to help them visualize the vast distances in the solar system and the relative size of the planets and their orbits around the sun. Calculator tape may be used to plot these distances to scale.
		1b. Students know the evidence from Earth and moon rocks indicates that the solar system was formed from a nebular cloud of dust and gas approximately 4.6 billion years ago.		*E S,* Prentice Hall, 2006 23.4, 13.1, 1.1	Asteroid Meteoroid Meteor Meteorology Radioactivity lunar relative dating supernova nucleosynthesis accreted	hypothesis hydrogen helium volatile fractionated Billion grains collision composition heavy elements condensation	
		1c. Students know the evidence from geological studies of Earth and other planets suggest that the early Earth was very different from Earth today.		*E S,* Prentice Hall, 2006 12.1,12.2,12.4,13.1	Theory Density Kinetic energy Planetoid Radioactive decay Iron differentiation volatile gases radioactive decay distribution evolution lithosphere hydrosphere continents erosion	Volcanic gases carbon dioxide hydrogen chloride carbon monoxide ozone ultraviolet radiation stratosphere fossils anaerobic organisms aerobic organisms Sterile Aerobic organisms Antarctica deltas	Evidence from core samples and surface exposures of very old rocks reveals that early Earth differed from its present form in the distribution of water, the composition of the atmosphere, and the shapes, sizes, and positions of landmasses. Knowing the evolution of these systems will help students understand the structure of the Earth's lithosphere, hydrosphere, and atmosphere.
		1 d. Students know the evidence indicating that the planets are much closer to Earth than the stars are.		*E S,* Prentice Hall, 2006 22.1, 25.1, 2.3, 3.4, 6.3, 22.1	planetary motions direct techniques Relative Doppler Effect Radar Parallax angle diameter orbit	Inverse square law of light intensity of light horizon telescope evidence constellations fixed position Extragalactic objects	

TIME FRAME	BIG IDEA TOPIC	STANDARDS	ASSESSMENTS	INSTRUCTIONAL MATERIALS	VOCABULARY	NOTES
		1 e. Students know the Sun is a typical star and is powered by nuclear reactions, primarily the fusion of hydrogen to form helium.		*E S*, Prentice Hall, 2006 2.1, 24.3,	Sun Nuclear Fusion Nuclear Reaction fusion reaction ionosphere thermosphere ionized Spectra spectrum abundant Luminosity Nucleosynthesis hydrogen fusion nuclear fission	
		1 f. Students know the evidence for the dramatic effects that asteroid impacts have had in shaping the surface of planets and their moons and in mass extinction of life on Earth.		*E S*, Prentice Hall, 2006 22.3, 23.4, 1.5, 13.3, 22.3, 23.4	Mass extinctions Craters Mercury Cretaceous Asteroids iridium-rich layer Tertiary period	
		2a. Students know the solar system is located in an outer edge of the disc-shaped Milky Way galaxy, which spans 100,000 light years.		*E S*, Prentice Hall, 2006 25.3	Solar system Galaxy Disc-shaped spiral galaxy Speed of light Hubble's law Spiral Milky Way Galaxy cluster Red shifts Big bang theory Elliptical	
		2b. Students know galaxies are made of billions of stars and comprise most of the visible mass of the universe		*E S*, Prentice Hall, 2006 25.3	Galaxies Superclusters Mass astrophysics Electromagnetic radiation Luminous Doppler effect matter (invisible) Spectroscopic analysis	Students should know that scientist catalog galaxies and tars according to the coordinates of their positions in the sky, their brightness, and their other physical characteristics.
		2c. Students know the evidence indicating that all elements with an atomic number greater than that of lithium have been formed by nuclear fusion in stars.		*E S*, Prentice Hall, 2006 2.1, 25.2	Elements Periodic table Nucleosynthesis Big bang Fusion Neutrons Metals Metalloids Compounds Nuclei Supernova Atomic number Nuclear fusion Spectra velocities Protons Electrons Nonmetals Isotope Bonds Repel isotopes	
		2d. Students know that stars differ in their life cycles and that visual, radio and X-ray telescopes may be used to collect data that reveal those differences.		*E S*, Prentice Hall, 2006 24.2	Size Surface gravity Radio waves Life cycles Luminosity Chemical composition Refracting telescopes Chromatic aberration Electromagnetic radiation Color Temperature X-ray Astronomers Objective lens Focal Length optical Reflecting telescopes	

Earth Science: Quarter 3

TIME FRAME	BIG IDEA TOPIC	STANDARDS	ASSESSMENTS	INSTRUCTIONAL MATERIALS	VOCABULARY		NOTES
20 Days	Dynamic Earth Processes	3a. Students know features of the ocean floor (magnetic patterns, age, and sea-floor topography provide evidence of plate tectonics.		*E S,* Prentice Hall, 2006 9.3, 14.1, 14.2	Magnetic patterns Plate tectonics Topographic features midoceanic ridge rift valley chain of volcanoes continental drift symmetrically sediment	Geomagnetic field Seafloor spreading ocean basin convection cycle continental drift lava magma Residual field normal polarity reverse polarity	
		3b. Students know the principal structures that form at the three different kinds of plate boundaries.		*E S,* Prentice Hall, 2006 9.2, 9.3, 11.2, 11.3	Divergent Convergent parallel slip Mid-Atlantic Ridge East Pacific Rise Subduction volcanic island arcs Aleutian Islands up-lifted	San Andres Fault North American Plate Pacific Plates fault Gulf of California Mendocino County Northern California Cascade Mts	
		3c. Students know how to explain the properties of rocks based on the physical and chemical conditions in which they formed, including plate tectonic processes.		*E S,* Prentice Hall, 2006 11.1, 2.1, 3.1-3.4	chemical conditions composition constituents igneous rocks molten material crystalline textures sedimentary rock fragmented texture magma deposits grain size	identifying properties distribution Subduction exposed weathering effects silicate materials igneous intrusive crystal reactivity *metamorphic* *possesses*	
		3d. Students know why and how earthquakes occur and the scales used to measure their intensity and magnitude.		*E S,* Prentice Hall, 2006 8.1, 8.2, 9.4	Earthquakes magnitude Richter scale Mercalli scale measure of amplitude intensity lithographic plates episodically stick-and-slip frictional forces wave amplitude subjective vibrations sonar graphs lithosphere rising magma	Seismogram Surface wave P wave S wave Elastic strain Logarithmic Focus Epicenter Aftershock Foreshock Seismograph magnetometers frequency ocean trench ocean ridge asthenosphere	Demonstrate elastic rebound with a limber stick. Have students identify types of waves from a sample seismogram. Identify Earthquake zones on a topographic map. Online resources will identify seismic activity throughout the world in real time.

TIME FRAME	BIG IDEA TOPIC	STANDARDS	ASSESSMENTS	INSTRUCTIONAL MATERIALS	VOCABULARY		NOTES
		3e. Students know there are two kinds of volcanoes: one kind with violent eruptions producing steep slopes and the other kind with voluminous lava flows producing gentle slopes.		*E S*, Prentice Hall, 2006 10.1	Violence steep slope steep-sided voluminous gentle slopes eruptions viscosity viscous stratovolcano composite cone	vent buoyantly volatiles (gases) magma rhyolitic lava Andesitic lava ash basaltic shield volcanoes cinder cone	
Benchmark Assessment Window: NO District Assessment (State STAR TESTING) Third Quarter Ends March 27th							

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Earth Science: Quarter 4

TIME FRAME	BIG IDEA TOPIC	STANDARDS	ASSESSMENTS	INSTRUCTIONAL MATERIALS	VOCABULARY	NOTES
Qtr 4 46 Days	Re-explore 1,2 & 9 I&E					
End of Course Assessment: TBD Spring Break is April 6th -13th Last Day of School June 9th						