

Earth Sciences 2011-2012 Benchmark Blueprint

Green Dot Public Schools

Assessments

Earth's Place in the Universe		1	2	3	4
1.0	Students know astronomy and planetary exploration reveal the solar system's structure, scale, and change over time. As a basis for understanding this concept:				
1.a	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.	3			3
1.b	Students know evidence from Earth and moon rocks for the solar system's formation from a nebular cloud of dust and gas approximately 4.6 billion years ago.	3			
1.c	Students know evidence from geological studies of the Earth and other planets that the early Earth was very different from today.	4			
1.e	Students know the sun is a typical star and is powered by nuclear reactions, primarily the fusion of hydrogen to form helium.	3			3
2.0	Students know earth-based and space-based astronomy reveal the structure, scale, and changes in stars, galaxies, and the universe over time. As a basis for understanding this concept:				
2.a	Students know the solar system is located in an outer edge of the disc-shaped Milky Way galaxy which spans 100,000 light years.	3			
2.b	Students know galaxies are made of billions of stars and form most of the visible mass of the universe.	3			
2.d	Students know stars differ in their life cycles, and visual, radio, and X-ray telescopes collect data that reveal these differences.	3			3
Dynamic Earth Processes					
3.0	Students know plate tectonics operating over geologic time has changed the patterns of land, sea, and mountains on Earth's surface. As the basis for understanding this concept:				
3.b	Students know the principal structures that form at the three different kinds of plate boundaries.		4		3
3.c	Students know how to explain the properties of rocks based on the physical and chemical conditions in which they formed, including plate tectonic processes.		4		3
3.e	Students know two kinds of volcanoes, one with violent eruptions producing steep slopes and the other with voluminous lava flows producing gentle slopes.		3		



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Energy in the Earth System		1	2	3	4
4.0	Students know energy enters the Earth system primarily as solar radiation and eventually escapes as heat. As a basis for understanding this concept:				
4.b	Students know the fate of incoming solar radiation in terms of reflection, absorption, and photosynthesis.		3		
4.c	Students know the different atmospheric gases that absorb the Earth's thermal radiation, and the mechanism and significance of the greenhouse effect.		4		3
5.0	Students know heating of Earth's surface and atmosphere by the sun drives convection within the atmosphere and oceans, producing winds and ocean currents. As a basis for understanding this concept:				
5.a	Students know how differential heating of the Earth results in circulation patterns in the atmosphere and oceans that globally distribute the heat.			5	3
5.b	Students know the relationship between the rotation of the Earth and the circular motion of ocean currents and air in pressure centers.			3	
5.d	Students know properties of ocean water such as temperature and salinity can be used to explain the layered structure of the oceans, generation of horizontal and vertical ocean currents, and the geographic distribution of marine organisms.			5	3
5.e	Students know the distribution of rain forests and deserts on Earth in bands at specific latitudes.			3	
6.0	Students know climate is the long-term average of a region's weather and depends on many factors. As a basis for understanding this concept:				
6.b	Students know effects on climate of latitude, elevation, topography, as well as proximity to large bodies of water and cold or warm ocean currents.			5	3
6.c	Students know how the Earth's climate has changed over time, corresponding to changes in the Earth's geography, atmospheric composition and/or other factors (solar radiation, plate movement, etc.).			6	3
Biogeochemical Cycles					
7.0	Students know each element on Earth moves among reservoirs, which exist in the solid earth, in oceans, in the atmosphere, and within and among organisms as part of biogeochemical cycles. As a basis for understanding this concept:				
7.a	Students know the carbon cycle of photosynthesis and respiration, and the nitrogen cycle.			5	
7.b	Students know the global carbon cycle in terms of the different physical and chemical forms of carbon in the atmosphere, oceans, biomass, and fossil fuels, and the movement of carbon among these reservoirs.			4	3



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Structure and Composition of the Atmosphere		1	2	3	4
8.0	Students know life has changed Earth's atmosphere, and changes in the atmosphere affect conditions for life. As a basis for understanding this concept:				
8.a	Students know the thermal structure and chemical composition of the atmosphere.		4		
8.c	Students know the location of the ozone layer in the upper atmosphere, its role in absorbing ultraviolet radiation and how it varies both naturally and in response to human activities.		3		
California Geology					
9.0	Students know the geology of California underlies the state's wealth of natural resources as well as its natural hazards. As a basis for understanding this concept:				
9.a	Students know the resources of major economic importance in California and their relation to California's geology.		4		
9.b	Students know the principal natural hazards in different California regions, and the geological basis of those hazards.		6		3
1.0	Students know scientific progress is made by asking meaningful questions and conducting careful investigations. As a basis for understanding this concept and addressing the content in the other four strands, students should develop their own questions and perform investigations. Students will:				
1.b	Identify and communicate sources of unavoidable experimental error.	3			
1.f	Distinguish between hypothesis and theory as science terms.	3			
1.g	Recognize the use and limitations of models and theories as scientific representations of reality.	3			
Total Number of Items		31	35	36	36