

Chemistry Unit 7

Anchoring Phenomena	Baltimore has more hills than people expect for a city on the water.
Driving Questions	Where did the hills come from and how did they change over time?

Design Challenge/Final Project

You have been requested, as a geologist, to design a page for the new Visit Baltimore website that will explain the origin of the hills and “mountains” within Baltimore.

Storyline Chapters	Phenomena-driven questions	Investigate and build knowledge through practices.	Incrementally build models that explain phenomena
Build	Are there hills/mountains in Baltimore?	Students organize and analyze data that represent measurements of topographic features and describe what each data set represents.	Mountains grow and shrink over time. Depending on age and location, the relative size varies on a geographic scale.
	What processes build hills and mountains?	Engage in argument from evidence	Specific internal processes build mountains and create volcanoes over time, each boundary changes the land in unique ways.
	What evidence do we have?	Communicate scientific information	
	What is Maryland’s tectonic history/How did we end up here?	Use a model to illustrate and/or predict the relationships between the components of a system	The motion of the continents and collision of tectonic plates have built the mountains within Maryland. This happens over long periods of time.
	How can the highest point in Maryland be both taller and shorter than Nihoa Volcano in Hawaii?	Analyze Data/Graphing	Due to the different compositions of the oceanic and continental crusts, tall mountains on the oceanic crust may not reach the same altitude as “shorter” mountains on the continental crust, as illustrated by a geographic scale.
	What types of rock have formed under our feet?	Obtaining, evaluating, and communicating information	The process of mountain building creates rocks of different composition and properties dependent on the conditions under which they formed.

Break	What can move/change mountains?	Evaluate the claims, evidence, and/or reasoning to determine the merits of arguments	Weathering, Erosion, Deposition are processes that break, move, and drop the material from mountains.
	How does Freezing water break down mountains?	Develop a model of physical weathering by observing the expansion of water as it freezes to illustrate and/or predict how freezing water can cause rocks to crack or break apart.	Water, through frost/ice wedging, can break apart the rocks of a mountain.
	How does moving water break down mountains?	Revise the physical weathering, model to include observed evidence from a rock tumbler which demonstrates the abrasive power of flowing water with sediment and its ability to wear down rocks.	Water, which can carry and move large and small matter (such as rocks, gravel, sand and silt), can wear down rocks in a river through abrasion.
	How does water break down other rock materials?	Communicate the process of physical weathering from water by creating a storyboard that illustrates and explains the process that forms a pot-hole in the streets of Baltimore.	Water breaks down natural and manmade rocks through physical weathering processes.
	How do chemical processes break down mountains?	Design an investigation of the impact of acidic rain/water on rock.	Water, as a component in a chemical process, such as an acid/base reaction, can break down and erode the rocks of a mountain.
Move	How do we measure chemical weathering? (two-day activity)	Analyze data regarding the mineral content of water and make an evidence supported argument from the data.	Dissolved matter from the rocks of a mountain, or manmade rocks, can be moved from their original location by flowing water.
	Where do we find evidence of weathering, erosion, and deposition in the local environment?	Observe the local environment to identify evidence of weathering, erosion and deposition.	Matter moves from one location and is deposited in another.
Drop	Where does the moving material go?	Create a model to illustrate the process of deposition and the impact of particle size on the movement of materials.	Large materials, such as boulders and rocks, are not able to be carried as far by flowing water as smaller particles of materials, such as gravel, sand and silt.

	What happens to dissolved materials?	Conduct experiments to observe the impact of Carbon Dioxide on lime-water to determine the impact on chemical deposition and report findings.	Dissolved minerals can be chemically deposited in the ocean either directly or through biological processes.
Final Project	Where did the hills come from?	Communicate scientific information by creating a visual model of the process of building and wearing away the mountains in Baltimore to form the hills found today.	Final Model which incorporates the information and understanding as developed throughout the unit.