

Earth's Changing Surface

Learning Goals for Students and Teachers

Overarching learning goal: At any given point in time, Earth's surface is being built up and worn down. While some processes are building up Earth's surface, others are wearing it down. These processes cause the surface to look different in various places.

Student and Teacher Learning Goals	Additional Teacher Learning Goals
<ol style="list-style-type: none"> 1. Earth's surface has a variety of landforms. 2. Earth's outermost layer (crust) is made up of tectonic plates that float or ride on a hot, slowly moving rock layer beneath them. Volcanic activity is one mechanism that builds up Earth's surface in some places. 3. Earth's tectonic plates move in different directions (colliding, spreading apart, or moving side to side), causing the surface to build up and form mountains or other surface features. 4. The major mountain ranges on Earth are found at the boundaries of tectonic plates. This evidence supports the idea that collisions of crustal plates form mountains. Mountain building caused by plate collisions occurs very slowly and can't always be felt or seen. 5. <i>Weathering</i> is a process that changes Earth's surface by causing rock to fragment, crack, and crumble into smaller pieces. 6. <i>Erosion</i> and <i>deposition</i> are processes that change the surface of Earth by carrying and depositing weathered materials, such as rock and soil, from one place to another. 7. Landforms, like mountains and valleys, can be explained using science ideas about plate movement, weathering, and erosion. At any given point in time, Earth's surface is being built up and worn down. 	<ol style="list-style-type: none"> 2Ta. Earth is composed of several layers: a thin, cold, brittle crust; a hot, convecting mantle; and a dense, metallic core. 2Tb. Earth's crust is composed of an oceanic crust and a continental crust. The oceanic crust has a greater density than the continental crust. 4Ta. Heat transfer by convection in Earth's mantle causes tectonic plates to move and may result in earthquakes. 4Tb. Earthquakes, volcanic activity, mountain building, and trench formation occur at tectonic plate boundaries, although volcanic hotspots also occur within plate interiors. 4Tc. Plate boundaries can be described as <i>convergent</i> (plates colliding), <i>divergent</i> (plates pulling apart), or <i>transform</i> (plates sliding past one another). 4Td. The volume of tectonic plates that disappear into the mantle along convergent boundaries by subduction is more or less in equilibrium with the new crust formed along divergent margins. In this way, the total surface area of the globe remains approximately the same. 5T. <i>Chemical weathering</i> is the process of in which rocks and minerals break down as they're exposed to rainwater, atmospheric gases, and organic acids.