

**Principle 2:  
Grades 6-8**

**Principle 2:  
The ocean and life in the ocean shape the features of Earth.**

**Geologic Change**

**Rock Cycle**

**A.**  
Many changes in geologic features occur where the ocean meets the land.

**B.**  
Many of the rocks exposed on land were formed in the ocean.

**Plate Tectonics**

**A.1.**  
Many landforms are the result of a combination of constructive and destructive forces where the ocean meets the land.

**A.13.**  
The surface of the land is shaped by sea level changes.

**A.19.**  
Tectonic activity between oceanic and continental plates can result in volcanoes, earthquakes and mountain formation near the coast.

**B.1.**  
Some igneous rocks are formed in the ocean in volcanoes, at hot spots and at mid-ocean ridges.

**B.2.**  
Some metamorphic rocks are formed in the ocean (e.g., at subduction zones).

**B.3.**  
Many sedimentary rocks are formed in the ocean from organic sediments.

**A.2.**  
Weathering is the breaking down of rocks, soils and minerals through physical, chemical and biological processes.

**A.8.**  
Erosion and deposition of rocks, sediments and other particles by wind, rain, waves, ice, gravity or living organisms can alter coastlines.

**A.14.**  
Sea level is affected by changes in climate and tectonic activity.

**B.4.**  
Many marine organisms form carbonate and silicate skeletal structures, which contribute to the formation of sedimentary rocks, reefs and stromatolites.

**A.3.**  
Biological weathering is caused by living organisms (e.g., when sea urchins grind holes in rocks).

**A.5.**  
Chemical weathering breaks down and alters the chemical composition of rocks and minerals through hydrolysis, oxidation and acidification.

**A.6.**  
Physical weathering of rocks can be caused by freeze-thaw cycles, salt crystallization, hydraulic action, pressure release, wind abrasion and/or thermal expansion.

**A.9.**  
Powerful storms can cause drastic short- and long-term changes to coastlines.

**A.10.**  
Beach profiles change seasonally due to different wave action and water flow.

**A.15.**  
Variations in global climate affect the volume of water in the ocean by changing the size of polar ice caps and glaciers, resulting in relative sea-level changes.

**A.18.**  
Tectonic activity causes uplift and subduction, which results in relative sea level changes.

**B.5.**  
Some organisms, such as cyanobacteria, coralline algae and corals construct complex structures (e.g., stromatolites and reefs).

**B.9.**  
The skeletal structures formed by some organisms (e.g., mollusk shells, foraminifera, coccoliths, radiolaria and diatom cell walls) sink and are deposited on the ocean floor, eventually forming sedimentary rocks.

**A.4.**  
Organisms can release organic acids that can increase chemical weathering.

**A.7.**  
Cracks in rock become sites where further weathering is more likely to occur.

**A.11.**  
Powerful winter wave action removes sediment from shorelines. Gentle summer wave action re-builds beaches.

**A.12.**  
Sediment deposits from rivers replace sand removed by waves and currents.

**A.16.**  
Changes in sea level can create, destroy, expose and cover landforms, such as continental shelves, islands, marine terraces, beaches and inland seas.

**A.17.**  
Fossilized marine organisms, ancient coral reefs and beaches can be found on land, far from current coastlines.

**B.6.**  
Lime-secreting cyanobacteria trap sediments and form large mounds called stromatolites.

**B.8.**  
Coral reefs are produced by living organisms that secrete an exoskeleton of calcium carbonate.

**B.7.**  
Stromatolites are a major component of the fossil record for the first 3.5 billion years of life on Earth.

See Principle 3: A7

See Principle 6: C4

See Principle 1: C11

See Principle 1: A1

See Principle 4: B1