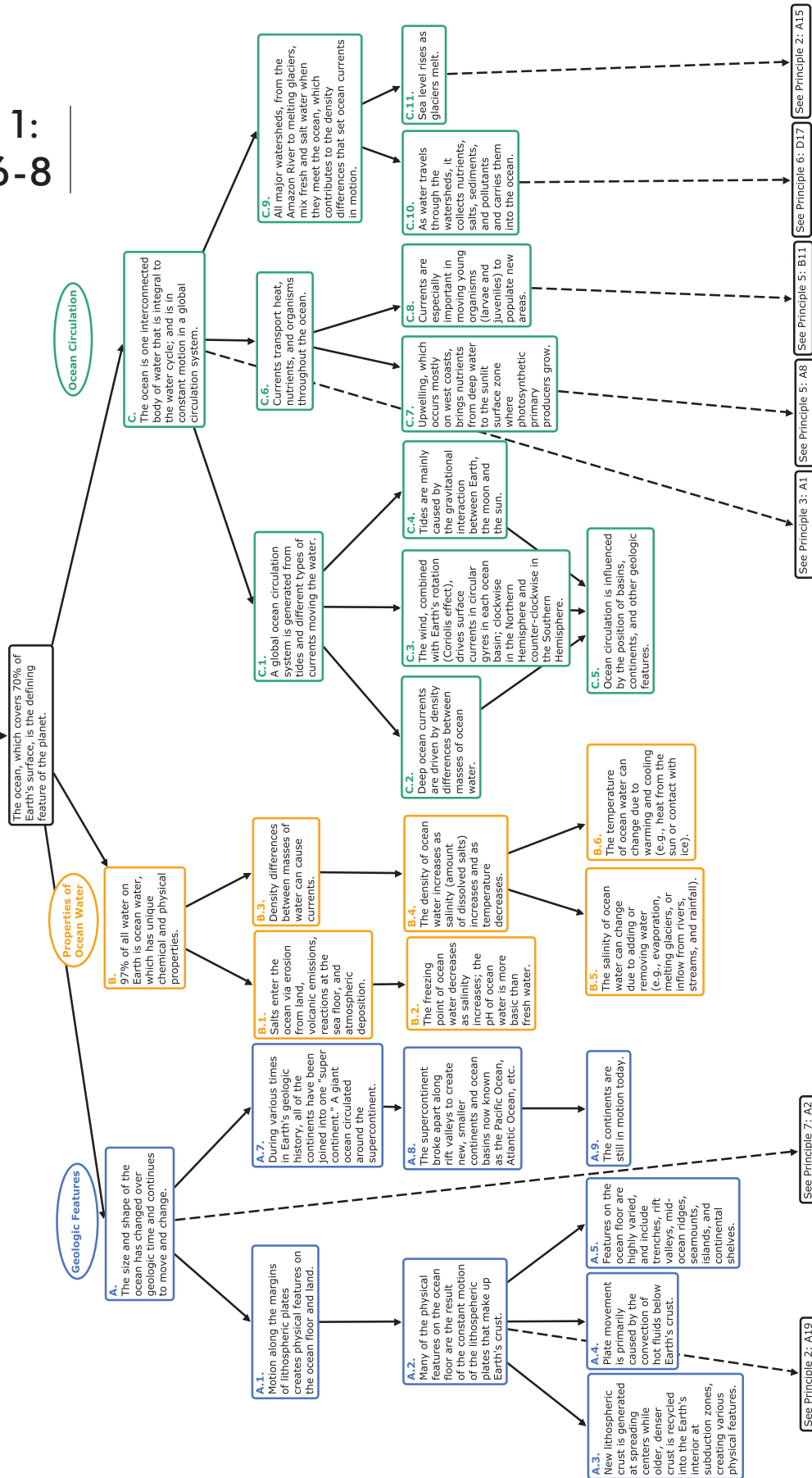


# PRINCIPLE 1: GRADES 6-8

## Principle 1: Earth has one big ocean with many features.



## PRINCIPLE 2: GRADES 6-8

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

#### Geologic Change

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

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

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

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

**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.

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

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

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

#### Plate Tectonics

#### Rock Cycle

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

**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.

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

**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.

**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 4: B1

See Principle 1: A1

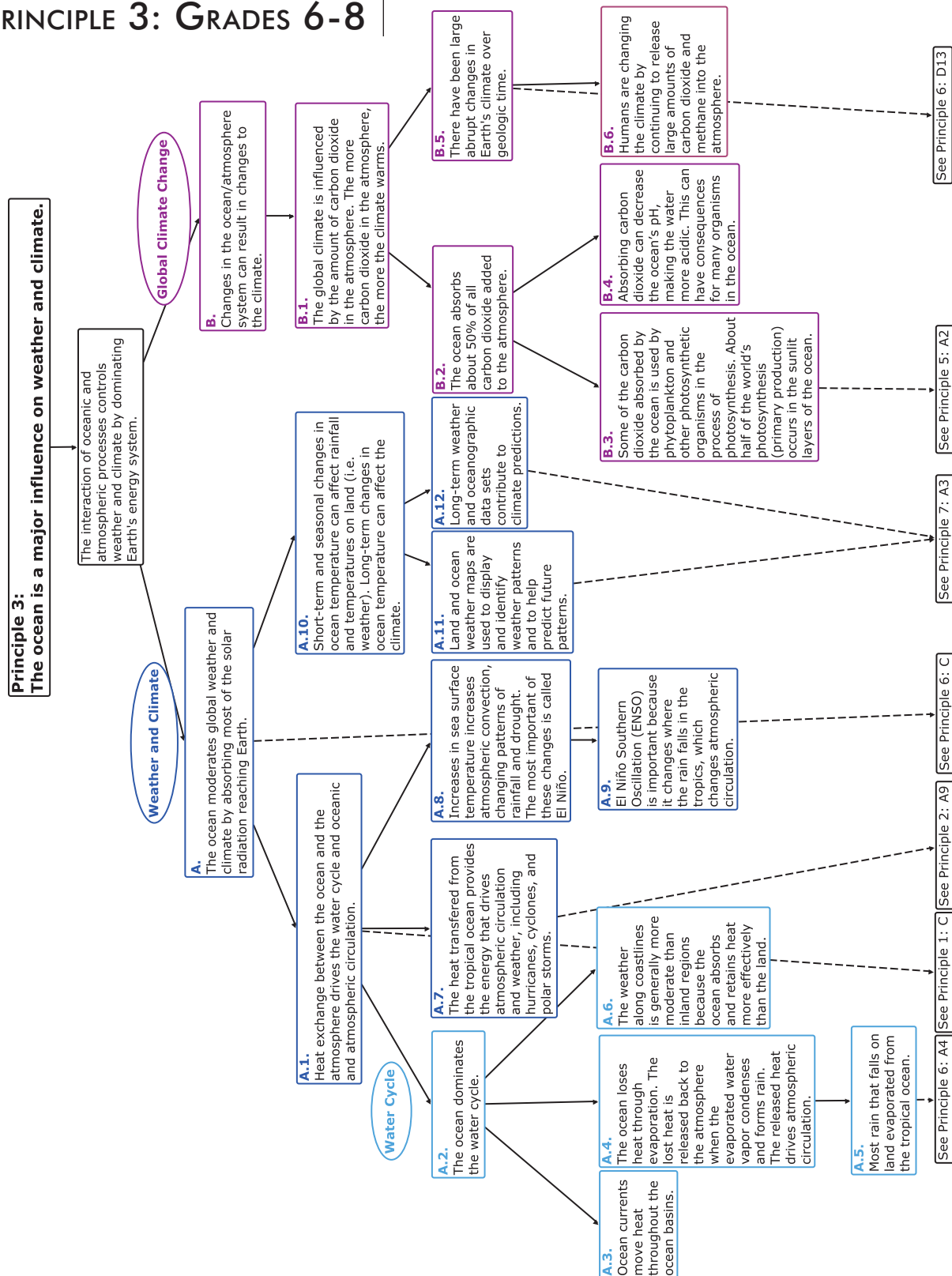
See Principle 1: C11

See Principle 3: A7

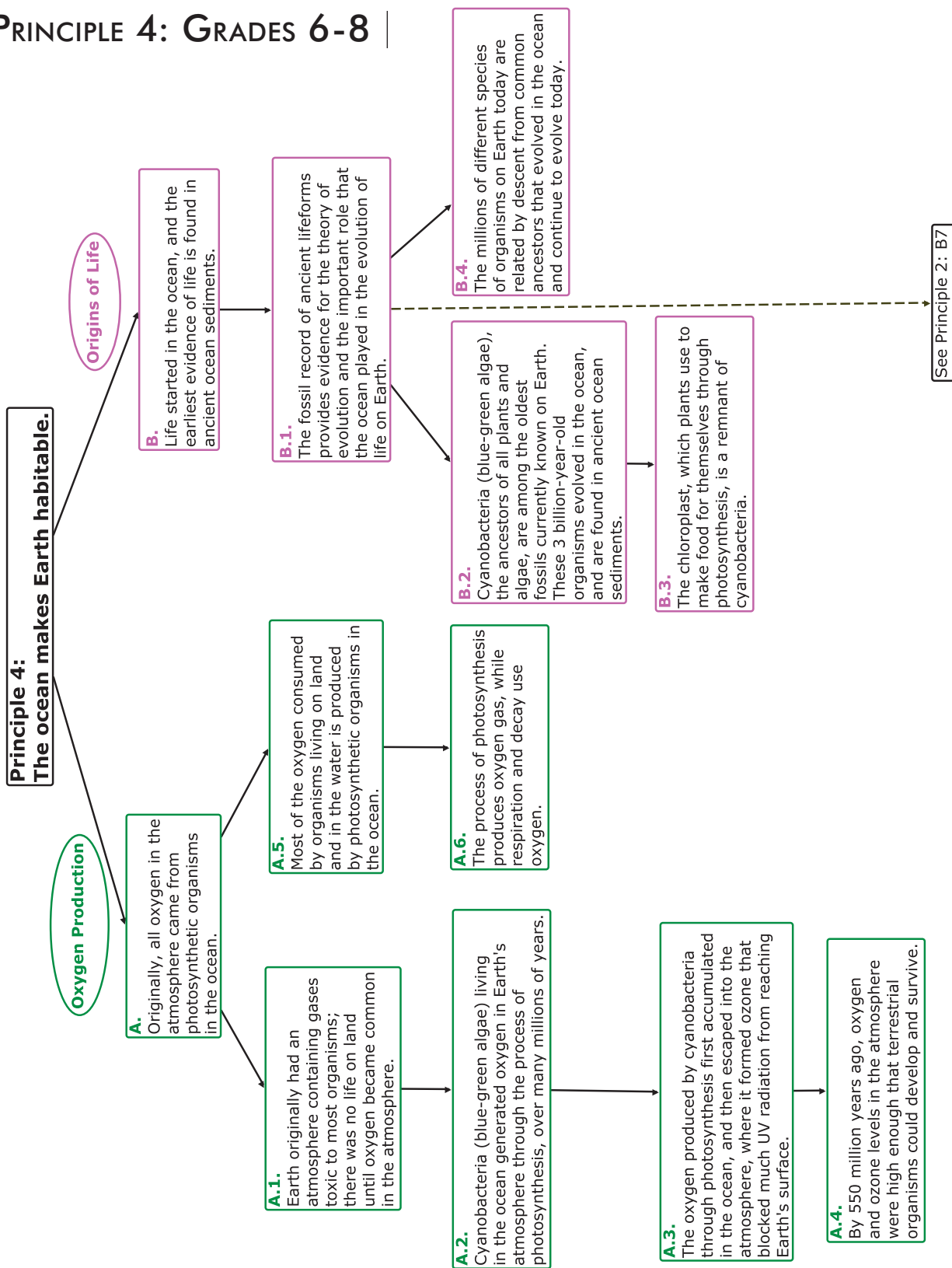
See Principle 6: C4

See Principle 1: A1

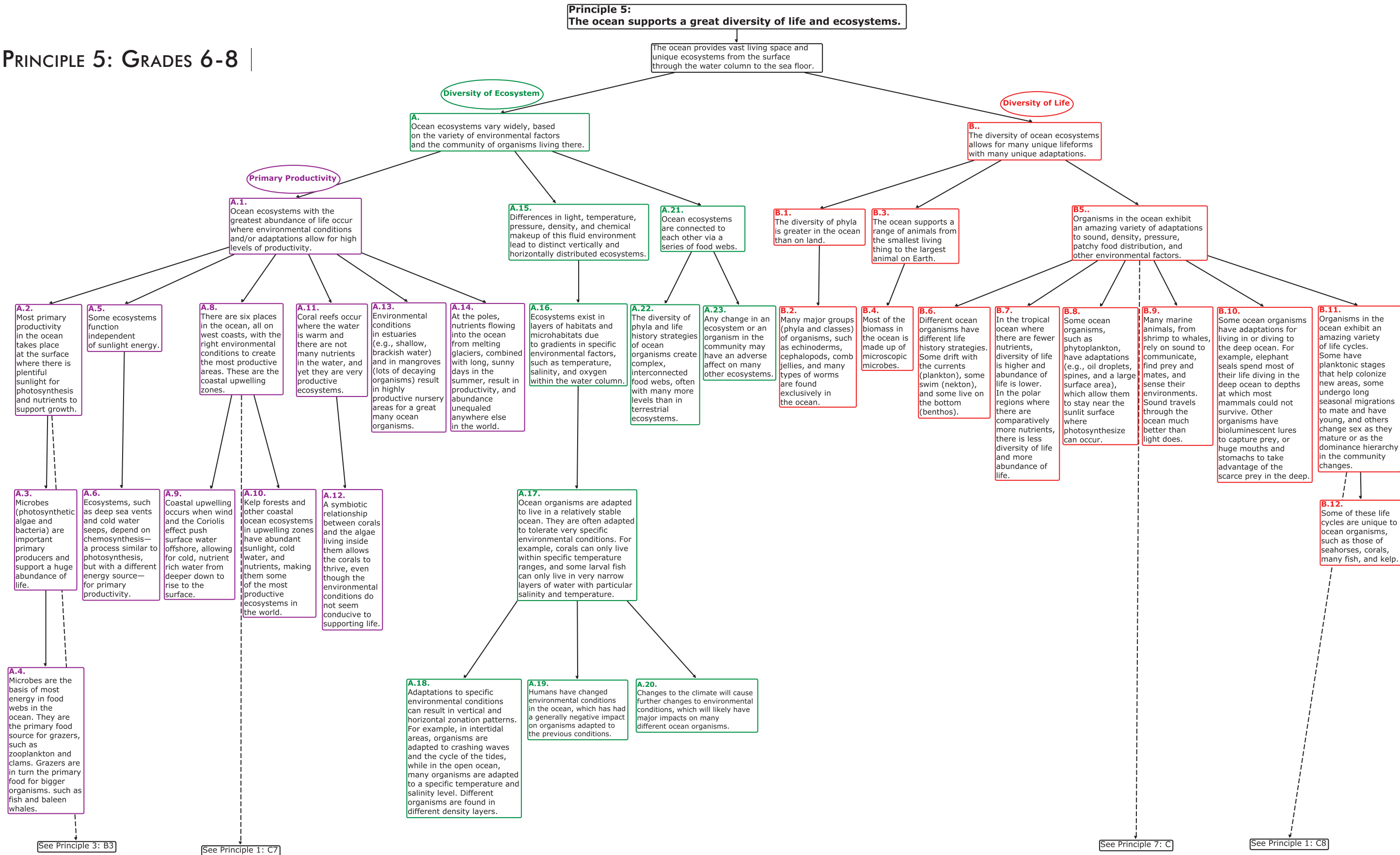
# PRINCIPLE 3: GRADES 6-8



## PRINCIPLE 4: GRADES 6-8

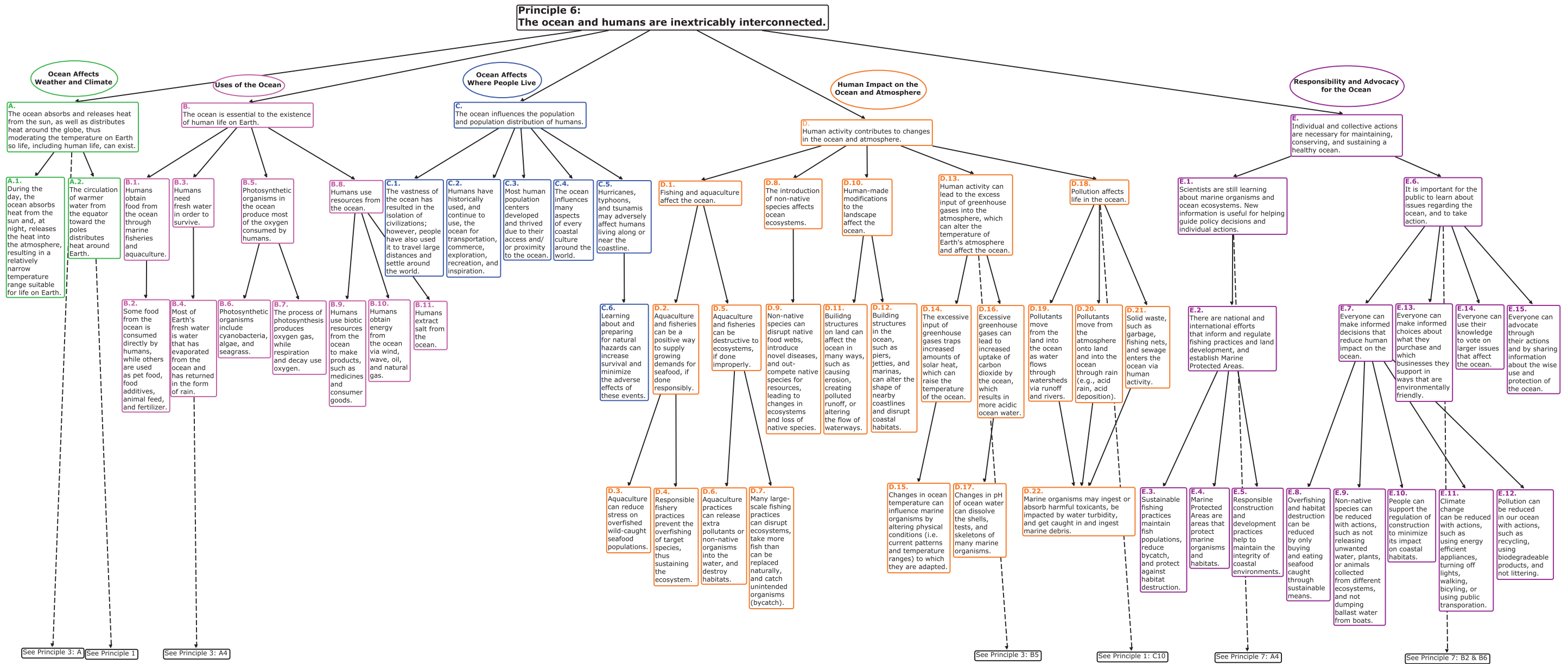


PRINCIPLE 5: GRADES 6-8





PRINCIPLE 6: GRADES 6-8



PRINCIPLE 7: GRADES 6-8

