

Ocean Literacy Essential Principle 5

Dionne Hoskins-Brown, Savannah State University & NOAA Fisheries
Sarah Schoedinger, NOAA Office of Education

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Essential Principle 5



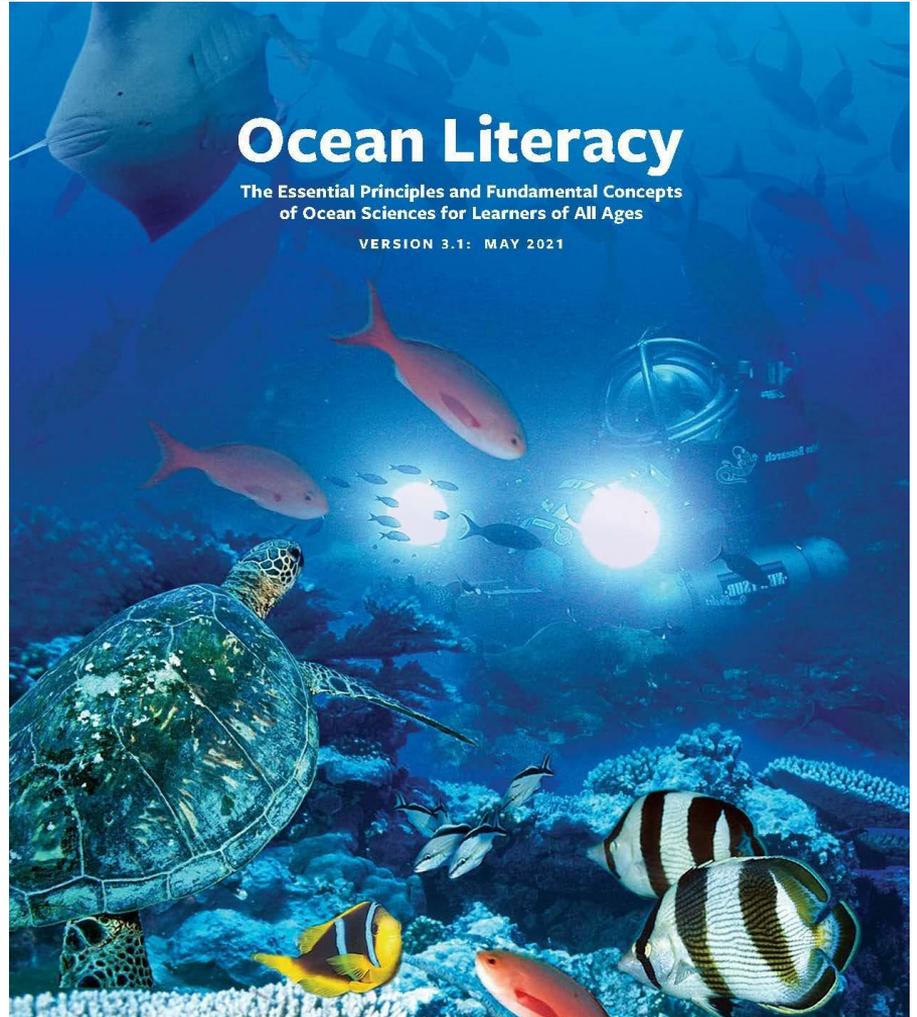
Using the OL Framework with Your Learners

1. **Look at the Guide** to determine the Essential Principles and Fundamental Concepts you want &/or need to address with your learners.
2. Then **look at the Scope and Sequence** for that principle for your grade level, and locate the concepts you decided to focus on.
3. Finally, **choose an activity** that addresses one or more of those concepts, following the flow shown in the scope and sequence.

Ocean Literacy Guide:

The Essential Principles & Fundamental Concepts of Ocean Sciences

<http://www.marine-ed.org/ocean-literacy/guide>





EP 5: The ocean supports a great diversity of life and ecosystems.

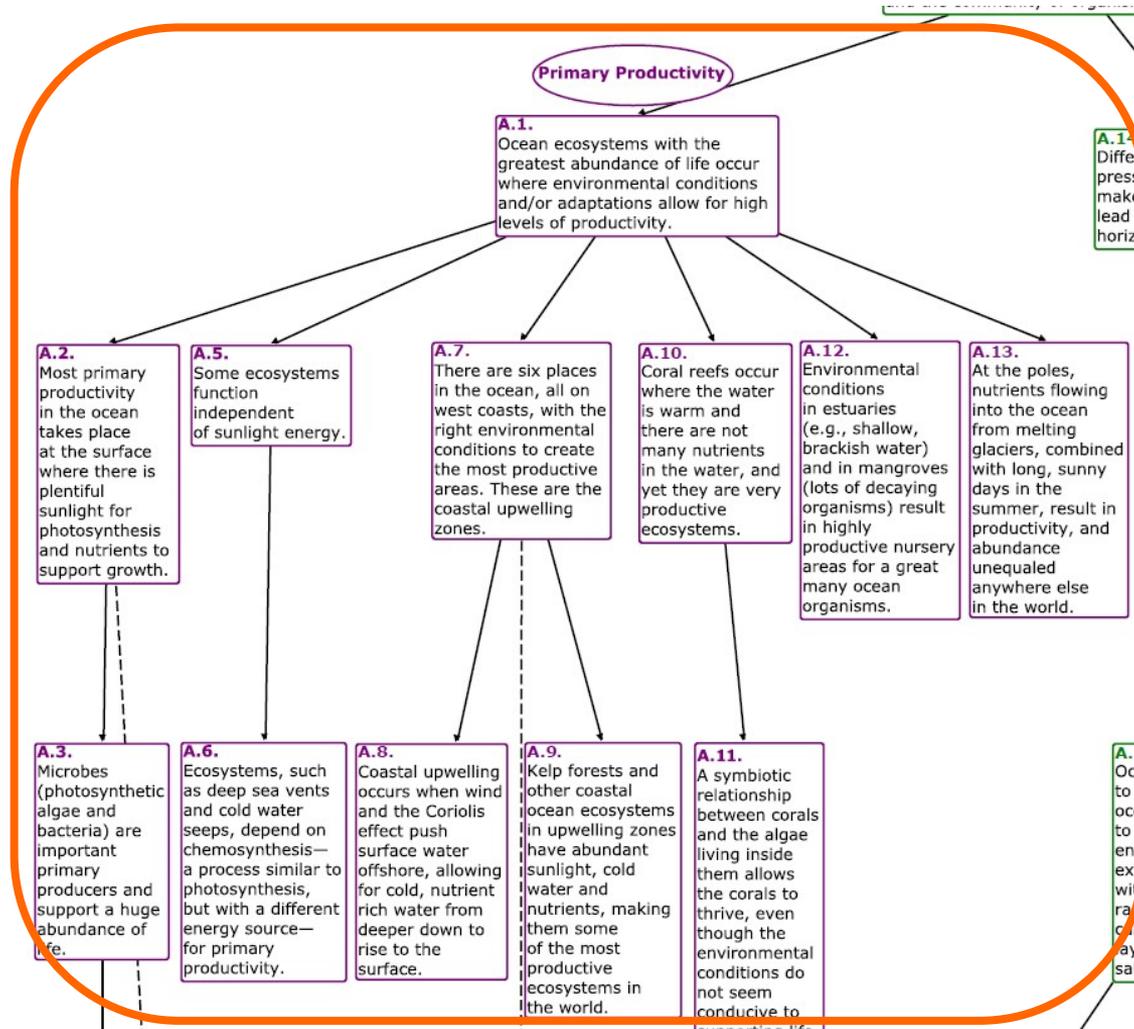
- a. **Ocean life ranges in size** from the smallest living things, microbes, to the largest animal that has lived on Earth, blue whales.
- b. **Most of the organisms and biomass in the ocean are microbes**, which are the basis of all ocean food webs. Microbes are the most important primary producers in the ocean. They have extremely fast growth rates and life cycles, and produce a huge amount of the carbon and oxygen on Earth.
- c. **Most of the major groups that exist on Earth are found exclusively in the ocean** and the diversity of major groups of organisms is much greater in the ocean than on land.
- d. Ocean biology provides many **unique examples of life cycles, adaptations and important relationships among organisms** (symbiosis, predator-prey dynamics, and energy transfer) that do not occur on land.
- e. The ocean provides a **vast living space with diverse and unique ecosystems** from the surface through the water column and down to, and below, the seafloor. Most of the living space on Earth is in the ocean.



EP5 continued...

- f. Ocean ecosystems are defined by environmental factors and the community of organisms living there. **Ocean life is not evenly distributed through time or space due to differences in abiotic factors** such as oxygen, salinity, temperature, pH, light, nutrients, pressure, substrate and circulation. A few regions of the ocean support the most abundant life on Earth, while most of the ocean does not support much life.
- g. **There are deep ocean ecosystems that are independent of energy from sunlight and photosynthetic organisms.** Hydrothermal vents, submarine hot springs, and methane cold seeps rely only on chemical energy and chemosynthetic organisms to support life.
- h. Tides, waves, predation, substrate, and/or other factors cause vertical zonation patterns along the coast: density, pressure, and light levels cause vertical zonation patterns in the open ocean. **Zonation patterns influence organisms' distribution and diversity.**
- i. **Estuaries provide important and productive nursery areas** for many marine and aquatic species.

S&S P5A
strand: a
particular
portion of the
Ocean Literacy
Scope &
Sequence



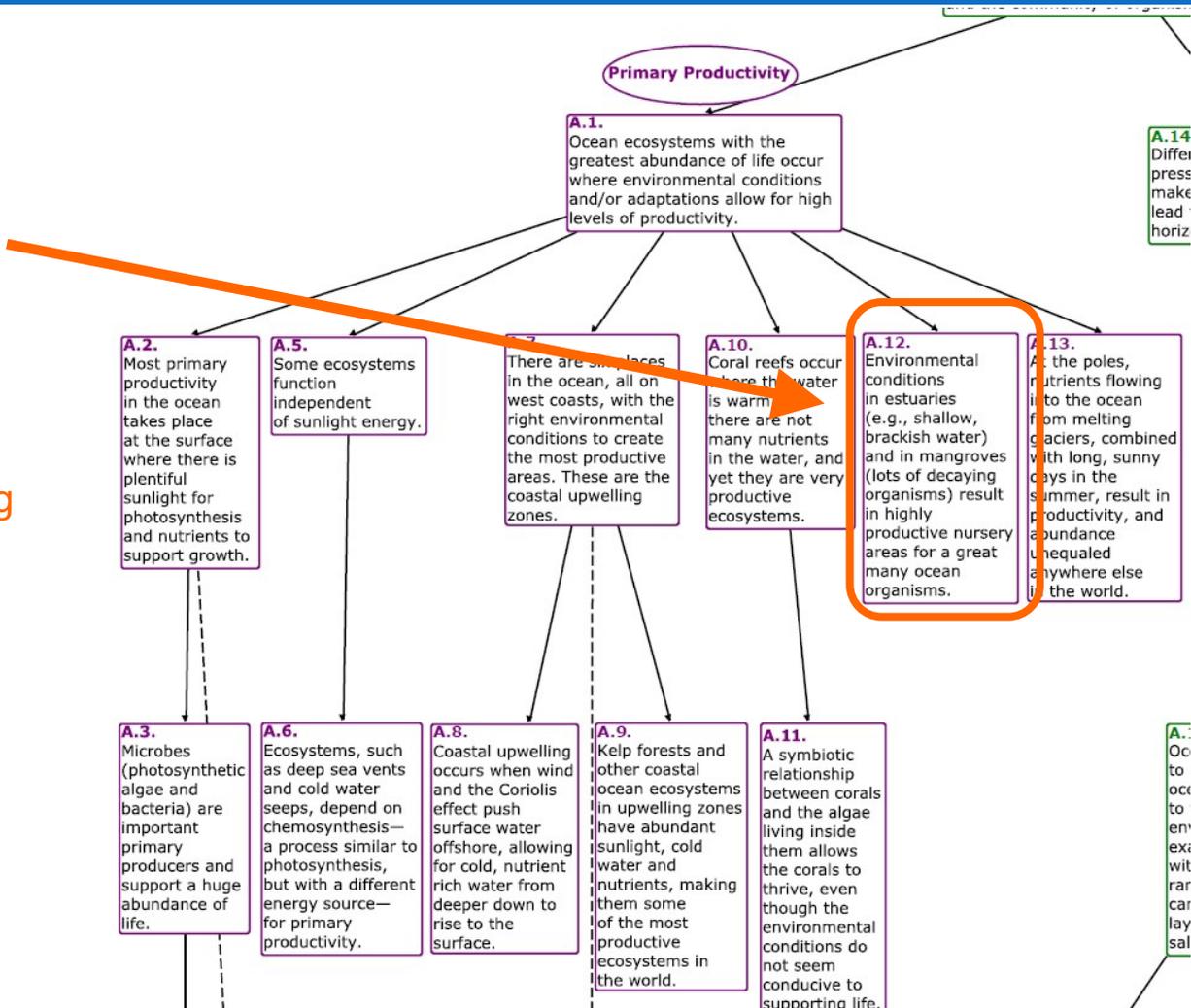
See p.37 of
your copy of
the Handbook



Essential Principle 5

Activity

S&S P5 A.12:
 Environmental
 conditions
 in estuaries
 (e.g., shallow,
 brackish
 water) and in
 mangroves
 (lots of decaying
 organisms)
 result in highly
 productive
 nursery areas
 for a great
 many ocean
 organism

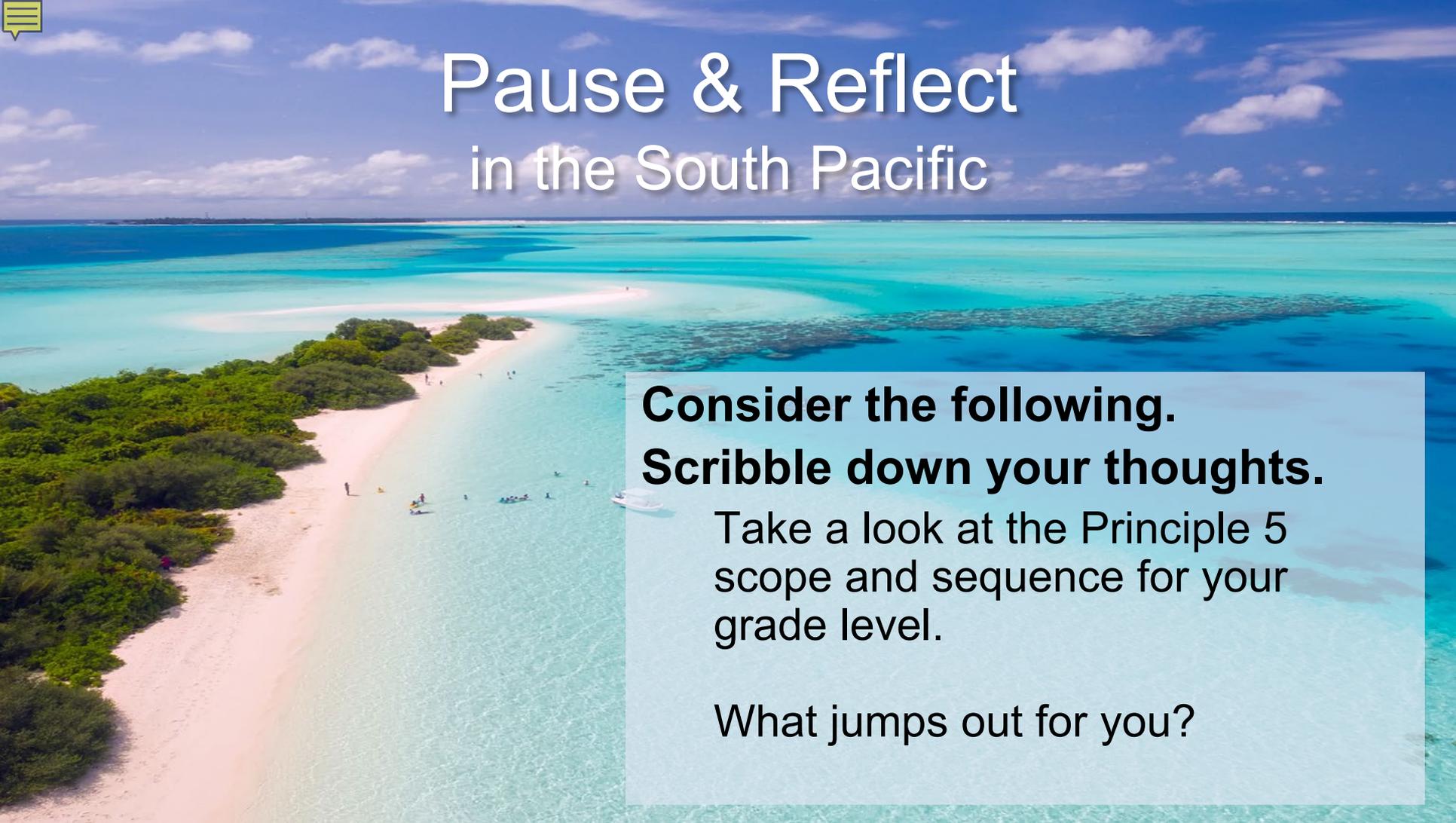


A.14
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See p.37 of
 your copy of
 the Handbook

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An aerial photograph of a tropical beach. The water is a vibrant turquoise color, transitioning to a deeper blue further out. A white sandbar runs diagonally across the frame, separating a shallow lagoon from the open ocean. The beach is lined with lush green vegetation. Several people are visible on the sandbar and in the shallow water. A small white boat is anchored near the sandbar. The sky is a clear, bright blue with a few wispy white clouds.

Pause & Reflect in the South Pacific

**Consider the following.
Scribble down your thoughts.**

Take a look at the Principle 5
scope and sequence for your
grade level.

What jumps out for you?



Back-up Slides

**Principle 1:
Grades 3-5**

Strand Topic

Properties of Ocean Water

Major concept of this strand

97% of all water on Earth is salt water in the ocean.

2 ideas that support bigger ideas in this strand

A.1.
Only 3% of all water on Earth is fresh water stored in lakes, rivers, underground aquifers, glaciers, and other places.

A.4.
Salinity and temperature vary throughout the ocean.

Supporting ideas on properties of ocean water discussed in further detail

A.2.
Most of all the fresh water in the world is stored in ice caps and glaciers.

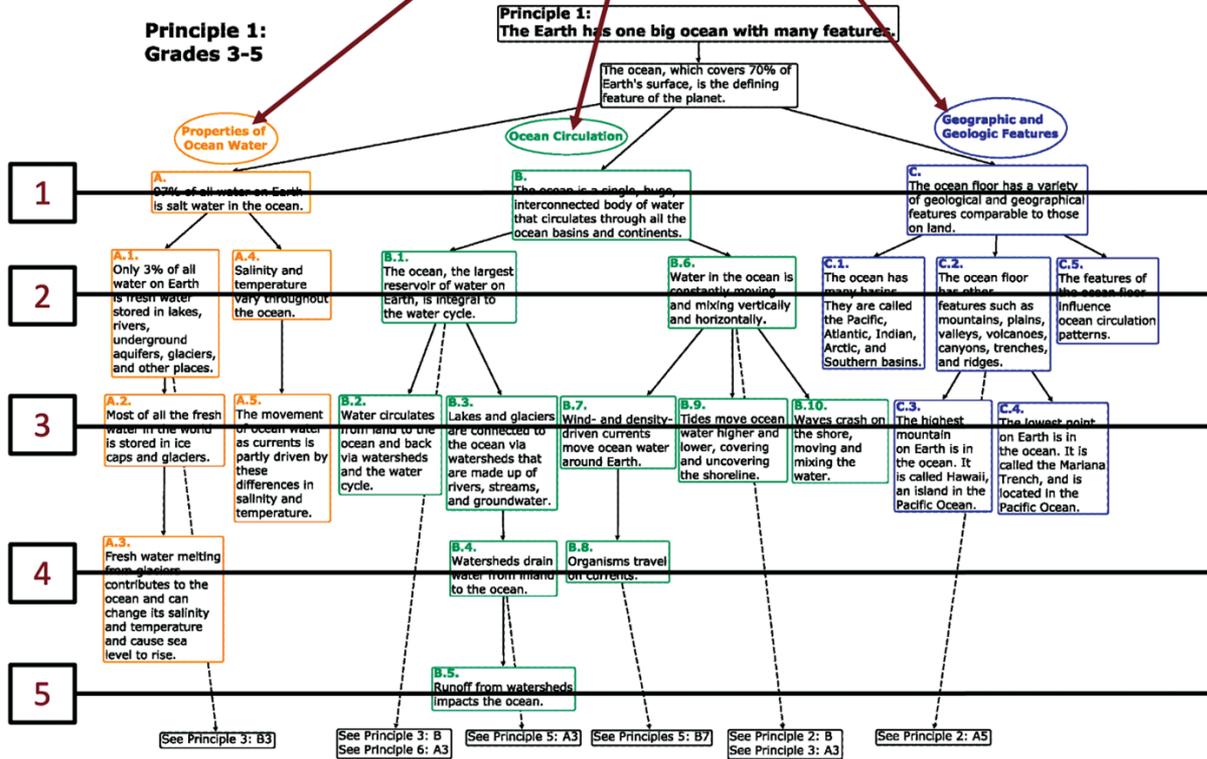
A.5.
The movement of ocean water as currents is partly driven by these differences in salinity and temperature.

A.3.
Fresh water melting from glaciers contributes to the ocean and can change its salinity and temperature and cause sea level to rise.

For Grades 3-5, concept A2 in Principle 1 is connected to concept B3 in Principle 3

See Principle 3: B3

Strand A → Strand B → Strand C



Dashed lines lead to cross-referenced concept statements in other essential principles.