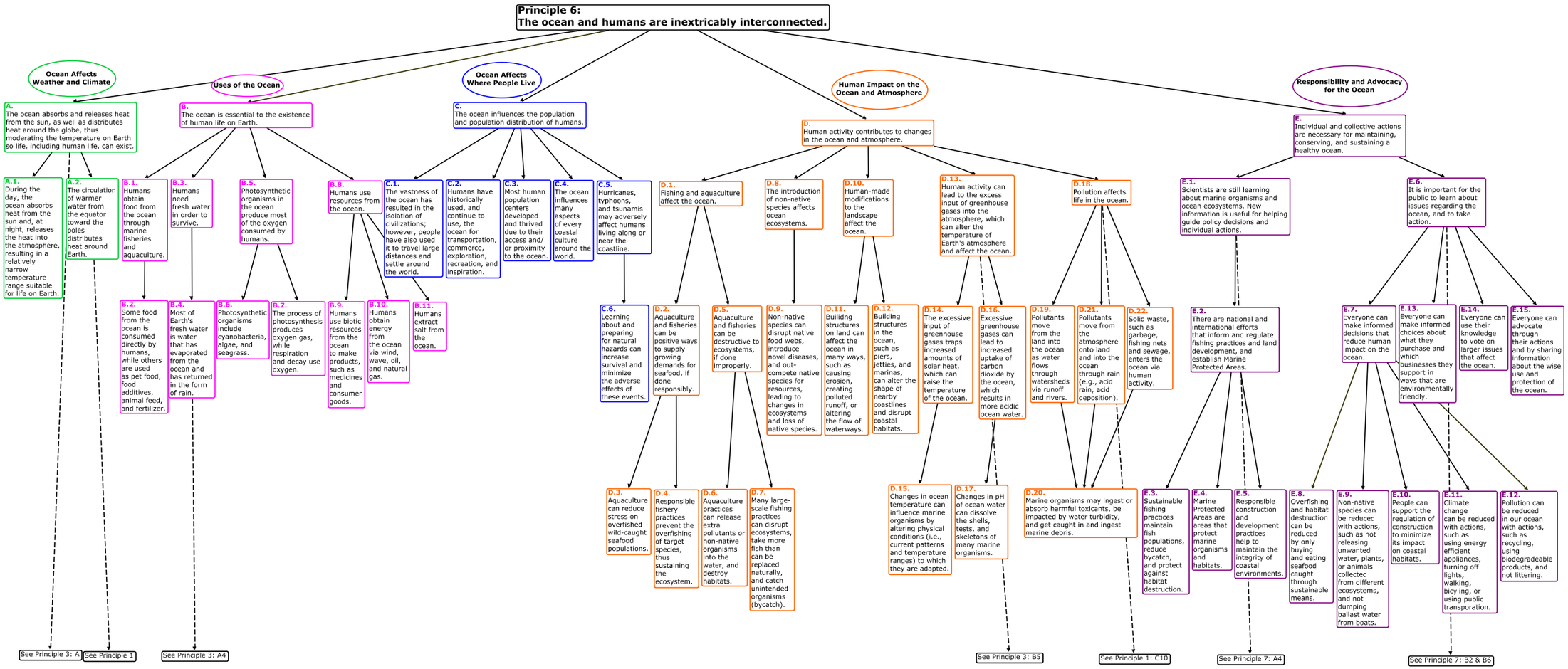
Principle 6:
The ocean and humans are inextricably interconnected.
Ocean Affects Weather and Climate
A. The ocean absorbs and releases heat from the sun, as well as distributes heat around the globe, thus moderating the temperature on Earth so life, including human life, can exist.
A.1. During the day, the ocean absorbs heat from the sun and, at night, releases the heat into the atmosphere, resulting in a relatively narrow temperature range suitable for life on Earth.
A.2. The circulation of warmer water from the equator toward the poles distributes heat around Earth.
See Principle 3: A
See Principle 1
Uses of the Ocean
B. The ocean is essential to the existence of human life on Earth.
B.1. Humans obtain food from the ocean through marine fisheries and aquaculture.
B.2. Some food from the ocean is consumed directly by humans, while others are used as pet food, food additives, animal feed, and fertilizer.
B.3. Humans need fresh water in order to survive.
B.4. Most of Earth's fresh water is water that has evaporated from the ocean and has returned in the form of rain.
See Principle 3: A4
B.5. Photosynthetic organisms in the ocean produce most of the oxygen consumed by humans.
B.6. Photosynthetic organisms include cyanobacteria, algae, and seagrass.
B.7. The process of photosynthesis produces oxygen gas, while respiration and decay use oxygen.
B.8. Humans use resources from the ocean.
B.9. Humans use biotic resources from the ocean to make products, such as medicines and consumer goods.
B.10. Humans obtain energy from the ocean via wind, wave, oil, and natural gas.
B.11. Humans extract salt from the ocean.
Ocean Affects Where People Live
C. The ocean influences the population and population distribution of humans.
C.1. The vastness of the ocean has resulted in the isolation of civilizations; however, people have also used it to travel large distances and settle around the world.
C.2. Humans have historically used, and continue to use, the ocean for transportation, commerce, exploration, recreation, and inspiration.
C.3. Most human population centers developed and thrived due to their access and/or proximity to the ocean.
C.4. The ocean influences many aspects of every coastal culture around the world.
C.5. Hurricanes, typhoons, and tsunamis may adversely affect humans living along or near the coastline.
C.6. Learning about and preparing for natural hazards can increase survival and minimize the adverse effects of these events.
Human Impact on the Ocean and Atmosphere
D. Human activity contributes to changes in the ocean and atmosphere.
D.1. Fishing and aquaculture affect the ocean.
D.2. Aquaculture and fisheries can be positive ways to supply growing demands for seafood, if done responsibly.
D.3. Aquaculture can reduce stress on overfished wild-caught seafood populations.
D.4. Responsible fishery practices prevent the overfishing of target species, thus sustaining the ecosystem.
D.5. Aquaculture and fisheries can be destructive to ecosystems, if done improperly.
D.6. Aquaculture practices can release extra pollutants or non-native organisms into the water, and destroy habitats.
D.7. Many large-scale fishing practices can disrupt ecosystems, take more fish than can be replaced naturally, and catch unintended organisms (bycatch).
D.8. The introduction of non-native species affects ocean ecosystems.
D.9. Non-native species can disrupt native food webs, introduce novel diseases, and out-compete native species for resources, leading to changes in ecosystems and loss of native species.
D.10. Human-made modifications to the landscape affect the ocean.
D.11. Builidng structures on land can affect the ocean in many ways, such as causing erosion, creating polluted runoff, or altering the flow of waterways.
D.12. Building structures in the ocean, such as piers, jetties, and marinas, can alter the shape of nearby coastlines and disrupt coastal habitats.
D.13. Human activity can lead to the excess input of greenhouse gases into the atmosphere, which can alter the temperature of Earth's atmosphere and affect the ocean.
D.14. The excessive input of greenhouse gases traps increased amounts of solar heat, which can raise the temperature of the ocean.
D.15. Changes in ocean temperature can influence marine organisms by altering physical conditions (i.e., current patterns and temperature ranges) to which they are adapted.
D.16. Excessive greenhouse gases can lead to increased uptake of carbon dioxide by the ocean, which results in more acidic ocean water.
D.17. Changes in pH of ocean water can dissolve the shells, tests, and skeletons of many marine organisms.
See Principle 3: B5
D.18. Pollution affects life in the ocean.
D.19. Pollutants move from the land into the ocean as water flows through watersheds via runoff and rivers.
D.20. Marine organisms may ingest or absorb harmful toxicants, be impacted by water turbidity, and get caught in and ingest marine debris.
D.21. Pollutants move from the atmosphere onto land and into the ocean through rain (e.g., acid rain, acid deposition).
D.22. Solid waste, such as garbage, fishing nets and sewage, enters the ocean via human activity.
See Principle 1: C10
Responsibility and Advocacy for the Ocean
E. Individual and collective actions are necessary for maintaining, conserving, and sustaining a healthy ocean.
E.1. Scientists are still learning about marine organisms and ocean ecosystems. New information is useful for helping guide policy decisions and individual actions.
E.2. There are national and international efforts that inform and regulate fishing practices and land development, and establish Marine Protected Areas.
E.3. Sustainable fishing practices maintain fish populations, reduce bycatch, and protect against habitat destruction.
E.4. Marine Protected Areas are areas that protect marine organisms and habitats.
E.5. Responsible construction and development practices help to maintain the integrity of coastal environments.
See Principle 7: A4
E.6. It is important for the public to learn about issues regarding the ocean, and to take action.
E.7. Everyone can make informed decisions that reduce human impact on the ocean.
E.8. Overfishing and habitat destruction can be reduced by only buying and eating seafood caught through sustainable means.
E.9. Non-native species can be reduced with actions, such as not releasing unwanted water, plants, or animals collected from different ecosystems, and not dumping ballast water from boats.
E.10. People can support the regulation of construction to minimize its impact on coastal habitats.
E.11. Climate change can be reduced with actions, such as using energy efficient appliances, turning off lights, walking, bicyling, or using public transporation.
E.12. Pollution can be reduced in our ocean with actions, such as recycling, using biodegradeable products, and not littering.
E.13. Everyone can make informed choices about what they purchase and which businesses they support in ways that are environmentally friendly.
E.14. Everyone can use their knowledge to vote on larger issues that affect the ocean.
E.15. Everyone can advocate through their actions and by sharing information about the wise use and protection of the ocean.
See Principle 7: B2 & B6