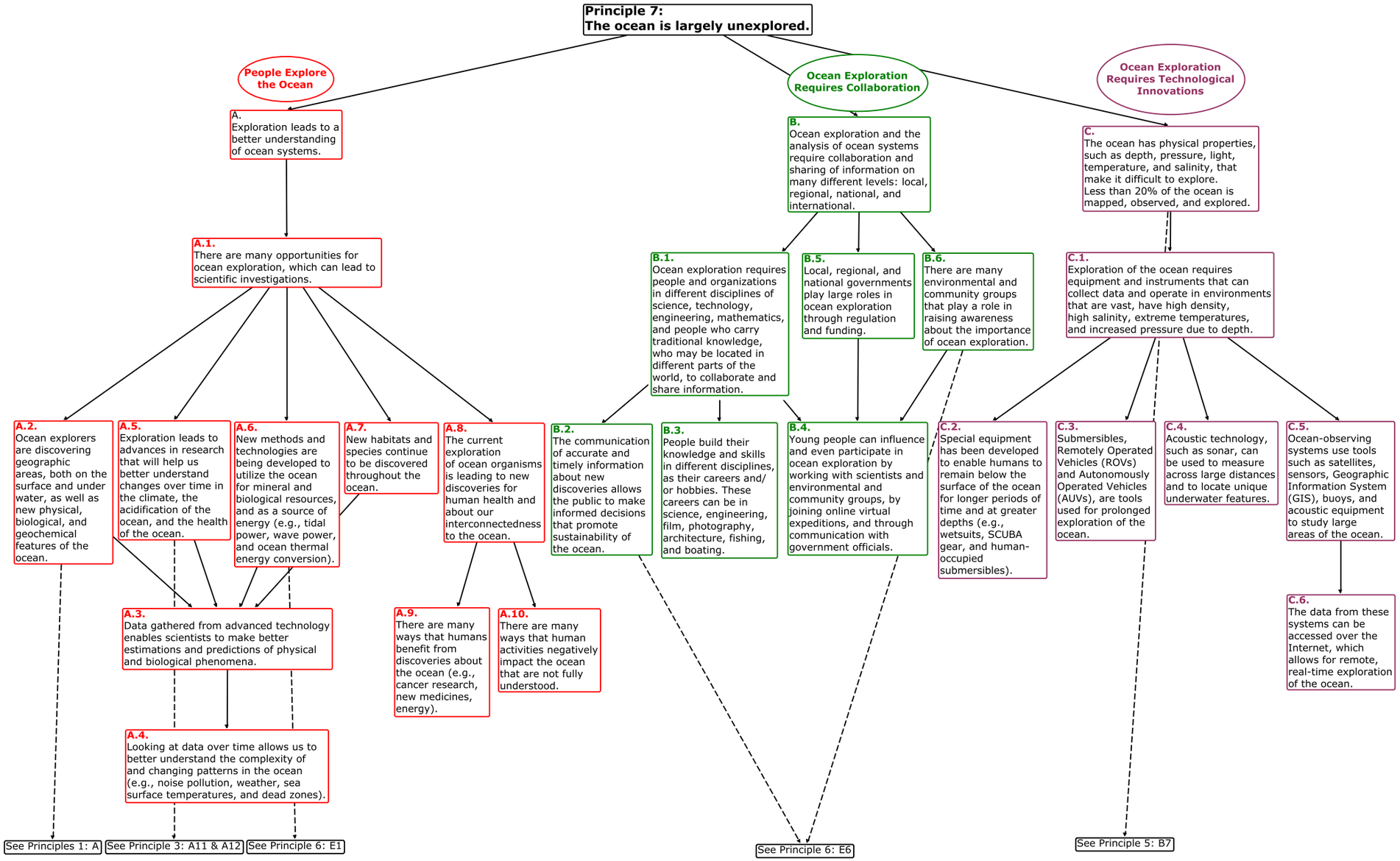
Principle 7:
The ocean is largely unexplored.
People Explore the Ocean
Ocean Exploration Requires Collaboration
Ocean Exploration Requires Technological Innovations
A.
Exploration leads to a better understanding of ocean systems.
A.1.
There are many opportunities for ocean exploration, which can lead to scientific investigations.
A.2.
Ocean explorers are discovering geographic areas, both on the surface and under water, as well as new physical, biological, and geochemical features of the ocean.
A.5.
Exploration leads to advances in research that will help us better understand changes over time in the climate, the acidification of the ocean, and the health of the ocean.
A.6.
New methods and technologies are being developed to utilize the ocean for mineral and biological resources, and as a source of energy (e.g., tidal power, wave power, and ocean thermal energy conversion).
A.7.
New habitats and species continue to be discovered throughout the ocean.
A.8.
The current exploration of ocean organisms is leading to new discoveries for human health and about our interconnectedness to the ocean.
A.3.
Data gathered from advanced technology enables scientists to make better estimations and predictions of physical and biological phenomena.
A.9.
There are many ways that humans benefit from discoveries about the ocean (e.g., cancer research, new medicines, energy).
A.10.
There are many ways that human activities negatively impact the ocean that are not fully understood.
A.4.
Looking at data over time allows us to better understand the complexity of and changing patterns in the ocean (e.g., noise pollution, weather, sea surface temperatures, and dead zones).
See Principles 1: A
See Principle 3: A11 & A12
See Principle 6: E1
B.
Ocean exploration and the analysis of ocean systems require collaboration and sharing of information on many different levels: local, regional, national, and international.
B.1.
Ocean exploration requires people and organizations in different disciplines of science, technology, engineering, mathematics, and people who carry traditional knowledge, who may be located in different parts of the world, to collaborate and share information.
B.5.
Local, regional, and national governments play large roles in ocean exploration through regulation and funding.
B.6.
There are many environmental and community groups that play a role in raising awareness about the importance of ocean exploration.
B.2.
The communication of accurate and timely information about new discoveries allows the public to make informed decisions that promote sustainability of the ocean.
B.3.
People build their knowledge and skills in different disciplines, as their careers and/or hobbies. These careers can be in science, engineering, film, photography, architecture, fishing, and boating.
B.4.
Young people can influence and even participate in ocean exploration by working with scientists and environmental and community groups, by joining online virtual expeditions, and through communication with government officials.
See Principle 6: E6
C.
The ocean has physical properties, such as depth, pressure, light, temperature, and salinity, that make it difficult to explore. Less than 20% of the ocean is mapped, observed, and explored.
C.1.
Exploration of the ocean requires equipment and instruments that can collect data and operate in environments that are vast, have high density, high salinity, extreme temperatures, and increased pressure due to depth.
C.2.
Special equipment has been developed to enable humans to remain below the surface of the ocean for longer periods of time and at greater depths (e.g., wetsuits, SCUBA gear, and human-occupied submersibles).
C.3.
Submersibles, Remotely Operated Vehicles (ROVs) and Autonomously Operated Vehicles (AUVs), are tools used for prolonged exploration of the ocean.
C.4.
Acoustic technology, such as sonar, can be used to measure across large distances and to locate unique underwater features.
C.5.
Ocean-observing systems use tools such as satellites, sensors, Geographic Information System (GIS), buoys, and acoustic equipment to study large areas of the ocean.
C.6.
The data from these systems can be accessed over the Internet, which allows for remote, real-time exploration of the ocean.
See Principle 5: B7