



**Principle 7:  
The ocean is largely unexplored.**

**People Explore the Ocean**

**A.** Human interest has led to the exploration of and research about the ocean and its resources. However, less than 20% of the ocean is mapped, observed, and explored.

**A.1.** People explore the ocean to learn and discover more about it for many different political, economic, scientific, and social reasons.

**A.4.** The future health of the ocean and our ability to use and benefit from its resources depends on our understanding of the ocean.

**A.2.** In the past, people explored the ocean for reasons that included discovering new land, locating trading routes, searching for gold and silver, spreading religion, and expanding political power.

**A.3.** Today we explore the ocean for reasons, such as: to understand the climate, to assess the health of the ocean, to find medicine and food for humans, and to search for sources of energy (e.g., petroleum, natural gas, wind, wave, and tidal power).

**A.5.** The ocean affects all life on Earth because the ocean interacts with all other Earth systems: the atmosphere, biosphere, and lithosphere.

**A.6.** The ocean will provide future generations with many opportunities for exploration, discovery, inquiry, and investigation.

See Principle 6: A

**Ocean Exploration Requires Collaboration**

**B.** Ocean exploration is a collaborative process. It requires people with different areas of expertise and from different places and/or countries to work together, share knowledge, and use many types of technology to build a better understanding of the complex ocean system.

**B.1.** People develop areas of expertise for careers and/or hobbies in ocean exploration. These careers and hobbies include scientists, engineers, filmmakers, photographers, divers, architects, boat crews, and technicians.

**B.2.** Scientists specialize in different aspects of ocean exploration through the variety of science topics they study (e.g., weather, climate, animals, algae, geology). They share their expertise as work with other scientists and engineers.

**B.3.** Engineers specialize in different aspects of ocean exploration through the variety of topics they study (e.g., chemical, mechanical, and electrical engineering). They share their expertise as they work with other engineers and scientists.

See Principle 6: C7 and C9

**Ocean Exploration Requires Technological Innovations**

**C.** Ocean exploration requires people to use creativity and knowledge to develop specialized tools because the ocean is so vast and the human body and senses are not well adapted for life under water.

**C.1.** Humans require specialized equipment for immersion in the water or for gathering information about the ocean without actually going under water.

**C.2.** Humans are adapted to breathe air, and thus require special breathing equipment to explore under water (e.g., snorkels, SCUBA gear).

**C.3.** Human eyes are adapted to function in the air, and thus require special tools to see under water (e.g., masks, cameras).

**C.4.** Humans require a certain amount of light to see, and thus require special lights to see deep in the ocean (e.g., dive lights).

**C.5.** Humans are adapted to living on land, and thus require special tools for protection from the increasing pressure as we explore deeper into the ocean (e.g., human-occupied submersibles).

**C.6.** Humans are adapted to survive within a particular range of temperatures, and thus require special equipment for protection from the cold temperatures in the ocean (e.g., wetsuits, dry suits, submersibles).

**C.7.** Ocean scientists and engineers develop specialized technology that allows the collection of complex information over large areas of the ocean without actually going under water themselves, such as satellites, sensors, computers, and robots.