Principle 6:
Grades 9-12

Principle 6:
The ocean and humans are inextricably interconnected.

Use of the Ocean

A. The ocean is essential to the existence of human life on Earth.

Where People Live

B. People choose to live in coastal areas for many reasons.

Weather Impacts People

C. Changes in the current patterns in the ocean can affect climate and weather.

Human Impact on the Ocean and Atmosphere

D. The exponential growth of human populations, together with technological advances, have exacerbated changes in the ocean and atmosphere.

Responsibility and Advocacy for the Ocean

E. Achieving sustainability of the diverse ecosystems & resources in the ocean depends upon collective and individual action based on scientific research and exploration.

A.1 The ocean has an incredible array of renewable and non-renewable resources that humans use.

A.2. Technology has enabled marine fisheries and aquaculture to produce increased amounts of food for humans.

A.3. The ocean provides most of the fresh water on Earth, and photosynthetic organisms in the ocean provide most of the oxygen on Earth.

A.4. Many of our medicines, chemicals (e.g., salt) and food products are extracted or derived from a variety of ocean life, including bacteria, algae, sponges and fish products.

A.5. Energy resources and raw materials are extracted from the sea floor, including mineral ores, crude oil and natural gas.

A.6. Increased human population, and thus increased demand for resources, as well as improved technology, are having environmental, social and ecological implications on the ocean.

B.1. The ocean is a continuous body of water connecting all the land masses, which in turn facilitates exploration, transportation and commerce.

B.2. The ocean supports the global economy and offers a host of opportunities for careers in commercial realms, recreation and scientific research.

B.3. Coastal areas provide moderate weather and climate.

B.4. Coastal areas provide opportunities for recreation, inspiration and rejuvenation.

B.5. Coastal areas are a source for cultural heritage.

B.6. Cultural exchange has occurred, and continues to occur, as ships carry people across the ocean.

C.1. Changes in the weather and climate affect biodiversity, migration patterns and fisheries, which may also adversely affect people.

C.2. Hurricanes, typhoons, tsunamis and storm surge have killed and adversely affect humans living along or near the coastline.

C.3. More effective global communication can provide warning to cities and remote areas, allowing sufficient time to minimize the effects of natural disasters on human populations.

D.1. Human activity contributes to global climate change.

D.2. Activities such as burning fossil fuels, the decay of organic waste in landfills and the emission of hydrofluorocarbons in industrial processes input more greenhouse gases into the atmosphere than are being removed (i.e., being absorbed into the ocean, or taken up by trees).

D.3. Thermal expansion of water and melting ice caps raises the sea level, which could displace a large fraction of the world's coastal populations and cause changes in ocean current patterns, affecting climate.

D.4. Human actions have increased the effect of natural hazards.

D.5. These human actions have increased the effects of storm surges, the intensity and number of hurricanes and tsunamis.

D.6. These human actions have intensified the effects of forest fires and droughts inland.

D.7. Humans contribute to some of the topographical changes of areas, such as beaches, bays, wetlands, the sea floor, and coral reefs.

D.8. Topography is altered by activities such as blast fishing, the construction of dams, jetties and landfills, and the drainage of wetlands.

D.9. The deliberate alteration of the ocean and/or terrestrial topography can have negative impacts on marine ecosystems.

D.10. Some of these impacts include sedimentation that block coral growth, and the destruction of fish habitats, the disruption of migration routes and loss of breeding and nesting areas for marine mammals, birds and turtles.

D.11. Humans contribute to biological changes of ocean ecosystems.

D.12. Ocean ecosystems are altered by activities that change symbiotic and predator/prey relationships.

D.13. Activities, such as the introduction of invasive species through bilge water, aquarium trade and poorly managed aquaculture and fisheries alter predator/prey relationships, which destabilizes food webs and leads to a loss of biodiversity.

D.14 Human activities that increase ocean temperature disrupt relationships between organisms such as symbiotic relationships between coral and zooxanthellae.

D.15. Humans contribute to biochemical changes in ocean ecosystems.

D.16. Increased carbon emissions into the atmosphere from factories and automobiles lead to increased carbon dioxide uptake by the ocean. This process results in a decrease of pH of ocean water, known as ocean acidification, and leads to changes in organisms and ecosystems, such as shell thinning and disrupting food webs.

D.17. Biomagnification of toxic substances leads to the decreased fitness of organisms, which disrupts ecosystems.

D.18. Activities, such as the use of nitrogen-based fertilizer, the improper disposal of pet waste and use of phosphorous-containing detergents, can dramatically impact the biological health of coastal ecosystems (e.g., phosphorous pollution, eutrophication, and algal blooms).

D.19. Rapid growth of some algae and dinoflagellates is responsible for the poisoning of marine birds, mammals and humans, as well as the smothering of coral.

E.1. The ocean historically has been seen as a common area: an inexhaustible resource exploited by many, but protected by no one.

E.2. Planning and action on a global, regional and local level can result in enforceable regulations, laws and accords aimed toward environmental sustainability.

E.3. Many marine resources are renewable with protection, regulation, education and support for the ocean.

E.4. There are laws that establish protected areas such as Marine Protected Areas and Marine Reserves.

E.5. There are state and federal laws that regulate activities such as fishing, polluting, dumping sewage, emitting air pollutants and oil drilling.

E.6. It is important for the public to learn about the issues regarding the ocean and to take action.

E.7. Make education about the ocean (e.g., through the media, and both formal and informal means) can help people understand the relevance of the ocean to their own lives and future, and that of future generations.

E.8. There are programs that offer consumer information about sustainably harvested seafood and other marine products.

E.9. Education helps people understand the impact of their personal choices in order to make informed decisions.

E.10. Air pollution and excess greenhouse gases can be reduced through simple actions, such as turning off electronics to use less electricity, walking and biking instead of driving, carefully sealing and insulating homes and using energy efficient appliances and light bulbs.

E.11. Biological and biochemical changes can be reduced through actions, such as eliminating the input of chemicals and other pollutants into our watersheds, not dumping into storm drains, not littering, using phosphorous-free detergents and investing in biodegradable household and gardening products.

E.12. Overfishing and the destruction of marine habitats can be reduced through actions, such as only buying and eating sustainably caught seafood and by respecting No Take Marine Protected Areas.

E.13. Compliance with regulations and laws concerning the protection of the ocean is a vital part of conserving marine resources.

E.14. Concerned citizens, including young people, can form community groups on a grassroots level to educate, conserve and restore coastal and marine habitats.

See Principle 1: A1
See Principles 4: A6
See Principle 7: A7
See Principle 7: B
See Principle 3: A6
See Principle 2: B11
See Principle 3: B5
See Principle 1: D6
See Principle 1: A1
See Principle 3: C
See Principle 5: C30
See Principle 2: B16
See Principle 2: B16 & B25
See Principle 5: C15
See Principle 1: A1
See Principle 7: A5
See Principle 7: A2
See Principle 2: B16
See Principle 3: C