Aice Marine Science Vocabulary

**Abiotic:** the environment’s geological, physical and chemical features, the nonliving part of an ecosystem.
- geological, physical, and chemical features
- geological features include: substrate type, topography, and suspended sediment.
- physical features include: water temperature, exposure to wind and sunlight, wave action, tides, currents, hydrostatic pressure, light intensity, and wavelength.
- chemical features include: organic nutrients, pH, salinity, oxygen, carbon, nitrogen, and phosphorus.

**Absorption spectrum:** a graph of the absorbance of different wavelengths of light by a compound such as a photosynthetic pigment

**Abyssal plain:** a flat, sandy region of the ocean floor found between the trenches and the continental rise, found along transform boundaries

**Accessory pigment:** a pigment that is not essential for photosynthesis but that absorbs light of different wavelengths and passes the energy to chlorophyll a, such as chlorophyll b, xanthophylls and phycobilins

**Action spectrum:** a graph showing the effect of different wavelengths of light on a process, e.g. on the rate of photosynthesis

**Active transport:** the movement of particles (or molecules) from a lower concentration to a higher concentration (against a concentration gradient), it requires additional energy in the form of ATP and the use of membrane protein pumps on the surface of cells

**Aerobic respiration:** the release of energy from glucose or another organic substrate in the presence of oxygen, the waste products are carbon dioxide and water
- chemical equation: \( C_6H_{12}O_6 + 6 \text{ O}_2 \rightarrow 6\text{CO}_2 + 6\text{H}_2\text{O} \)
- word equation: glucose + oxygen > carbon dioxide + water

**Ahermatypic:** soft corals that do not build reefs

**Alevin:** the first larval form of salmon, they possess a yolk and sac and remain within the gravel nests or redds

**Algal bloom:** a rapid increase in a population of algae
***Anaerobic respiration***: the release of energy from glucose or another organic substrate in the absence of oxygen, animals produce lactate as a waste product while plants and fungi produce ethanol and carbon dioxide

***Anchorage***: [boats] the portion of a harbor or estuary used for ships to anchor: [organisms] location on a substrate where a sessile organism attaches and lives

***Anomaly***: a result or observation that deviates from what is normal or expected. In experimental results it normally refers to one repeated result that does not fit the pattern of the others

***Aquaculture***: the rearing of aquatic animals and plants for human consumption or use
- can be extensive or intensive
- extensive aquaculture is less labor intensive and usually requires less capital investment, has low stocking densities and lower productivity
- intensive aquaculture requires more human input, has high stocking densities and high productivity

***Artificial reef***: an artificial underwater structure built to mimic the characteristics of a natural reef
- increases biodiversity, ecological stability, reduce wave energy and height

***Assimilated***: the conversion of a nutrient into a useable form that can be incorporated into the tissues of an organism

***Asthenosphere***: a nearly liquid layer made of the uppermost part of the mantle

***Atoll***: a coral reef somewhat circular in shape with a central lagoon

***Autotroph (autotrophic)***: an organism that can capture the energy in light or chemicals and use it to produce carbohydrates from a simple molecules such as carbon dioxide

***Barrier reef***: a reef separated by a lagoon from the land mess which it is associated

***Beach renourishment***: the process of dumping sand from another location onto an eroding shoreline to create a new beach or to widen the existing beach

***Benthic trawling***: a fishing method that drags a net along the seabed; wooden boards at the front of the net keep the net open and stir up the seabed, causing damage

***Bioaccumulation***: the accumulation of substances, such as pesticides or other chemicals, in an organism
**Biodiversity**: a measure of the number of different species present

**Biomagnification**: the increasing concentration of a substance, such as a toxic chemical, in the tissues of organisms at successively higher levels in a food chain

**Biomass**: the mass of living material in an area, it can be measured as dry mass (without the water) or wet mass

**Biotechnology**: the application of biological processes for industrial and other purposes, which can be the use of substances from living organisms, such as enzymes, or the use of the organisms themselves

**Biotic**: the living parts of an ecosystem, which includes the organisms and their effects on each other

**Carbohydrate**: organic compounds occurring in living tissues that contain carbon, hydrogen and oxygen, for example starch, cellulose and sugars; carbohydrates can be broken down in the process of respiration to release energy

**Catch per unit effort**: a measure of fish abundance calculated from the catch size divided by the fishing effort

**Chemoautotroph**: a producer that uses chemical energy to produce its own food energy

**Chemosynthesis (chemosynthetic)**: the production of organic compounds by bacteria or other living organisms using the energy derived from reactions with inorganic chemicals

**Chlorophyll**: a pigment found in plants and algae that is used to absorb sunlight for photosynthesis

**Chloroplast**: the photosynthetic cell organelle found in eukaryotes

**Climate change**: changes in global or regional climate patterns, especially changes that have been seen since the late 20th century

**Community**: all the different populations occupying a habitat at the same time

**Compensation point**: the light intensity at which the rate of photosynthesis and the rate of respiration are equal
**Competition:** a relationship between two organisms where both species are negatively affected by trying to fill the same ecological niche

**Condensation (condense):** when water changes from vapor to liquid; the energy needed to maintain the vapor state is released into the atmosphere

**Confounding variable:** a variable that could affect the dependent variable. In laboratory experiments these are the variables that must be controlled. In field experiments they are normally just measured and recorded

**Conservation:** the protection of plants, animals, and other organisms along with their habitats from extinction

**Consumer:** an animal that feeds on other organisms to gain its food energy

**Continental drift:** a theory supporting the possibility that continents are able to move over Earth’s surface

**Continental margin:** the submerged area next to a continent, which includes the continental shelf, continental slope, and continental rise.

**Continental rise:** a gently sloping surface at the base of the continental slope where sand deposits

**Continental shelf:** a gently sloping surface that extends from the low tide to the continental slope, typically where a great deal of sand deposits

**Continental slope:** a relatively steep sloping surface between the continental shelf and the continental rise

**Control group:** a group within an experiment or study that receives exactly the same treatment as the experimental groups with the exception of the variable being tested

**Control variables:** variables that are not being tested but that must be kept the same in case they affect the experiment

**Convection current:** the movement of fluids or air based on density differences caused by differing temperatures

**Convergent boundary:** when two or more tectonic plates come together
Coral bleaching: the loss of symbiotic algae from the tissues of corals as a result of environmental factors

Coriolis Effect: a force that results from the Earth’s rotation that causes objects or particles in motion to deflect to the right in the Northern Hemisphere and to the left in the Southern Hemisphere

Current: a continuous physical movement of water caused by wind or density

Cyanobacteria: group of photosynthetic bacteria found in marine and freshwater

Decomposers: bacteria and fungi that break down dead organic matter and release the nutrients back into the environment

Deep chlorophyll maximum: the maximum concentration of chlorophyll below the surface of a body of water

Delta: a low-lying triangular area at the mouth of a river formed by the deposition of sediments

Denaturation: the loss of shape of enzymes resulting in a loss of activity, usually the result of heating to a high temperature

Density: the mass per unit volume of a substance

Dependent variable: the variable being measured in an experiment

Deposition: a geological process where sediments, soil, and rocks are added to a landform or land mass

Desiccation: the process of drying out or losing moisture

Diatom: group of unicellular algae found in phytoplankton characterized by silica skeletons

Diazotroph: an organism that is able to grow without external sources of fixed nitrogen because it is able to fix nitrogen gas into substances like ammonia

Diffusion: the random movement of particles (or molecules) from a higher concentration to a lower concentration (down a concentration gradient); it is a passive process, not requiring the input of energy
**Dinoflagellate:** group of unicellular algae found in phytoplankton characterized by the presence two flagella

**Dissociation (dissociates):** a reversible chemical change where the molecules of a single compound separate into two or more other substances

**Dissolution:** the dissolving of a solute into a solvent

**Dissolved oxygen (DO):** oxygen that has dissolved into water

**Diurnal:** occurring daily

**Divergent boundary:** where two tectonic plates are moving away from each other

**DNA ligase:** an enzyme that joins the sugar-phosphate backbone of sections of DNA, it is used to recombine pieces of DNA

**Earthquake:** a sudden release of energy inside the Earth that creates seismic waves usually caused by a movement of tectonic plates or volcanic activity

**Ecological linkages:** the ecological relationships that exist between species and their environment within an ecosystem

**Ecological niche:** the role of a species within an ecosystem

**Ecosystem:** the living organisms and that environment with which they interact

**Ecotourism:** sustainable tourism that is associated with an appreciation of the natural world that minimises damage to the environment; it can benefit both environment and local populations

**Ectothermic:** an organism that maintains its body temperature by exchanging heat with its surroundings

**El Nino:** a warm current that develops off the coast of Ecuador around December, which can cause widespread death within local food chains

**Endosymbiosis:** a theory that suggest that chloroplasts were originally independent photosynthetic bacteria that were taken in by other cells
**Endothermic:** an organism that maintains its body temperature by generating heat in metabolic processes

**Enzyme:** a protein produced by a living organism that acts as a catalyst in a specific reaction

**Erosion:** a natural process where material is worn away from the Earth's surface and transported elsewhere

**Estuary:** a partially enclosed, tidal, coastal body of water where fresh water from a river meets the salt water of the ocean

**Euryhaline:** organisms, such as salmon, that are able to tolerate a wide range of salinities

**Eutrophication:** the process by which a body of water becomes enriched in dissolved nutrients (such as nitrates and phosphates) that simulate the growth of producers, usually resulting in the depletion of dissolved oxygen

**Evaporation:** a change in state from liquid to gas below the boiling point of a substance

**Exotic species:** species that are not native to a particular location

**Extensive aquaculture:** aquaculture that use little technology, low stocking densities and no artificial feeding

**External fertilization:** where gametes such as sperm and eggs are released and fuse outside the body

**Extremophile:** an organism that is adapted to survive extreme temperature, pressure, salinity, or pH.

**Fecundity:** the rate of reproduction of organisms, in fish the rate of egg production is often considered as a measure of fecundity

**Fish:** vertebrates that live in water and have gills and fins

**Food chain:** a way of describing the feeding relationships between organisms

**Food web:** a way of describing how food chains are interrelated in an ecosystem
**Fringing reef**: a reed close to and surrounding newer volcanic islands or that borders continental landmasses

**Fry**: the early, small larval stage if many fish, including salmon

**Gene**: a sequence of nucleotides in an organism’s DNA that codes for the production of a particular protein, it is the hereditary unit that codes for a characteristic of an organism

**Genetic engineering**: the modification of organisms by changing their genetic material, this can be the addition of genes from other species or the editing of genes that are already present

**Genotype**: the genetic constitution of an individual organism

**Geomorphology**: the study of the characteristics, origin, and development of landforms

**Global warming**: the observed and projected increases in the average temperature of Earth’s atmosphere and oceans due to an enhanced greenhouse effect

**Gradient**: the rate of increase or decrease of a characteristic relative to another

**Greenhouse effect**: the heating of the atmosphere due to the presence of carbon dioxide and other gases, these gases prevent infrared radiation being re-emitted into space

**Gross primary production**: the amount of light or chemical energy fixed by producers in a given length of time in a given area

**Growth rate**: the speed of growth of a population in terms of numbers or size of individual fish

**Habitat**: the natural environment where an organism lives

**Halocline**: a layer of water below the mixed surface layer where a rapid change in salinity can be measured as depth increases

**Hermaphroditism**: able to produce both male and female gametes

**Hematypic**: hard coral capable of reef-building

**Heterotroph (heterotrophic)**: an organism that cannot make its own food and instead relies on consuming other organisms; all animals, fungi, and protozoans are heterotrophic, as well as most bacteria
**Hurricane**: a tropical cyclone with wind speeds of more than 120 kmh, generally applied to those occurring in the Atlantic Ocean and northern Pacific Ocean

**Hydrothermal vent**: an area where cold ocean water that has seeped into the Earth’s crust is superheated by underlying magma and forced through vents into the ocean floor

**Hypersaline**: when a body of water has a salinity level greater than 25%

**Hypothesis**: an explanation of an observation that can be tested through experimentation

**Hypoxic**: an explanation of an observation that can be tested through experimentation

**Independent variable**: the variable being changed in an experiment

**Infauna**: animals living within the sediments of the ocean floor, river, or lake beds

**Infiltration**: part of the water cycle where water soaks into the soil from the ground level and moves underground

**Intensive aquaculture**: aquaculture that uses intensive methods such as high stocking densities and artificial feeding to maximize production

**Internal fertilization**: when gametes such as sperm and eggs fuse inside the body of a parent

**Isostasy**: a process similar to buoyancy but related to the Earth’s crust floating on the flexible mantle

**Juvenile**: the stage of life cycle that is not sexually mature

**Keystone species**: a consumer that affects biodiversity to a greater extent than would be expected from its population numbers

**K-strategist**: an organism that produces few offspring but provides a large amount of parental investment

**Larval**: the immature form of animals that undergo some metamorphosis, often having different food sources and habitats to avoid competition with the adults

**Latent heat**: the quantity of heat gained or lost per unit of mass as a substance undergoes a change of state (e.g. vapor to liquid)
Leaching: a process by which water-soluble nutrients are removed from the soil and dissolve in water that is flowing to the sea (run-off)

Lithosphere: the outermost layer of the Earth’s crust

Littoral zone: the benthic, or bottom, zone between the highest and lowest spring tide shorelines, also referred to as the intertidal zone

Mantle: a region of molten rock within the interior of the Earth, between the core and the crust

Marine protected area (MPA): an area of ocean or coastline where restrictions have been placed on activities the levels of restriction may vary, some may be no-take areas where no fishing is permitted, others may allow some fishing, some may ban all access to unauthorized people, while others may allow restricted access

Marine snow: particles of organic material that fall from surface waters to the deeper ocean

Maximum sustainable yield (MSY): the intensity of fishing that can be carried out without reducing future populations

Meniscus: the curve in the upper surface of a liquid inside a container. It is caused by surface tension and can be concave or convex

Mid-ocean ridge: a mountain range with a central valley on an ocean floor at the boundary between two diverging tectonic plates, where new crust forms from upwelling magma

Monsoon: seasonal winds in India that blow from the south-west during the summer and the north-east during the winter

Morphology: the study of the forms of things

Mortality rate: the death rate; natural mortality is the death rate arising from natural causes, while fishing mortality is the death rate caused by fishing

Mutualism: a relationship between two different organisms where both organisms benefit

Mysis: the later larval form of crustaceans, shrimp mysis larvae drift to coastal areas
Neap tide: a tide that occurs when the Moon and Sun are at right angles from each other, causing the smallest tidal range

Net primary production: the amount of energy that is left over after respiration to be made into new plant biomass

Nursery ground: important habitats of oceanic water where young fish and other species find food and shelter from predators, e.g. mangroves

Nutrient: a chemical that provides what is needed for organisms to live and grow

Nutrient cycles: the movement and exchange of elements that are essential to life, from inorganic molecules, through fixation and then into living organisms before being decomposed back into inorganic molecules

Ocean: a continuous mass of seawater in the Earth's surface, its boundaries formed by continental land masses, ridges on the ocean floor, or the equator

Ocean acidification: a reduction in the pH of the ocean over an extended period of time, caused primarily by uptake of carbon dioxide from the atmosphere

Osmoconformer: organisms that have an ionic and salt concentration that is the same as the surrounding water

Osmoregulation: the process of regulating the internal water and ion content of an organism

Osmoregulator: organisms that regulate their internal salt and ion balance at a constant level, which may differ from the surrounding water

Osmosis: the movement of water from a higher water potential (more dilute solution) to a lower potential (higher concentration of solute) across a selectively permeable membrane

Oxygen minimum layer: the layer within the ocean where the concentration of dissolved oxygen is at its lowest, typically found between 100 and 1000 meters deep

Parasitism: a relationship between two organisms where the parasite obtains benefit at the expense of the host

Parental investment: the amount of care and nutrition that parent organisms give to offspring

Patch reef: small, isolated reef usually located within the lagoon of a barrier reef
**Pediveliger:** the third-stage larva of molluscs, characterized by the development of a foot

**Phenotype:** the observable characteristics of an individual resulting from the interaction of its genotype with the environment

**Photoautotroph:** a producer that uses light energy to produce its own food energy

**Photosynthesis (photosynthetic):** the process of using light energy to synthesis glucose from carbon dioxide and water

**Phytoplankton:** microscopic photosynthetic organisms that live in the upper, sunlit layers of water

**Plasmid:** a small circular DNA strand in the cytoplasm of a bacterium, they are used as vectors in the laboratory manipulation of genes

**Plate tectonics:** the process where large sections (‘plates’) of the Earth’s crust are in constant movement over the fluid mantle, causing earthquakes and volcanoes at the borders between the plates.

**Population:** all the individuals of the same species that live at the same place and time

**Precautionary principle:** a strategy to cope with possible risks where scientific understanding is yet incomplete, such as the risks of releasing genetically modified organisms; it tries to ensure that all possible consequences of a new technology are considered before allowing it to be used

**Precipitation:** water the falls from the atmosphere to the Earth’s surface such as rain, sleet, snow, or hail

**Predation:** a relationship between two organisms where a predator hunts, kills, and eats a prey animal

**Predator:** an animal that kills and eats animals for food

**Prediction:** a statement of the expected results in an experiment based on the hypothesis being tested

**Prey:** an animal that is eaten by predators

**Primary pigment:** photosynthetic pigment that is directly involved with photosynthesis
**Primary producer**: organisms that produce biomass from inorganic compounds, in almost all cases there are photosynthetically active organisms

**Producer**: an organism that can produce its own food energy

**Promoter**: a section of DNA that is often located in front of a gene, it is responsible for the ‘switching on and off’ a gene

**Protozoa**: the second-stage larva of crustaceans such as shrimp, typically planktonic these larvae pass through several forms as they grow

**Pumped ventilation**: ventilation of gills by the muscle action of the mouth pumping water over the gills, it can occur when the fish is stationary

**Purse seine**: a seine net used to capture pelagic shoals of fish, it has a series of ropes that are used to close it and trap the fish before hauling them on board

**Pycnocline**: a boundary between two layers of water with different densities

**Pyramid of biomass**: a diagram that shows the biomass present in each trophic level of a food chain

**Pyramid of energy**: a diagram that shows the amount of energy in each trophic level of a food chain

**Pyramid of numbers**: a diagram that shows the number of organisms in each trophic level of a food chain

**Qualitative data**: descriptive data about a variable, for example color or behavior

**Quantitative data**: numerical data that give the quantity, amount, or range of a variable, for example concentration of oxygen or number of eggs laid

**Radiocarbon dating**: process used to estimate the age of organic material by measuring the radioactivity of its carbon content (also called carbon dating)

**Ram ventilation**: ventilation of gills by swimming with the mouth open so that a constant flow of water passes through the mouth and over the gills, it only occurs when a fish is swimming

**Recruitment**: the arrival of new organisms in a population, for fish it is often considered to be the stage at which fish have reached an age when they can be caught in nets
**Reef erosion:** the gradual wearing away of a coral reef by the action of living organisms (bioerosion) and physical factors, such as storms

**Refute (a hypothesis):** submitting evidence that shows that a hypothesis is not correct

**Reliable:** results that can be replicated by other people

**Reproductive maturity:** the time when an organism is able to reproduce sexually

**Reservoir:** part of the abiotic phase of the nutrient cycle where nutrients can remain for long periods of time

**Residence time:** the average time that a particle spends in a particular system

**Respiration:** the process by which all living things release energy from their food by oxidizing glucose

**Restriction endonuclease:** enzyme that cuts DNA at specific internals, palindromic sequences, they are used in genetic engineering

**Ribosome:** cell organelle involved in protein synthesis

**r-strategist:** an organism that produces large numbers of offspring while providing little parental investment

**Run-off:** the flow of water from land caused by precipitation

**Salinity:** a measure of the quantity of dissolved solids in ocean water, represented by parts per thousand, ppt, or 0/00

**Saprophytic (saprophyte):** decomposers that feed on dead organic matter (‘death eater’)

**Sea:** a continuous mass of seawater on the Earth’s surface, part of the ocean, that is partially enclosed by land, so seas are found where the ocean and land meet

**Secondary production:** the rate of production of new biomass by consumers, using the energy gained by eating producers

**Sedimentation:** the act or process of depositing sediment from a solution (e.g. seawater)
**Selective breeding:** the process by which humans use animal and plant breeding to develop particular characteristics selectively, choosing which animals or plants are used for sexual reproduction and then selecting the offspring that are required; this is also known as artificial selection

**Semi-diurnal:** occurring twice daily

**Shellfish:** aquatic invertebrates that are used as food, including shelled mollusks, crustaceans, and echinoderms, such as bivalves, crabs, lobsters, and sea urchins

**Shoaling:** when fish swim together in a group

**Sink:** an area where there is a net loss of material (for example: where more gas dissolved into the ocean than diffuses into the atmosphere)

**Smolt:** form of salmon that occurs when parr lose their markings while in estuaries, they are adapted for marine life by being silver in color and elongated in shape

**Solubility:** the ability of a solute to dissolve into a solvent

**Source:** an area where there is a net gain of material (for example: where more gas diffuses into the atmosphere than dissolved in the ocean)

**Species:** a group of similar organisms that can interbreed naturally to produce fertile offspring

**Spring tide:** a tide that occurs when the Sun and Moon are aligned, causing the largest tidal range

**Stakeholder:** a person who has a vested interest, for any reason, in an area or project

**Stroma:** the fluid part of a chloroplast in which the carbohydrates are synthesized

**Subduction:** the process where one lithospheric plate slides below another at a convergent plate boundary

**Subsidence:** sinking of land

**Succession:** the change in community structure over time
**Surface area to volume ratio:** an index that gives a relative measure of both surface area and volume, exchange organs generally have a very high surface area : volume ratio

**Sustainable aquaculture:** aquaculture that causes less short- and long-term damage to the environment, economy, and local community

**Sustainable development:** development that meets the needs of the present without compromising the ability of future generations to meet their needs

**Sustainable fishing:** fishing up to the maximum sustainable yield so that future fish stocks are not at risk of being depleted

**Theory:** a well-substantiated explanation of an aspect of the natural world that has been repeatedly tested and confirmed through observation and experimentation

**Thermocline:** a boundary between two layers of water with different temperatures

**Thylakoid:** a flattened, membrane-bound, fluid-filled sac that is the site of the light-dependent reactions of photosynthesis in a chloroplast

**Tidal range:** the difference in height between the high-tide mark and the low-tide mark over the course of a day, also called the tidal amplitude

**Tidal surge:** the coastal flood or tsunami-like phenomenon of rising water, associated with low pressure weather systems, also called a storm surge

**Tide:** the periodic rise and fall of the surface of the ocean resulting from the gravitational pull of the Moon and Sun

**Transform boundary:** when two plates are moving in an antiparallel direction, creating friction between them

**Transgenic organism:** an organism that contains genetic material into which DNA from an unrelated organism has been introduced

**Trench:** a long, narrow and deep depression on the ocean floor with relatively steep sides, caused by convergent plate boundaries

**Trochophore:** the first larval stage of mollusks such as giant clams and oysters, they move using cilia and are planktonic
**Trophic level:** a position in a food chain or food web

**Tropical cyclone:** a localized, intense low-pressure wind system that forms over tropical oceans with strong winds

**Tsunami:** a seismic sea wave created by an underwater earthquake or volcanic event, not noticeable in the open ocean but building to great heights in shallow water

**Typhoon:** a tropical cyclone in the Indian Ocean or western Pacific Ocean

**Upwelling:** the movement of cold, nutrient-rich water, from deep in the ocean to the surface

**Variable:** a condition in an experiment that can be controlled or changed

**Vector:** a section of DNA, typically a plasmid, that is used to transfer DNA from one organism to another

**Veligier:** the second-stage larva of mollusks, characterized by the presence of a vellum organ used for feeding and movement, and a shell

**Volcano:** a mountain or hill with a crater or vent through which lava, rock fragments, hot vapor and gas are being forced from the Earth’s crust

**Water potential:** a measure of the potential energy of water in a solution and thus the tendency of water to move from one place to another; the more solute that is dissolved in a solution, the lower the water potential

**Zonation:** a separation of organisms in a habitat into definite zones or bands according to biological and physical factors, common in rocky shore habitats

**Zooxanthellae:** symbiotic, photosynthetic dinoflagellates living within the tissues of many invertebrates