

APES introductory vocabulary words and unit conversions

anthropogenic (Greek roots: anthropo- = mankind; -gen = origin): Having its origin in the activities of mankind. For example, anthropogenic carbon dioxide comes from the burning of fossil fuels.

aquaculture (Latin: aqua- = water; -culture= to care for) using farm techniques to grow and harvest aquatic organisms such as fish (ex.: salmon; tilapia) shellfish (shrimp, oysters) or algae.

atmosphere: (Greek roots: atmo- = vapor, air, gas; -sphere = ball, round) the envelope of gases surrounding the Earth and held to it by the force of gravity.

autotroph (Greek roots: auto=self; troph=nutrition): an organism capable of making its own food from inorganic (non-living) substances using light or chemical energy.

binomial nomenclature (Latin roots: bi=two; nomial=name; clature=to call) – In biology, a pair of Latin words forming a scientific name in the classification of all organisms, e.g., *Homo*=man; *sapiens*=wise, or wise man.

bioaccumulation: (Greek roots: bio- = life; accumul- = heap up; -ation = process) the increasing concentration of a compound in the bodies of living organisms at higher levels in the food chain (leads to **biomagnification** of toxins such as mercury and DDT).

biodegradable: (Greek roots: bio- = life; de- = from; grad- = steps) any material that can be broken down or decomposed by the action of living organisms.

biodiversity (Greek root: bio=life; Latin roots: divers-=different; -ity=condition): when referring to **species diversity**, the number and variety of organisms in a given community or ecosystem at a given time.

biogeochemical cycle: (Greek roots: bio- = life; geo- = earth) Natural processes that recycle nutrients in various chemical forms from the nonliving environment to living organisms and then back to the nonliving environment.

biosphere (Greek roots: bio=life; sphere=ball, round): parts of the earth's air, water and soil where life is found; all living organisms and their environment.

climatology: (Greek roots: climat- = slope, incline; -ology = branch of knowledge) the study of **long-term** and **large-scale** trends of variables associated with weather **patterns** (ex. prevailing or average temperature, humidity, rainfall).

commensal (Latin: com- = with, together; *mensalis* = "of the table") Living in a relationship when one organism gets food or other benefits from another organism or group without doing any harm to it.

conservation (Latin: con- = together; -serva = to preserve; -tion = process or action) a careful preservation and protection of something; especially planned management of a natural resource to prevent exploitation or destruction.

consumption (Latin: con- = together; sump = to take; -tion = process or action) the process of using natural resources, materials, or products to satisfy human **wants** (ex: plastics) and **needs** (ex: water).

convection: (Latin roots: con- = with; -vect = to carry) the vertical circulatory pattern in a fluid at non-uniform temperature caused by the variation of its density and the force of gravity.

cryosphere: (Greek roots: cryo = ice; sphere = ball, round) the region of the Earth's surface that is characteristically covered by snow and ice.

desalination: (Latin roots: de = from; salin- = salt) the process of removing salt from seawater or brackish water through evaporation or reverse osmosis.

ecology (Greek: eco- = house; -ology = study of) The branch of the biological sciences that deals with the relationship between organisms and their environment, including their relationship with other organisms.

ectotherm (Greek roots: ecto=outside; therm=heat): a “cold-blooded” animal; meaning body temperature is controlled by the external environment (reptiles, amphibians, and most fish).

endotherm (Greek roots: endo=within; therm=heat): a “warm-blooded” animal; such as, an organism that maintains its body temperature by producing heat within the body (mammals, birds, some fish).

epipelagic (Greek roots: epi=above; pelagic=sea): Relating to or living in the upper zone of the ocean, from the surface to a depth of about 200 meters (656 feet).

erosion (Latin: ros- = eat away): a process of being gradually worn away. Erosion of coasts depends on exposure to wave activity.

estuary (Latin: estu- = ebb and flow of the sea; -ary = a place where) – a body of water partially surrounded by land, where freshwater mixes with ocean water (e.g., Biscayne Bay, Florida Bay).

euphotic zone (Greek: eu- = good; photo = light) the well lit upper region of the photic zone where most photosynthesis takes place in the ocean.

eustatic change (Greek: eu- = good; -static = to place) variation in sea-level that can be measured over the world ocean (eustatic change leads to changes in the locations of coasts as ocean volume changes).

eutrophication (Greek: eu- = good; troph- = feeding; -ation = action of) an overabundance of nutrients that causes an ecological imbalance and may lead to harmful algal blooms (HABs) such as red tides.

hemisphere: (Greek roots: hemi = half; sphere = ball, round) one half of the earth; especially, a half north or south of the equator or west or east of the prime meridian.

heterotroph (Greek roots: hetero=different, other; troph=food, nutrition): an organism such as animal, fungus or bacterium that is unable to synthesize organic compounds and must consume other organisms or their organic products.

hydrosphere: (Greek roots: hydro = water; sphere = ball, round) the portion of the Earth that is water, including liquid water, ice, and water vapor; on the surface, underground, or in the atmosphere.

hypothesis: (Greek roots: hypo- = under, less than; -thesis = a placing, proposition) a tentative explanation for something in the natural world that may be verified or disproved by observation or experimentation.

moratorium (Latin: mora- = delay; -torium= performing an action) a waiting period, a suspension of an activity, e.g., a moratorium on whaling.

neuston (Greek root *neusto-* = float): plankton that lives on the water's surface (ex.: Portuguese Man-of-War).

oscillation: (Latin roots: *oscill-* = swing; *-ation*= process) the action or state of swinging back and forth between two points. In climatology, the southern oscillation influences climate and weather.

oviparous: (Latin roots: *ovi-* = egg, *-parous* = to bear): reproduction in which female lays eggs that mature and hatch outside of the body.

paleoclimatology: (Greek roots: *paleo-* = old; *climat-* = incline; *-ology* = branch of knowledge) the study of climatic conditions, and their causes and effects, in the geologic past, using evidence found in glacial deposits, fossils, and sediments.

photosynthesis (Greek: *photo* = light; *syn* = with) - the production of organic substances, primarily sugars, from carbon dioxide and water in green plant cells and algae cells.

phytoplankton (Greek roots: *phyto*=plant; *plankton*=drifter): plant-like algae that drift with the currents, get energy from sunlight (photosynthesis) and use carbon dioxide (CO₂) and nutrients from their environment to grow. Diatoms are the pre-dominate group and provide food for many zooplankton species.

salinity: (Latin roots: *salin-* = salt; *-ity* = state, property) A measure of the **total** concentration of dissolved ions (e.g., Na, Cl, Mg, Ca, K) in sea water, usually measured in parts per thousand.

sediment (Latin roots: *sed*=sit, sitting; *-ment*=result of): solid fragments of material that come from the weathering of rock and are carried and deposited by wind, water, or ice.

subduction: (Latin roots: *sub-* = below, under; *duct* = draw along) the action or process in plate tectonics of one crustal plate descending below the edge of another (in the case of oceanic crust this process forms trenches).

subsidence (Latin: *sub-* = under, below; *-sid* = sit): the sinking down of land resulting from natural shifts or human activity (for example New Orleans is slowly subsiding or sinking below sea level).

sustainable: (Latin roots: *sus-* = below; *-tain* = hold; *-able*=capable) capable of being used without being completely used up or destroyed (ex. sustainable fishing practices or sustainable energy resources).

sympiosis (Greek: *sym-*= with; *bios* = life) the co-occurrence of two species in which the life of one is closely interwoven with the life of the other; mutualism, commensalism, or parasitism.

taxonomy: (Greek roots: *taxo*=arrangement; *nomy*=law): The classification of organisms (plants, animals, others) in an ordered system that indicates their presumed natural relationships.

topography: (Greek roots: *topo-* = place, position; *-graphy* = record, describe) the general configuration of a surface, including its relief; may be a land or water-bottom surface.

vaporization: (Latin roots: *vapor-* = steam, mist; *-ization* = action, process) the change of state in water from a liquid to gas, requiring the breaking of hydrogen bonds.

viviparous: (Latin roots: *vivi-* = live, *-parous* = to bear): reproduction in which the young develop inside the adult female and are born alive and not as eggs (e.g., dolphin, polar bear, seal).

Table 1 Some Common Metric Conversions

| | | |
|------------------|--------------------|-----------------------------|
| gallons/liters | 1 US gal = 3.8 L | One US gallon = 3.8 Liters |
| liters/gallons | 1L =0.264 U.S. gal | One Liter =0.264 US gallons |
| meters/yards | 1m =1.094 yd | One meter = 1.094 yards |
| yards/meters | 1yd = 0.914 m | One yard = 0.914 meters |
| grams/ounces | 1g = 0.035 oz | One gram= 0.035 ounce |
| ounces/grams | 1 oz = 28.35 g | One ounce = 28.35 grams |
| kilograms/pounds | 1 kg = 2.2 lb | One kilogram = 2.2 pounds |
| pounds/grams | 1 lb = 454 g | One pound = 454 grams |
| miles/kilometers | 1 mi = 1.609 km | One mile =1.609 kilometers |
| kilometers/miles | 1 km = 0.621 mi | One kilometer = 0.621 mile |

Table 2 Conversion Factors for Area

| | | |
|--------------------------------|---|--|
| Square miles/square kilometers | 1 mi ² = 2.6 km ² | One square mile = 2.6 square kilometers |
| Square kilometers/square miles | 1km ² = 0.39 mi ² | One square kilometer = 0.39 square miles |
| Hectares/acres | 1 ha =2.47 acres | One hectare = 2.47 acres |
| Acres/hectares | 1 acre = 0.4 ha | One acre = 0.4 hectares |
| Square yards/ square meters | 1 yd ² = 0.84m ² | One square yard = 0.84 square meters |
| Square meters/ square yards | 1m ² = 1.2 yd ² | One square meter =1.2 square yards |

Table 3 Units of the Metric System: Conversions

| | |
|--|---|
| Units of Distance: The fundamental unit is the <i>meter</i> | |
| 1000 (10 ³) m= 1 km | One thousand meters = one kilometer |
| 100 (10 ²) m= 1 m | One hundred centimeters = one meter |
| 10 (10 ¹) mm= 1cm | Ten millimeters = one centimeter |
| 1000 (10 ³) μm= 1mm | One thousand micrometers = one millimeter |

| | |
|--|---|
| Unit of Mass: The fundamental unit is the <i>gram</i> | |
| 1000kg = 1metric ton | One thousand kilograms = One metric tonne (spelled tonne) |
| 1000g = 1 kg | One thousand grams = one kilogram |
| 1000mg = 1g | One thousand milligrams = one gram |
| 1,000,000 (10 ⁶) ng = 1mg | One million nanograms=one milligram |
| Units of Volume: The fundamental unit is the <i>liter</i> | |
| 1000L = 1m ³ | One thousand liters = 1 cubic meter |
| 1000mL = 1 L | One thousand milliliters= 1 liter |

Table 4 Metric Prefixes and Equivalents

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|----------------------|------------------------|--------------------------------------|
| Large Numbers | | |
| One thousand | =1,000 | =10 ³ (kilo or k) |
| One million | =1,000,000 | =10 ⁶ (mega or M) |
| One billion | =1,000,000,000 | =10 ⁹ |
| One trillion | =1,000,000,000,000 | =10 ¹² |
| One quadrillion | =1,000,000,000,000,000 | =10 ¹⁵ |
| Small Numbers | | |
| One hundredth | =1/100 | =10 ⁻² (centi or c) |
| One thousandth | =1/1000 | =10 ⁻³ (milli or m) |
| One millionth | =1/1,000,000 | =10 ⁻⁶ (micro or mc or μ) |
| One billionth | =1/1,000,000,000 | =10 ⁻⁹ (nano or n) |