Types of ecosystems: terrestrial and aquatic, with examples

An ecosystem is a community of living things plus the non-living environment they interact with, at any scale (a rock pool to a rainforest). Biotic parts: producers, consumers, decomposers. Abiotic parts: sunlight, temperature, water, air, soil, climate. Energy flows one way (about 90% lost per step); matter cycles.

Terrestrial	Climate	Plants	Animals	Example
Tropical rainforest	hot and wet all year	tall evergreen layers, lianas, epiphytes; poor soil	greatest land biodiversity: monkeys, jaguars, toucans	Amazon, Congo, Borneo
Temperate deciduous forest	four seasons, 750-1,500 mm	oak, beech, maple; rich soil	deer, foxes, squirrels, badgers	eastern USA, Europe
Boreal forest (taiga)	long cold winters	conifers; acidic podsol	moose, wolves, lynx, bears	Canada, Scandinavia, Siberia
Tropical savanna	hot; wet and dry seasons	grasses, scattered acacia, baobab; fire	zebra, wildebeest, elephant, lion	Serengeti, northern Australia
Temperate grassland	hot summers, cold winters, 250-750 mm	grasses; deep fertile soil	bison, pronghorn, saiga	Great Plains, steppe, pampas
Hot desert	very hot days, cold nights, under 250 mm	cacti, succulents	camels, fennec fox, scorpions; nocturnal	Sahara, Sonoran, Australian
Cold desert	cold winters, dry	sparse shrubs	Bactrian camels, jerboas	Gobi, Great Basin, Patagonia
Tundra	very cold, permafrost, under 250 mm	mosses, lichens, dwarf willow; no trees	caribou, Arctic fox, lemmings, snowy owl	northern Canada, Alaska, Siberia
Mountain	zones change with altitude	forest, then alpine meadow, then rock	mountain goats, pikas, condors	Rockies, Alps, Himalayas

Aquatic	Water	Producers	Animals	Example
Lakes and ponds (lentic)	still fresh water, zoned by light	reeds, lilies, phytoplankton	perch, pike, frogs, ducks, otters	Lake Superior, a garden pond
Rivers and streams (lotic)	flowing, oxygen-rich	algae on stones, bankside trees	trout, carp, mayfly larvae, kingfishers	Nile, Mississippi, Murray
Wetlands	shallow, waterlogged	reeds, sedges, mangroves, sphagnum	wading birds, frogs, alligators; fish nurseries	Everglades, Pantanal, Kakadu
Estuaries	brackish, tidal, nutrient-rich	salt-marsh grass, seagrass, mangroves	shellfish, crabs, young fish, birds	Thames estuary, Chesapeake Bay
Intertidal shore	covered and uncovered twice a day	seaweeds, lichens	barnacles, limpets, crabs, anemones	rock pools
Coral reefs	warm, clear, shallow, salty	zooxanthellae in the coral	a quarter of marine species	Great Barrier Reef, Red Sea
Open ocean (pelagic)	sunlit top 200 m, then dark	phytoplankton (half the world's O2)	tuna, whales, dolphins, jellyfish	Pacific, Atlantic
Deep sea (abyssal)	no light, about 4 °C, high pressure	none, except vent bacteria	anglerfish, giant squid, tube worms	Mariana Trench, vents

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The parts of an ecosystem, the definitions, and a practice set

	Component	Role	Examples
Biotic	producers	make food by photosynthesis (or chemosynthesis)	plants, algae, phytoplankton
	consumers	eat others: herbivores, carnivores, omnivores	rabbit, fox, eagle
	decomposers and detritivores	break down dead matter, return nutrients	fungi, bacteria, earthworms
Abiotic	sunlight; temperature; water	energy source; metabolic rates; availability and salinity	
	air and gases; soil or substrate; climate and disturbance	O2, CO2, wind; nutrients, pH, texture; rainfall, fire, flood	

Term	Meaning	Example
Population	all individuals of one species in a place	the frogs in a pond
Community	all populations of all species in a place	frogs, fish, insects, plants, bacteria of the pond
Habitat	where an organism lives	the pond is the frog's habitat
Ecosystem	community + non-living environment, interacting	the pond with its water, light, mud and life
Biome	a world region with one climate type and its ecosystems	the temperate forest biome
Artificial ecosystem	made and maintained by people: low biodiversity, constant inputs	wheat field, city park, reservoir, aquarium

Curriculum	Where
US NGSS	5-LS2-1; MS-LS2-1 to 5; HS-LS2
England	KS2 habitats; KS3 interdependence; GCSE Ecology (abiotic and biotic factors, sampling practical)
Australia	Year 7 AC9S7U02 food webs; Year 9 ecosystems; Years 11-12
CBSE	Class 10 Our Environment (natural and artificial); Class 12 Ecosystem
Ontario	Grade 7 interactions in the environment; Grade 9 sustainable ecosystems

Practice

1. Define an ecosystem and name its two kinds of components with two examples each.
2. Which terrestrial ecosystem has the greatest biodiversity, and why is its soil poor?
3. Match each animal to its ecosystem: caribou, camel, jaguar, bison, anglerfish, barnacle.
4. Lentic against lotic: the difference, with an example of each.
5. Three ways an artificial ecosystem differs from a natural one.
6. A pond, the temperate forest biome and the frogs in the pond: which is a population, an ecosystem, a biome?

Answers

1. A community plus its non-living environment, interacting; biotic (plants, fungi) and abiotic (sunlight, water). 2. Tropical rainforest; the nutrients are held in the living plants and heavy rain leaches the soil. 3. Tundra; hot desert; tropical rainforest; temperate grassland; deep sea; intertidal shore. 4. Lentic is still water (a lake); lotic is flowing water (a river). 5. Low biodiversity (often one species), short food chains, not self-sustaining (needs water, fertiliser, pest control). 6. Frogs: population; pond: ecosystem; temperate forest: biome.