



AP[®] Environmental Science

Course and Exam Description Clarifications and Corrections

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To be Implemented for Fall 2026

Framework Clarifications

In order to provide clarity, accuracy, and alignment with current environmental science disciplinary domain knowledge, clarifications are being made to the AP Environmental Science course framework. The following clarifications will be made to one learning objective and select essential knowledge statements in the AP Environmental Science Course and Exam Description in the summer of 2026, and will be effective for the 2026-2027 school year:

- Topic 1.5 The Nitrogen Cycle
 - ERT-1.E.1 The nitrogen cycle is the movement of atoms and molecules containing the element nitrogen between sources and sinks. It involves several steps, including nitrogen fixation, assimilation, ammonification, nitrification, and denitrification. Microorganisms in the soil play an important role in many of these steps.
 - ERT-1.E.2 In nitrogen fixation, atmospheric nitrogen (N_2) is converted by certain types of soil bacteria into ammonia (NH_3). In the soil, ammonia quickly converts to ammonium (NH_4^+), which is available for biological uptake.
 - ERT-1.E.3 The availability of nitrogen compounds in the soil is limited by the rate of nitrogen fixation. In many ecosystems, the availability of nitrogen compounds limits primary production by plants and other producers.
 - ERT-1.E.4 The largest reservoir of nitrogen is the atmosphere. Most of the reservoirs in which nitrogen compounds occur in the nitrogen cycle hold those compounds for relatively short periods of time.

- Topic 1.6 The Phosphorous Cycle
 - ERT-1.F.2 The major reservoirs of phosphorus in the phosphorus cycle are rock and ocean sediments that contain phosphorus-bearing minerals. The phosphorus cycle lacks a significant atmospheric component.
 - ERT-1.F.3 Phosphorus is relatively scarce in ecosystems because rocks weather slowly. As a result, phosphorus is often a limiting nutrient for plants and other producers, particularly in freshwater and some terrestrial ecosystems.
- Topic 1.11 Food Chains and Food Webs
 - ENG-1.D.1 A food chain depicts the flow of energy and matter from producers (autotrophs) to primary consumers (herbivores) and secondary and tertiary consumers (omnivores and carnivores). Detritivores and decomposers play an essential role in food chains and food webs by returning nutrients to the soil. A food web is a model of an interlocking pattern of food chains that depicts the flow of energy and matter in two or more food chains.
- Topic 2.6 Adaptations
 - **Learning Objective:** ERT-2.H Explain how populations respond to changes in their environment.
 - ERT-2.H.1 Natural selection acts on heritable traits, causing populations to adapt to their environment over generations via incremental changes at the genetic level.
- Topic 3.8 Human Population Dynamics
 - EIN-1.C.1 Human population growth and decline are determined by the rates of birth, death, immigration, and emigration. Birth rates and death rates are affected by factors such as access to education, family planning, healthcare, and nutrition.
 - EIN-1.C.4 The rate of natural increase (RNI) is a demographic metric measuring population growth or decline, calculated by subtracting the crude death rate from the crude birth rate, typically expressed as a percentage. One way to estimate the doubling time of a population is by dividing 70 by the annual population growth rate expressed as a percentage.
- Topic 4.3 Soil Composition and Properties
 - ERT-4.C.4 A soil texture triangle is a diagram that allows for the identification and comparison of soil types based on their percentages of clay, silt, and sand. Loam consists of a blend of clay, silt, and sand that can support a variety of crops.
- Topic 5.5 Irrigation Methods
 - EIN-2.E.1 On a global scale, approximately 70% of human freshwater consumption is used for agriculture.
- Topic 5.7 Meat Production Methods
 - EIN-2.H.1 Methods of meat production include feedlots and concentrated animal feeding operations (CAFOs), as well as pasture-based systems, such as rotational grazing and free-range grazing.
 - EIN-2.I.1 Meat production requires more land, water, and energy per gram of protein produced than the production of plant-based foods, and it increases nutrient pollution and emissions of greenhouse gases, such as methane. The environmental impacts of meat production vary by the type of livestock raised and production practices used.
 - EIN-2.1.2 Concentrated animal feeding operations (CAFOs) can be more economically efficient, which lowers costs for consumers. Animals raised in CAFOs are kept in confined spaces and fed grain- and soy-based diets. CAFOs have high concentrations of manure that can contaminate nearby waterways if not properly managed. Routine use of antibiotics in CAFOs can contribute to the global risks of antibiotic resistance.
 - EIN-2.1.3 Free-range or pasture-based grazing systems allow animals to feed on grass or forage for most of their lives. Rotational grazing can improve the sustainability of these systems. Manure delivers nutrients to pasture soils, but runoff and erosion risks remain if animal density is high.

These systems require more land, leading to higher consumer costs. Not all free-range systems are antibiotic-free.

- EIN-2.I.4 Overgrazing occurs when the livestock population exceeds the land's capacity to regenerate vegetation. This results in reduced plant cover, soil erosion, and soil compaction, all of which reduce soil fertility. Overgrazing also reduces biodiversity and lowers carbon storage. Rotational grazing can help prevent or minimize these impacts.
- EIN-2.I.5 Overgrazing can lead to desertification in arid and semi-arid regions. Implementing restoration efforts, soil conservation measures, and improved grazing practices can help slow or reverse the desertification process.
- EIN-2.I.6 Less consumption of meat, especially from ruminant livestock such as cattle and sheep, can lower emissions of CO₂ and N₂O, conserve freshwater resources, and reduce reliance on antibiotics and growth hormones. Advances in feed quality and the use of precision farming technologies, can also mitigate environmental impacts. The magnitude of these benefits depends on the production methods applied and how land no longer used for livestock is subsequently managed.
- Topic 6.5 Fossil Fuels
 - ENG-3.F.1 Hydraulic fracturing (fracking) can cause groundwater contamination and the release of volatile organic compounds.

Exam Information Clarifications and Corrections

EXAM OVERVIEW

Revised language in the “Exam Information, Section II: Free-Response” section (p. 226) provides clarity about which science practices will be assessed in free-response questions 1 and 2.

Throughout the AP Environmental Science Course and Exam Description, the titles of free-response questions will be updated to:

- Free-response Question 1: “Design an investigation”
- Free-response Question 2: “Analyze and interpret quantitative data”
- Free-response Question 3: “Analyze an environmental problem doing calculations”