

2025



AP[®] Environmental Science

Scoring Guidelines

Set 2

AP[®] Environmental Science 2025 Scoring Guidelines

Question 1: Design an Investigation

10 points

A	Based on the data in the graph, identify the number of Common Tern breeding pairs in 1995. Acceptable identification point: • 1400	Point 01
B	Based on the data in the graph, describe the trend in the number of Common Tern breeding pairs from 1995 to 2008. Examples of acceptable responses may include the following: • The number of breeding pairs varies but shows an overall decrease. • The number of breeding pairs decreases.	Point 02
C	A group of students hypothesized that sea level rise will lead to an increase in Common Tern populations. Describe one reason the data in the graph refute this hypothesis. Examples of acceptable responses may include the following: • The data suggest that a rise in sea level will decrease the number of breeding pairs. • As sea level rises, fewer breeding pairs will likely lead to smaller populations.	Point 03
D	Explain how climate change can lead to sea level rise. Examples of acceptable responses may include the following: • Increasing global temperatures results in melting glaciers/land-based ice sheets. • Increasing global temperatures causes ocean water expansion.	Point 04
E	(i) Identify a hypothesis that researchers are likely investigating in the wading bird study. Examples of acceptable responses may include the following: • If sea level rises, wading bird diversity/species richness will decrease. • If sea level rises, wading bird diversity/species richness will increase. • Sea level rise will/will not affect wading bird diversity/species richness. • Wading bird diversity/species richness is correlated with sea level rise. (ii) Identify the dependent variable in this study. Examples of acceptable responses may include the following: • Number of wading bird species • Species richness of wading birds	Point 05 Point 06

F If the researchers repeated their study, **explain** how this environmental change could affect the results of the study. **Point 07**

Examples of acceptable responses may include the following:

- There would be a decrease in wading birds because PCBs tend to magnify/concentrate in higher trophic levels.
- There would be a decrease in wading birds because PCBs can bioaccumulate (in fatty tissue).
- There would be a decrease in wading birds because PCBs are toxic/kill birds/make birds sick when ingested.
- There would be a decrease in wading birds because of eggshell thinning/developmental deformities/reproductive problems caused by PCBs.

G **Describe** a regulating ecosystem service that can be provided by wetlands. **Point 08**

Examples of acceptable responses may include the following:

- (Wetlands) filter/purify/improve water (quality).
- (Wetlands) provide flood regulation/erosion control.
- (Wetlands) store/sequester carbon.

H **Explain** how increased sediment might lead to a change in the size of the wading bird populations. **Point 09**

Examples of acceptable responses may include the following:

- (Increased sediment) can reduce the ability of wading birds to see prey/food/fish.
 - (Increased sediment) can reduce/increase the ability of wading birds to hunt.
 - (Increased sediment) negatively impacts organisms in lower trophic levels, reducing food/energy for the wading birds.
 - Reduced light infiltration can decrease the (number of) primary producers, resulting in less energy for higher trophic levels.
-

I **Describe** an environmental problem, other than an increase in sediment, that can occur in wetlands that is associated with increased urbanization and development. **Point 10**

Examples of acceptable responses may include the following:

- Construction projects can reduce/fragment wetland habitats.
 - Runoff of fertilizers/wastewater effluent can lead to eutrophication, (decreasing DO and killing fish).
 - Runoff of litter can kill animals when ingested/tangled.
 - More impervious structures/roads/buildings/sidewalks/parking lots can lead to flooding.
 - Runoff of heavy metals/pesticides can kill/weaken organisms when absorbed/ingested.
 - Noise/light pollution can disrupt hunting/migrating/behavior.
 - Runoff of oil can block light, preventing photosynthesis.
 - Increased water use can decrease the amount of groundwater/cause wetlands to dry up.
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Question 2: Analyze an Environmental Problem and Propose a Solution**10 points**

A	Based on the information in Figure 1, identify the type of plate boundary that runs beneath Serengeti National Park. Acceptable identification point: Divergent (boundary)	Point 01
B	Based on the information provided, identify the dominant biome within the Serengeti. Examples of acceptable responses may include the following: - Savanna - Tropical grassland	Point 02
C	Wildebeest give birth to their young when new grasses are growing. Based on the information in Figure 2, identify the location in the Serengeti where wildebeest are most likely to give birth. Examples of acceptable responses may include the following: - Grumeti Game Reserve - The west/northwestern side/edge (of Serengeti National Park)	Point 03
D	Explain why resource partitioning allows for the coexistence of the wildebeest and the gazelle in the Serengeti. Examples of acceptable responses may include the following: (Resource partitioning) reduces the (negative) impact of competition for (limited) resources. (Resource partitioning) allows species to use (limited) resources in different ways/places/at different times.	Point 04
E	Describe one way the proposed highway shown in Figure 2 could negatively affect the wildebeest population in the Serengeti. Examples of acceptable responses may include the following: - Building the highway would fragment/destroy habitat/food/resources. - The highway could prevent/reduce/disturb migration. - Wildebeest could be hit/killed by vehicles. - Noise pollution could cause stress/change migratory routes.	Point 05

F

Propose a solution to the negative effect created by the planned highway described in part E.

Examples of acceptable responses may include the following:

Problem in part E	Realistic Potential Solution
Building the highway would fragment/destroy habitat/food/resources.	- Construct a habitat corridor over/under the highway - Construct the highway over/above the habitat - Relocate the highway north/outside of the migratory path - Expand the national park/create additional protected habitat
The highway could prevent/reduce/disturb migration.	- Relocate the highway north/outside of the migratory path - Construct a habitat corridor over/under the highway
Wildebeest could be hit/killed by vehicles.	
Noise pollution could cause stress/change migratory routes.	- Install a sound barrier to mitigate noise pollution - Relocate the highway north/outside of the migratory path

Point 06

G

Describe a characteristic of an invasive species, such as the spotted knapweed, that allows them to outcompete native species.

Examples of acceptable responses may include the following:

- They have many offspring/reproduce quickly/mature early/invest minimal energy in each offspring (tend to be r-selected).
- They can feed on/use many different types of resources.
- They can survive in conditions outside their normal habitat/have a wide range of tolerance (tend to be generalists).

Point 07

H

Justify the use of crop rotation as an environmental solution by providing an additional advantage, other than controlling pest populations.

Examples of acceptable responses may include the following:

- Improved soil fertility/soil structure/soil quality
- Increased nutrient cycling/reduction in fertilizer use
- Reduced soil erosion
- Increased food security/crop yield
- Increased biological activity (in the soil)

Point 08

I	Describe an environmental problem associated with controlling pest populations with large amounts of pesticide.	Point 09
	Examples of acceptable responses may include the following:	
	- Pesticides can harm/kill nontarget species. - Pests can develop resistance to the pesticide.	
J	Propose a solution to controlling pests, other than pesticides or crop rotation.	Point 10
	Examples of acceptable responses may include the following:	
	- Use biocontrol/intercropping/natural predators - Trap insects/use mechanical controls to eliminate the pests - Use genetically modified crops that are pest resistant	

Question 3: Analyze an Environmental Problem and Propose a Solution (Doing Calculations)

10 points

A	Identify a type of surface mining the company could use to access the coal.	Point 01
	Examples of acceptable responses may include the following:	
	- Strip mining - Open pit - Mountain top removal	
B	Describe an environmental problem associated with surface mining.	Point 02
	Examples of acceptable responses may include the following:	
	- Removal of vegetation/soil/rock causes loss/destruction of habitat. (Surface mining) causes loss of habitat, which results in loss of biodiversity. - Removal of vegetation can increase rates of erosion. (Surface mining) can lead to contamination of groundwater/surface water/waterways from runoff of sediments/pollutants. - Removal of vegetation/soil/bedrock/parent material can release dust particles/methane. - High energy/fossil fuel consumption is needed to operate equipment and leads to air pollution.	
C	Describe an environmental problem the town could experience as a result of the electricity generation at the coal-burning power plant.	Point 03
	Examples of acceptable responses may include the following:	
	- Release of air pollutants/toxic metals/particulates/NO_x/SO_x could lower air quality/result in respiratory problems. - Release of air pollutants/sulfur dioxides/nitrogen oxides could cause acid rain. - Greenhouse gas emissions/carbon dioxide/methane/water vapor could lead to altered precipitation/climate/weather/temperature patterns.	
D	Propose a realistic solution the local government could enact that would reduce the negative environmental consequences of using coal to generate electricity.	Point 04
	Examples of acceptable responses may include the following:	
	- Require/incentivize the plant to install scrubbers/electrostatic precipitators. - Incentivize the use of alternative energy sources/energy efficient appliances. - Incentivize green building design/conservation landscaping/planting trees as carbon sinks.	

E	Calculate how many pounds of coal would need to be burned to generate enough electricity to power a town with 11,000 houses for a year. Show your work.	Point 05
	One point for the correct setup to calculate how many pounds of coal would be needed. Examples of acceptable responses may include the following: $(11,000 \text{ houses} \times 10,640 \text{ kWh per house}) / 0.88 \text{ kWh per lb of coal}$ $(11,000 \times 10,640) / 0.88$	
	One point for the correct calculation of how many pounds of coal would be needed. Examples of acceptable responses may include the following: 133,000,000 1.33×10^8	Point 06
F	Calculate the percent change in bird species per hectare since the power plant was installed. Show your work.	Point 07
	One point for the correct setup to calculate the percent change in bird species per hectare. Examples of acceptable responses may include the following: $(6.0 \text{ species / ha} - 7.5 \text{ species / ha}) / 7.5 \text{ species / ha} \times 100$ $(6.0 - 7.5) / 7.5 \times 100$	
	One point for the correct calculation of the percent change in bird species per hectare. Examples of acceptable responses may include the following: -20% 20% decrease -20	Point 08
G	Assuming that the growth rate remains constant, calculate the year in which the population will reach 52,500. Show your work.	Point 09
	One point for the correct setup to calculate the year the population will reach 52,500. Acceptable setup point: $(70 / 5.38) + 2022$	
	One point for the correct calculation of the year the population will reach 52,500. Acceptable calculation point: 2035	Point 10