2025

AP® Environmental Science

Sample Student Responses and Scoring Commentary Set 2

Inside:

Free-Response Question 2

- ☑ **Scoring Guidelines**
- ☑ **Student Samples**
- ☑ **Scoring Commentary**

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. **Point 06**

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. Wildebeest could be hit/killed by vehicles.	• Relocate the highway north/outside of the migratory path • Construct a habitat corridor over/under the highway
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

G **Describe** a characteristic of an invasive species, such as the spotted knapweed, that allows them to outcompete native species. **Point 07**

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).

H **Justify** the use of crop rotation as an environmental solution by providing an additional advantage, other than controlling pest populations. **Point 08**

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)

I	**Describe** an environmental problem associated with controlling pest populations with large amounts of pesticide. Examples of acceptable responses may include the following: • Pesticides can harm/kill nontarget species. • Pests can develop resistance to the pesticide.	**Point 09**
J	**Propose** a solution to controlling pests, other than pesticides or crop rotation. 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	**Point 10**

----Response A----
The type of plate boundary that runs beneathe Serengeti National Park is divergent plate boundary.
----Response B----
The dominant biome within the Serengeti is tropical grassland.
----Response C----
The location in the Serengeti where wildebeest are most likely to give birth is Grumeti Game Reserve.
----Response D----
Resource partitioning allows for the coexistence of wildebeest and gazelle in the Serengeti because it lowers competition for food source, by having different needs of types of grasses, there will not be competition between the two species which allows the coexistence of the two species in the Serengeti.
----Response E----
One way the planned highway could negatively affect the wildebeest population in the Serengeti is the habitat partitioning will make it difficult for the wildebeest population to have food source from August to October which is when the wildebeest primarily feeds on new grass on the opposite side of the highway, which is very difficult and dangerous for wildebeest population to cross.
----Response F----
A solution to the negative effect created by the planned highway is to have the highway build off the ground, high enough in the air for wildebeests to have no trouble crossing under the highway while still keeping the highway.
----Response G----
A characteristic of an invasive specie that allows them to outcompete native species is high reproductive rate which gives them benefit when competing for resources with native species.
----Response H----
The use of crop rotation as an environmental solution can decrease soil erosion while not using chemicals that can harm the environment.
----Response I----
An environmental problem associated with controlling pest populations with large amounts of pesticide is the chemical can bring harm to other non-target organisms, killing off other populations in the environment that is not the invasive specie.
----Response J----
A solution to controlling pests, other than pesticides or crop rotation, is the human removal by hand which may be time consuming but is targeted only of invasive species and won't cause any harm to other non-target species.

----Response A----
Divergent Plate Boundary
----Response B----
Savanna
----Response C----
Wildebeest are most likely to give birth close to Lake Victoria, because the water from it allows grass to grow.
----Response D----
Resource partitioning allows for the coexistance of the wildebeest and gazelle because they consume different types of grasses, reducing competition and allowing their populations to both grow.
----Response E----
Building a highway across the Serengeti could harm the wildebeest population because the emissions from the cars would pollute the air, damaging the lungs of the wildebeest.
----Response F----
A solution to this negative effect would be to charge a fee to use the highway for people who drive non-electric vehicles, and therefore inscentivise people to either take other routes to their destination or use a vehicle that would not emit damaging pollutants into the nearby air.
----Response G----
A characteristic of invasive species, such as the spotted knapweed, is their large range of tolorance. Most native species to an area are adapted specifically to the conditions of the area, and have specialist traits such as the food they are able to consume. When an invasive species comes into the area, they consume all of that specific type of food that the native species require and can survive once it is depleted, unlike the native species.
----Response H----
Crop rotation makes it so farmlands don't become monocultures, and makes it less sceceptable to environmental change.
----Response I----
When large amounts of pesticide are used, they collect in the runoff of an area and pollute nearby lakes and streams, causing harm to the native species of those bodies of water.
----Response J----
One solution to controlling pests would be introducing a natural predator to such species into the area, allowing the predator to lower the population of pests.

----Response A----
a) Ans: The type of plate boundary that runs beneath the serengeti National park is the Indian plate.
----Response B----
B) ans: The dominant biome within the is: Wildbeest such as: Zebra or Giraffe.
----Response C----
C) Ans: The location in the Serengeti where the wildbeest are most likley to give birth is: Maswa Game Reserse from march to may
----Response D----
D) Ans: The resource partitioning allows for the coexistence of the wildbeest and the gazelle in the Serengeti as both of them are harbivores. As none of them are relying on each other but rather the nature for their food which is why being harbivores helps them to co-exist.
----Response E----
E) Ans: The highway takes place in the Ikrongo game reserve where the wildbeest and other coexisting harbivores organisms make their presence during August to October, although most of the grass grow from March to May but this partition still can affect their food cycle in a negative way as it limits their resources.
----Response F----
F) ans: A solution can be to make alternate routes for beest to move along the way of the highway by keeping them from a safe distant from the pedestrians. Which will allow them to fullfill their needs
----Response G----
G) Ans: A characteristic of an invase species is that, they destroy the regular society and lifecycle of the organisms which were natively living there, they also often a part of parasitism in which they can advantage of other species by destroying the host species.
----Response H----
H) ans: During crop rotation, a farmer goes from one type of crop to another after an harvestment which helps the farmers to get rid of the invasive species as, not every invasive species are local and known to every crop.
----Response I----
I) ans: One environmental problem is the use of pesticides which negatively impact the lands, as by the rain the sediments can run-off to water and pollute the water and harm the marine life. A large area will require more pesticides which leads to even more pollution
----Response J----
J) ans: One solution to control pests, other than pesticides or crop rotation is the use of organic matters instead of pesticides as the chemical of pesticides harms the land and the waterbodies, on the other hand the organic matters would help the soil to be rich and their run-off to water will also help the marine life.

Question 2

Note: Student samples are quoted verbatim and may contain spelling and grammatical errors.

Overview

NEW for 2025: The question overviews can be found in the *Chief Reader Report on Student Responses* on AP Central.

Sample: 2A
Score: 10

One point was earned in part A for identifying "divergent plate boundary." One point was earned in part B for identifying "tropical grassland" as the dominant biome within the Serengeti. One point was earned in part C for identifying "Grumeti Game Reserve" as the location in the Serengeti where wildebeest are most likely to give birth. One point was earned in part D for explaining that resource partitioning "lowers competition for food source, by having different needs of types of grasses … which allows the coexistence of the two species." One point was earned in part E for describing "habitat partitioning will make it difficult for the wildebeest population to have food source from August to October" as one way the proposed highway shown in Figure 2 could negatively affect the wildebeest population. One point was earned in part F for proposing a solution to "have the highway build off the ground, high enough in the air for wildebeest to have no trouble crossing under the highway while still keeping the highway." One point was earned in part G for describing "high reproductive rate which gives them benefit when competing for resources with native species" as a characteristic of an invasive species. One point was earned in part H for justifying the use of crop rotation as an environmental solution as it "can decrease soil erosion while not using chemicals." One point was earned in part I for describing "pesticide ... can bring harm to other non-target organisms, killing off other populations." One point was earned in part J for proposing "human removal by hand which may be time consuming but … won't cause any harm to other non-target species."

Sample: 2B
Score: 6

One point was earned in part A for identifying "Divergent Plate Boundary." One point was earned in part B for identifying "Savanna" as the dominant biome within the Serengeti. No point was earned in part C. One point was earned in part D for explaining "they consume different types of grasses, reducing competition and allowing their populations to both grow" as why resource partitioning allows for the coexistence of the wildebeest and the gazelle. No point was earned in part E. No point was earned in part F. One point was earned in part G for describing a characteristic of invasive species as "their large range of tolorance … When an invasive species comes into the area, they consume all of that specific type of food that the native species require and can survive once it is depleted, unlike the native species." No point was earned in part H. One point was earned in part I for describing an environmental problem associated with large amounts of pesticide as "they collect in the runoff of an area … causing harm to the native species of those bodies of water." One point was earned in part J for proposing "introducing a natural predator to such species into the area, allowing the predator to lower the population of pests."

Question 2 (continued)

Sample: 2C
Score: 2

No point was earned in part A. No point was earned in part B. No point was earned in part C. No point was earned in part D. One point was earned in part E for describing "The highway takes place … where the wildbeest and other coexisting harbivores organisms make their presence … this partition still can affect their food cycle in a negative way as it limits their resources" as one way the proposed highway shown in Figure 2 could negatively affect the wildebeest population. No point was earned in part F. No point was earned in part G. No point was earned in part H. One point was earned in part I for describing that pesticides "can run-off to water and pollute the water and harm the marine life." No point was earned in part J.