2025

AP® Environmental Science

Sample Student Responses and Scoring Commentary Set 1

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Free-Response Question 2

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Question 2: Analyze an Environmental Problem and Propose a Solution — 10 points

A	**Identify** the sea surface condition for the eastern equatorial area of the Pacific Ocean illustrated in Figure 1. Acceptable identification point: • (Ocean water) cooler than average	**Point 01**
B	Based on the information in Figure 1, **identify** the climate phenomenon associated with the sea surface conditions shown in the equatorial area of the Pacific Ocean. Acceptable identification point: • La Niña	**Point 02**
C	Based on the information in Figure 2, **describe** a difference in climate patterns between the regions A and B. Examples of acceptable responses may include the following: • Region A has an increased chance of precipitation, while Region B has a decreased chance of precipitation. • Region A will be wetter, while Region B will be drier.	**Point 03**
D	**Describe** one reason why there is an increased risk of flooding in urban areas during extended periods of precipitation. Examples of acceptable responses may include the following: • Impervious/paved surfaces increase runoff/reduce infiltration/reduce absorption. • Parking lots/roads/buildings/sidewalks increase runoff/reduce infiltration/reduce absorption. • There is less vegetation and, therefore, less infiltration/absorption.	**Point 04**
E	**Propose** a realistic solution a city could implement to decrease the risk of flooding in urban areas. Examples of acceptable responses may include the following: • Use permeable pavement • Plant vegetation/establish parks/create rain gardens/build green roofs • Install retention ponds/stormwater basins	**Point 05**

F **Justify** the solution proposed in part E by providing an additional advantage other than a reduction in the risk of flooding. **Point 06**

Examples of acceptable responses may include the following:

Solution from part E	Justification of solution with additional advantages
Use permeable pavement	• Increased recharge of nearby aquifers/groundwater • Decreased pollution in runoff
Plant vegetation/establish parks/create rain gardens/build green roofs	• Vegetation absorbs pollutants • Vegetation stores carbon dioxide/produces oxygen • Decreased erosion • Increased/restored habitat for wildlife • Increased biodiversity • Helps reduce urban heat island effect • Aesthetic enjoyment/improved quality of life • Creates jobs (in landscaping/park maintenance)
Install retention ponds/stormwater basins	• Decreased pollution in runoff • Increased habitat/biodiversity

G **Describe** one difference between the climate of a temperate seasonal forest and that of a savanna. **Point 07**

Examples of acceptable responses may include the following:

- Temperate seasonal forests have a cooler climate than a savanna.
- Temperate seasonal forests have a stronger/colder winter than a savanna.
- Temperate seasonal forests have four distinct seasons while savannas do not.
- Temperate seasonal forests receive more annual precipitation than savannas.
- Temperate forests receive precipitation throughout the year while savannas have a rainy season/dry season.

H **Identify** the ecological process that occurs following a forest fire that leaves the soil intact. **Point 08**

Acceptable identification point:

- Secondary succession

I	**Describe** one way burning forests contribute to atmospheric pollution. Acceptable description point: • Burning of trees releases CO_2/CO/NO_X/particulate matter/VOCs.	**Point 09**
J	**Describe** one sustainable forestry practice that could be used to reduce the occurrence or severity of forest fires. Examples of acceptable responses may include the following: • Prescribed burns can remove excess fuel/dead leaves/underbrush. • Brush removal can remove excess fuel/dead leaves/underbrush. • Selective cutting can create a fire break. • In agroforestry, ground crops that might otherwise be fuel can be harvested/removed.	**Point 10**

----Response A----
During La Nina the eastern equatorial area of the Pacitic Ocean experiences ocean water cooler than average.
----Response B----
The climate phenomenon is La Nina.
----Response C----
Region A experiences increases precipitation while region B experiences decreased precipitation and warmer temperatures, meaning that it is more arid than usual. A, however, is wetter than usual.
----Response D----
Due to paved streets and sidewalks (which are not very permiable), urban areas have decreased levels of infiltration, meaning that water stays flooded on the surface instead of seeping into the ground.
----Response E----
Adding more green infastructure such as rooftop gardens, parks, and street trees will increase the amount of infiltration and evapotranspieration, which will decrease runoff and flooding.
----Response F----
Rooftop gardens, parks, and street trees will also decrease the urban heat island effect. Paved streets and concreet roofs have a very low albeto, so they absorb sunlight which makes cities really hot. Trees provide shade and rooftop garden and parks will increase the albeto, meaning that less sunlight is absorbed. This means that less people will die due to heat stroke.
----Response G----
A temperate seasonal forest has four seasons with more rain in the spring and fall, but the precipitation is more uniform. Savannas have a distinct wet and dry season. Savannas also have hotter summers.
----Response H----
The ecological process is secondary sucession.
----Response I----
The burning of forests releases athmospheric pollutants such as carbon monixide--which is formed in incomplete combusion--and particulate matter--which is fine particles in the air that result from ash and other particles released from burning.
----Response J----
Proscribed burnings of forests that are regulated can clear dead trees, which are a fire hazard if an unregulated burning occurrs and can help smaller trees grow when the older trees blocking sunlight are cleared away. This means that if a unregulated fire occurrs, there will be less fuel and the fire will be less severe.

----Response A----
A. The sea surface condition for the eastern equatorial area of the Pacific Ocean illustrated in Figure 1 is ocean water that is cooler than average.
----Response B----
B. Based on the information in Figure 1, the climate phenomenon associated with the sea surface conditions shown in the equatorial area of the Pacific Ocean is an increased chance of precipitation over Australia.
----Response C----
C. A difference in climate patterns between the regions A and B are that region A experiences an increased chance of precipitation, while region B experiences a decreased chance of precipitation.
----Response D----
D. One reason why there is an increased risk of flooding in urban areas during extended periods of precipitation is due to impermeable surfaces used in their infastructure. Roads in urban areas are often made of pavement, which is impermeable, meaning water cannot run through it. This causes water to sit on top of it, and gradually built up, rather than seeping into the ground. Ultimately, this causes flooding, and is a major issue with roads in modern times.
----Response E----
F. One realistic solution a city could implement to decrease the risk of flooding in urban areas is through replacing pavement roads with roads made of permeable materials. This would allow water to seep through the road itself, and into the ground, ultimately reducing flooding.
----Response F----
F. Although permeable roads are a good solution to reduce the risk of flooding, they are a good solution to reducing runoff as well. When rainfall occurs and water runs along the roads, it is unable to seep through the road and into the ground beneath it. Instead, it runs into the nearby water sources. This ultimately pollutes rivers and streams with fossil fuels such as oil and gasoline. However, introducing permeable roads would allow for water to seep through the road and into the ground beneath it. This would allow the water to infiltrate into the ground and the plants in the soil underneath the road would filter the pollutants out.
----Response G----
G. One difference between the climate of a temperate seasonal forest and that climate of a savanna is that the climate of a temperate seasonal forest typically experiences humidity throughout the summer, while a savanna experiences dry, hot summers.
----Response H----
H. The ecological process that occurs following a forest fire that leaves the soil intact is secondary succession.
----Response I----
I. One way burning forests contributes to atmospheric pollution is because it causes erosion. When you burn down vegetation, there are no longer roots in the ground to hold the soil in place. Therefore, the soil will erode, and may enter local water sources. This may pollute rivers and streams with sediment.
----Response J----
J. One sustainable forestry practice that could be used to reduce the occurence of severity of forest fires is planting native plants. By implementing native plants back into the environment, you are reducing the risk of forest fires by eliminating harmful invasive species.

----Response A----
The ocean water is cooler than average.
----Response B----
Climate change.
----Response C----
In region A it is more likely to have precipitation because it is closer to the ocean and winds are coming from that side of the water. In region B there is a decreased chance of precipitation because the wind is blowing not from the direction of the water.
----Response D----
Urban areas usually have smoother and more level surfaces so the water will have a greater chance of flooding.
----Response E----
Install drains throughout the area.
----Response F----
Installing drains and sewage systems could also be good places to hide in case of earthquakes or fires.
----Response G----
The climate of a temperate seasonal forest can change by a lot theoughout the seasons but a savanna will remain a constant temperature throughout the seasons.
----Response H----
Watering.
----Response I----
They release a lot of carbon dioxide into the atmosphere.
----Response J----
Controlled burns to reduce the amount that could burn and spread if there was an actual forest fire.

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 for part A for identifying "ocean water cooler than average" as the sea surface condition illustrated. One point was earned for part B for identifying "La Nina" as the climate phenomenon. One point was earned for part C for describing "Region A experiences increases precipitation while region B experiences decreased precipitation." One point was earned for part D for describing "Due to paved streets and sidewalks (which are not very permiable), urban areas have decreased levels of infiltration" as the reason for an increased risk of flooding in urban areas. One point was earned for part E for proposing a realistic solution of "Adding more green infastructure such as rooftop gardens, parks, and street trees" to decrease the risk of flooding in urban areas. One point was earned for part F for justifying the solution in part E with "Rooftop gardens, parks, and street trees will also decrease the urban heat island effect" as an additional advantage. One point was earned for part G for describing "A temperate seasonal forest has four seasons with more rain in the spring and fall … Savannas have a distinct wet and dry season." One point was earned for part H for identifying "secondary succession" as the ecological process that occurs flowing a forest fire. One point was earned for part I for describing "The burning of forests releases athmospheric pollutants such as carbon monoxide." One point was earned for part J for describing "Proscribed burnings of forests that are regulated can clear dead trees, which are a fire hazard … there will be less fuel and the fire will be less severe" as a sustainable forestry practice that could be used to reduce the occurrence or severity of forest fires.

Sample: 2B
Score: 6

One point was earned for part A for identifying "ocean water that is cooler than average" as the sea surface condition. No point was earned for part B. One point was earned for part C for describing "region A experiences an increased chance of precipitation, while region B experiences a decreased chance of precipitation." One point was earned for part D for describing "due to impermeable surfaces used in their infastructure. Roads in urban areas are often made of pavement, which is impermeable, meaning water cannot run through it" as a reason why there is increased risk of flooding in urban areas. One point was earned for part E for proposing a realistic solution of "replacing pavement roads with roads made of permeable materials" to decrease the risk of flooding in urban areas. One point was earned for part F for justifying the solution in part E with "they are a good solution to reducing runoff as well… This would allow the water to infiltrate into the ground and the plants in the soil underneath the road would filter the pollutants out." No point was earned for part G. One point was earned for part H for identifying "secondary succession" as the ecological process that occurs following a forest fire. No point was earned in part I. No point was earned in
part J.

Question 2 (continued)

Sample: 2C
Score: 3

One point was earned for part A for identifying "The ocean water is cooler than average." No point was earned for part B. One point was earned for part C for describing "In region A it is more likely to have precipitation ... In region B there is a decreased chance of precipitation." No point was earned for part D. No point was earned for part E. No point was earned for part F. No point was earned for part G. No point was earned for part H. One point was earned for part I for describing "They release a lot of carbon dioxide into the atmosphere" as one way burning forests contribute to atmospheric pollution. No point was earned for part J.