

AP[®] BIOLOGY
2014 SCORING GUIDELINES

Question 3

As part of a new suburban development, a sports complex consisting of athletic fields and buildings is constructed in a formerly wooded area.

- (a) **Predict** ONE ecological consequence on the local plant community that is likely to result during the site preparation and construction of the sports complex. **Justify** your prediction. (2 points maximum; LO 4.16, 2.21, 4.21)

Predicted consequences on plant community (1 point)	Justification of prediction (1 point)
Plant death / Loss of plant biomass	<ul style="list-style-type: none"> • Removing trees/shrubs • Pollution from construction equipment • Fewer individuals for reproduction • Altered habitat, e.g. change in amount of sunlight, obstruction by buildings, isolation of populations
Reduced number of plant species / Loss of biodiversity	<ul style="list-style-type: none"> • Removal of trees/shrubs • Reduced habitat • Pollution from construction kills local species
Decreased genetic diversity	Reduction in population size / bottleneck
Habitat loss	<ul style="list-style-type: none"> • Removal of trees/shrubs • Soil loss due to lack of ground cover
Increased success of sun-tolerant plants	Removal of shading trees
Introduction / Immigration of new plant species	Creation of new habitat and landscaped environments

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Question 3 (continued)

(b) To maintain the playing fields, large quantities of water and chemicals are applied regularly to the grass-covered areas. **Predict** ONE effect on the local animal community that might result from regular use and maintenance of the playing fields. **Justify** your prediction. (**2 points maximum**; LO 4.16, 2.21, 4.21)

Predicted consequence on animal community (1 point)	Justification of prediction (1 point)
Harm / Death to animals	<ul style="list-style-type: none"> • Exposure to toxic chemicals • Toxic chemicals accumulate through the food chain Persist in the environment • Contaminated groundwater
Emigration Displacement	<ul style="list-style-type: none"> • Loss of habitat and/or food • Loss of access • Exposure to toxic chemicals
Loss of native animal biodiversity	<ul style="list-style-type: none"> • Loss of plants on which the animals depend • Loss of habitat
Mutations	Chemicals effect on DNA
Improved conditions for animals	Increased food sources
Immigration of new animal species	Formation of new habitat
Less potable/drinking water for animals	<ul style="list-style-type: none"> • Increased salinity in water reservoir • Removal of water from reservoir / wells • Contamination of water with chemicals

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- (b) To maintain the playing fields, large quantities of water and chemicals are applied regularly to the grass-covered areas. **Predict** ONE effect on the local animal community that might result from regular use and maintenance of the playing fields. **Justify** your prediction.

PAGE FOR ANSWERING QUESTION 3

Because of the construction of the sports complex, the plants that may reside there would either be cut off or ~~cut off~~ be built on top of. If the plants were ~~cut off~~ cut off and removed from the area, then less of those plants would grow, making the population decrease significantly. The same thing would happen if the building was built on top of the plants because the plants would eventually, due to absence of light and CO_2 . As a result, we would also lose some O_2 production due to less plants being grown in that area.

Due to the application of chemicals on grassy areas, animals that may feed off of grass, including omnivores and ~~herbivores~~ herbivores, may start to die off because of the chemicals ~~altering~~ altering the grass. The chemicals on the grass could kill the animals and the population of local herbivores ~~would decrease~~ would decrease significantly. Omnivores would start feeding off of animals more, ~~reducing the population of herbivores~~

3. As part of a new suburban development, a sports complex consisting of athletic fields and buildings is constructed in a formerly wooded area.

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(a) One ecological consequence on the local plant community is likely the destruction of the entire plant community. Producers in the area will be destroyed.

(b) One affect on local animal community is the chemicals could be destructive in the animals' health, if ingested. The chemicals, for example pesticides, could kill insects that animals like spiders and birds are used to eating in this area. This ~~would~~ would affect the entire local ecosystem because the primary consumers are dying. The amount of free energy would decrease and be locked in the plants/grass because no one would be able to consume it and cycle it.

between plants and animals it would start a cascade of poor diets which could result in the destruction of the ecosystem.

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One ecological consequence on the local plant community is predation. Because the ~~new~~ new sports complex is being created, animals that once lived in the wooded area had to relocate to other local areas. Thus, ~~many~~ many would feed on the local plant community. If the local animal community has to feed on the grass covered areas, they may be exposed to certain toxins. Because the chemicals may contain harmful toxins, the animal community may decline.

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2014 SCORING COMMENTARY

Question 3

Question 3 was written to the following Learning Objectives in the AP Biology Curriculum Framework: 2.21, 4.16, 4.21

Overview

Question 3 asks students to consider the effects of expansion of human populations on local plant and animal communities, respectively. Students were asked to predict a likely ecological consequence to a plant community during the site preparation and construction of a sports complex in a formerly wooded area. Students were then asked to predict a likely effect on the animal community that might result from regular use and maintenance of the playing fields. Finally, students were asked to use appropriate data to support the effects of the expansion of human populations.

Sample: 3A

Score: 4

The response in Sample 3A earned 1 point in part (a) for justifying that the removal of plants would cause fewer plants to grow. The response also earned 1 point in part (a) for predicting that there will be a decrease in plant population size.

The response earned 1 point in part (b) for predicting that herbivores will die. The response also earned 1 point in part (b) for justifying that the exposure to toxic chemicals may cause harm.

Sample: 3B

Score: 3

The response in Sample 3B earned 1 point in part (a) for predicting that the plant community will be destroyed.

The response earned 1 point in part (b) for predicting that the animals will become sick. The response also earned 1 point for justifying that ingestion toxic chemicals causes harm to the animals.

Sample: 3C

Score: 2

The response in Sample 3C earned 1 point in part (b) for justifying that exposure to toxic chemicals may cause harm. The response also earned 1 point for predicting that animals may die.