

2022 MCAS Sample Student Work and Scoring Guide

High School Biology

Question 42: Constructed-Response

Reporting Category: Ecology

Practice Category: None

Standard: [HS.LS.2.7](#) - Analyze direct and indirect effects of human activities on biodiversity and ecosystem health, specifically habitat fragmentation, introduction of non-native or invasive species, overharvesting, pollution, and climate change. Evaluate and refine a solution for reducing the impacts of human activities on biodiversity and ecosystem health.

Item Description: Explain how an organism can become an invasive species over a large area and explain how damage caused by an invasive species can affect other species in the ecosystem.

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Scoring Guide

Select a score point in the table below to view the sample student response.

Score*	Description
4A	The response demonstrates a thorough understanding of the effects of human activities on biodiversity and ecosystem health, specifically the introduction of invasive species.
4B	The response clearly explains why the Asian longhorned beetle has the potential to become invasive over large, widespread areas and clearly explains three ways that damage to trees could affect other organisms in the forest ecosystem.
3	The response demonstrates a general understanding of the effects of human activities on biodiversity and ecosystem health, specifically the introduction of invasive species.
2	The response demonstrates a limited understanding of the effects of human activities on biodiversity and ecosystem health, specifically the introduction of invasive species.
1	The response demonstrates a minimal understanding of the effects of human activities on biodiversity and ecosystem health, specifically the introduction of invasive species.
0	The response is incorrect or contains some correct work that is irrelevant to the skill or concept being measured.

*Letters are used to distinguish between sample student responses that earned the same score (e.g., 4A and 4B).

Score Point 4A**This question has two parts.**

An invasive insect called the Asian longhorned beetle is threatening some forests in the United States. The beetle attacks and kills hardwood trees, including maple, elm, ash, poplar, willow, birch, and horse chestnut. The beetle larvae feed on the tissues inside the trees. As a result, the flow of water and nutrients in the trees is disrupted and the trees die. As adults, the beetles move to the outside of the trees.

Part A

Based on this information, explain why the Asian longhorned beetle has the potential to become invasive over very large, widespread areas of the United States.

Hardwood trees that the species feed on are found all over the United States. Also, as an invasive species the beetles have no natural predators to limit their population.

Part B

Explain **three** ways that damage to trees from the Asian longhorned beetle could affect other organisms in the forest ecosystem. Be specific in your answers.

1. Any species that lives in the trees or uses them for shelter (exp: birds) will lose a habitat.
2. When species that live in the trees die, their predators (foxes, snakes, etc.) will lose a food source.
3. Squirrels and other animals that eat the seeds of hardwood trees (acorns, etc.) will lose their food source.

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Score Point 4B**This question has two parts.**

An invasive insect called the Asian longhorned beetle is threatening some forests in the United States. The beetle attacks and kills hardwood trees, including maple, elm, ash, poplar, willow, birch, and horse chestnut. The beetle larvae feed on the tissues inside the trees. As a result, the flow of water and nutrients in the trees is disrupted and the trees die. As adults, the beetles move to the outside of the trees.

Part A

Based on this information, explain why the Asian longhorned beetle has the potential to become invasive over very large, widespread areas of the United States.

The Asian Longhorned beetle has the potential to become invasive over a very large, widespread area of the US because the trees they attack are so common. The trees (maple, elm, etc.) are spread across all of the US – so there are more tree and more areas the beetle can infest.

Part B

Explain **three** ways that damage to trees from the Asian longhorned beetle could affect other organisms in the forest ecosystem. Be specific in your answers.

One way it could damage other organisms, is a place of protection for some animals could be destroyed. For example, a birds nest could be up in the tree, and as the tree dies, the birds could lose their home and protection/shelter. Also, the loss of trees could result in a loss of food source for a certain organism. If the tree dies, then there is no more of that food source. Also, if large amounts of beetles kill a large amount of trees, then the amount of O₂/oxygen in the enviro. may decrease due to the lack of tree performing photosynthesis. The lack of O₂ could affect many organisms in the ecosystem – as organisms need O₂ to breathe.

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Score Point 3**This question has two parts.**

An invasive insect called the Asian longhorned beetle is threatening some forests in the United States. The beetle attacks and kills hardwood trees, including maple, elm, ash, poplar, willow, birch, and horse chestnut. The beetle larvae feed on the tissues inside the trees. As a result, the flow of water and nutrients in the trees is disrupted and the trees die. As adults, the beetles move to the outside of the trees.

Part A

Based on this information, explain why the Asian longhorned beetle has the potential to become invasive over very large, widespread areas of the United States.

The Asian longhorned beetle has the potential to become invasive because the beetle attacks and kills hardwood trees.

Part B

Explain **three** ways that damage to trees from the Asian longhorned beetle could affect other organisms in the forest ecosystem. Be specific in your answers.

One way the damage to the trees from the beetle could effect other organisms is if the trees die, less oxygen is being produced, effecting many organisms. Another way damage to the trees could effect organisms is that if the trees die, the organisms who use the trees as a habitat will no longer have a habitat to live in. A final way that damage to the trees could effect other organisms is if the tree dies, the organisms who use the trees for a source of food will no longer be able to use the trees for food.

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Score Point 2**This question has two parts.**

An invasive insect called the Asian longhorned beetle is threatening some forests in the United States. The beetle attacks and kills hardwood trees, including maple, elm, ash, poplar, willow, birch, and horse chestnut. The beetle larvae feed on the tissues inside the trees. As a result, the flow of water and nutrients in the trees is disrupted and the trees die. As adults, the beetles move to the outside of the trees.

Part A

Based on this information, explain why the Asian longhorned beetle has the potential to become invasive over very large, widespread areas of the United States.

Based on this information the Asian longhorned beetle has the potential to spread all over the country because the trees the larvae feed on and live in are spread all through the U.S.

Part B

Explain **three** ways that damage to trees from the Asian longhorned beetle could affect other organisms in the forest ecosystem. Be specific in your answers.

The effects the beetle has on trees could damage an ecosystem by taking away the home of many species like birds, squirrels and other animals along with killing the trees themselves.

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Score Point 1**This question has two parts.**

An invasive insect called the Asian longhorned beetle is threatening some forests in the United States. The beetle attacks and kills hardwood trees, including maple, elm, ash, poplar, willow, birch, and horse chestnut. The beetle larvae feed on the tissues inside the trees. As a result, the flow of water and nutrients in the trees is disrupted and the trees die. As adults, the beetles move to the outside of the trees.

Part A

Based on this information, explain why the Asian longhorned beetle has the potential to become invasive over very large, widespread areas of the United States.

the population is getting they are producing more

Part B

Explain **three** ways that damage to trees from the Asian longhorned beetle could affect other organisms in the forest ecosystem. Be specific in your answers.

Because any of the other animals that eat plants or trees wont get food

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Score Point 0**This question has two parts.**

An invasive insect called the Asian longhorned beetle is threatening some forests in the United States. The beetle attacks and kills hardwood trees, including maple, elm, ash, poplar, willow, birch, and horse chestnut. The beetle larvae feed on the tissues inside the trees. As a result, the flow of water and nutrients in the trees is disrupted and the trees die. As adults, the beetles move to the outside of the trees.

Part A

Based on this information, explain why the Asian longhorned beetle has the potential to become invasive over very large, widespread areas of the United States.

The beetle larvae feed on the tissues inside the trees and nutrients in the trees is disrupted and the tree dies. The beetles move to the outside of the trees.

Part B

Explain **three** ways that damage to trees from the Asian longhorned beetle could affect other organisms in the forest ecosystem. Be specific in your answers.

In three ways that beetle damage is attacks, and kill, also threatening some forests.

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