

## Question 2: Analyze an Environmental Problem and Propose a Solution

10 points

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| <b>A</b> | Based on the information in Figure 1, <b>identify</b> the type of plate boundary that runs beneath Serengeti National Park.<br><br>Acceptable identification point:<br><br><ul style="list-style-type: none"> <li>Divergent (boundary)</li> </ul>                                                                                                                                                                                                                                                                         | <b>Point 01</b> |
| <b>B</b> | Based on the information provided, <b>identify</b> the dominant biome within the Serengeti.<br><br>Examples of acceptable responses may include the following:<br><br><ul style="list-style-type: none"> <li>Savanna</li> <li>Tropical grassland</li> </ul>                                                                                                                                                                                                                                                               | <b>Point 02</b> |
| <b>C</b> | Wildebeest give birth to their young when new grasses are growing. Based on the information in Figure 2, <b>identify</b> the location in the Serengeti where wildebeest are most likely to give birth.<br><br>Examples of acceptable responses may include the following:<br><br><ul style="list-style-type: none"> <li>Grumeti Game Reserve</li> <li>The west/northwestern side/edge (of Serengeti National Park)</li> </ul>                                                                                             | <b>Point 03</b> |
| <b>D</b> | <b>Explain</b> why resource partitioning allows for the coexistence of the wildebeest and the gazelle in the Serengeti.<br><br>Examples of acceptable responses may include the following:<br><br><ul style="list-style-type: none"> <li>(Resource partitioning) reduces the (negative) impact of competition for (limited) resources.</li> <li>(Resource partitioning) allows species to use (limited) resources in different ways/places/at different times.</li> </ul>                                                 | <b>Point 04</b> |
| <b>E</b> | <b>Describe</b> one way the proposed highway shown in Figure 2 could negatively affect the wildebeest population in the Serengeti.<br><br>Examples of acceptable responses may include the following:<br><br><ul style="list-style-type: none"> <li>Building the highway would fragment/destroy habitat/food/resources.</li> <li>The highway could prevent/reduce/disturb migration.</li> <li>Wildebeest could be hit/killed by vehicles.</li> <li>Noise pollution could cause stress/change migratory routes.</li> </ul> | <b>Point 05</b> |

**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                                                                                                                                                                                                                                                                        |
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| Building the highway would fragment/destroy habitat/food/resources.                                           | <ul style="list-style-type: none"> <li>Construct a habitat corridor over/under the highway</li> <li>Construct the highway over/above the habitat</li> <li>Relocate the highway north/outside of the migratory path</li> <li>Expand the national park/create additional protected habitat</li> </ul> |
| <p>The highway could prevent/reduce/disturb migration.</p> <p>Wildebeest could be hit/killed by vehicles.</p> | <ul style="list-style-type: none"> <li>Relocate the highway north/outside of the migratory path</li> <li>Construct a habitat corridor over/under the highway</li> </ul>                                                                                                                             |
| Noise pollution could cause stress/change migratory routes.                                                   | <ul style="list-style-type: none"> <li>Install a sound barrier to mitigate noise pollution</li> <li>Relocate the highway north/outside of the migratory path</li> </ul>                                                                                                                             |

**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)

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| <b>I</b> | <b>Describe</b> an environmental problem associated with controlling pest populations with large amounts of pesticide.<br><br>Examples of acceptable responses may include the following: <ul style="list-style-type: none"><li>• Pesticides can harm/kill nontarget species.</li><li>• Pests can develop resistance to the pesticide.</li></ul>                                                   | <b>Point 09</b> |
| <b>J</b> | <b>Propose</b> a solution to controlling pests, other than pesticides or crop rotation.<br><br>Examples of acceptable responses may include the following: <ul style="list-style-type: none"><li>• Use biocontrol/intercropping/natural predators</li><li>• Trap insects/use mechanical controls to eliminate the pests</li><li>• Use genetically modified crops that are pest resistant</li></ul> | <b>Point 10</b> |

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