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| 1. What is an example of a trade-off for speed, as humans evolved to become bipedal?

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|   | a.  | Humans evolved a better warning system to detect when predators were nearby. |
|   | b.  | Human hands became sensitive to touch and able to manipulate objects. |
|   | c.  | Human hands evolved to become less strong, so humans had to become bipedal. |
|   | d.  | Humans evolved to consume more plants, meaning humans did not have to move as fast to catch food. |

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| 2. How does a sea slug transform into a photosynthetic animal?

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|   | a.  | A sea slug acquires chloroplasts from algae and has genetic control over the function of the chloroplasts, therefore controlling photosynthesis. |
|   | b.  | A sea slug engulfs algae, and the algae continue to do the photosynthetic reactions. |
|   | c.  | A sea slug engulfs algae, and the sea slug has genetic control over the algae. |
|   | d.  | A sea slug acquires chloroplasts from algae, and some of those chloroplasts randomly find their way to the cells of the sea slug that receive enough light to carry out photosynthesis. |

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| 3. Why do carnivorous plants consume insects?

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|   | a.  | There are too many insects, so the plant has evolved ways of reducing the insect population numbers. |
|   | b.  | The plants have carbon requirements that are not met through root acquisition from the soil. |
|   | c.  | The plants have nitrogen requirements that are not met through root acquisition from the soil. |
|   | d.  | The carnivorous plants are an example of how there is a continuum of diversity in communities. |

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| *ANSWER:* | c |

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| 4. There are many examples of animals being in relationships with other species, to the benefit of all individuals in the relationship. Some of the relationships are so strong that the individuals involved cannot survive without each other. Why have these types of relationships evolved?

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|   | a.  | Animals involved in relationships with other species have a readily available food source. There is no measurable benefit to the other species in the relationship. |
|   | b.  | Over evolutionary time, the individuals in these relationships have survived and reproduced better than individuals that did not engage in these relationships. |
|   | c.  | The full extent of the benefits to the species involved in the relationship is not known at this time and requires more study. |
|   | d.  | Over evolutionary time, the individuals in these relationships had better opportunities for food than individuals that did not engage in these relationships. |

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| 5. Does animal farming, such as the leaf-cutter ants tending to fungal gardens, increase the success of all species involved? Explain.

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|   | a.  | Yes: However, the animal farmers are not truly maintaining the crop; their natural feeding and surviving behaviours happen to support the growth of the fungal gardens. |
|   | b.  | No: The animal farmers are simply behaving the way they have evolved, with little to no impact on other species. |
|   | c.  | No: The species only appear to be interconnected. |
|   | d.  | Yes: The animal farmers maintain growing conditions that optimize the requirements for each species. |

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| 6. How do the disciplines of archeology (the scientific study of historic and prehistoric people) and biology work together to understand the evolution of humans?

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|   | a.  | Archeologists collect data on the past behaviour of humans that evolutionary biologists cannot gather because biologists do not have specimens to study. |
|   | b.  | Evolutionary biologists work with archeologists because the archeologists have access to specimens that biologists are not allowed to study. |
|   | c.  | Evolutionary biologists do not work directly with archeologists, they study the specimens that archeologists find, and then biologists draw their own conclusions. |
|   | d.  | Archeologists collect data on the past behaviour of humans that provides supporting evidence to the biological knowledge of evolutionary biologists. |

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| 7. What evidence is there that humans evolved as omnivores?

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|   | a.  | The fossil record reveals tool use specific to meat consumption and domestication of plants. |
|   | b.  | There are oral stories that have been passed down from the early humans that tell of hunting animals. |
|   | c.  | There is evidence of cooking as long ago as one million years. |
|   | d.  | There is fossil evidence of some animal species going extinct, which was caused by human overhunting. |

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| 8. How did the cultural evolution of humans, such as cooking food and living in permanent settlements, impact the communities of plants found in the area where humans settled?

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|   | a.  | Plants were domesticated to increase food production, and plant habitats were modified to increase space for domesticated plant populations. |
|   | b.  | Plant habitats were destroyed to allow the planting of domesticated plants. |
|   | c.  | Plants were domesticated to produce food for the people that were settling in the area. |
|   | d.  | Plants were not domesticated; humans modified the habitats so the naturally growing plants could grow better. |

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| 9. What mechanism allows animals to digest the cellulose in their diet?

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|   | a.  | Humans can take cellulose-digesting supplements to help digest the cellulose in their diet. |
|   | b.  | Animals chew the cellulose-containing food until their teeth grind the cellulose into glucose. |
|   | c.  | Organisms that consume a considerable amount of cellulose have evolved endosymbiotic relationships with organisms that can digest cellulose. |
|   | d.  | The cellulose-rich food sits in the stomach for hours or days until the acid breaks the cellulose into glucose. |

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| 10. Why do animals NOT get sick from the microbiota that live in their guts?

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|   | a.  | The microbiota are part of the community, and the growth of each species is controlled by the presence of other species. |
|   | b.  | The species that make up the gut biota are not the species that cause illness. |
|   | c.  | Humans consume small amounts of antibiotics every day that control the growth of the microbiota. |
|   | d.  | Because the gut microbiota never change, humans have evolved an immune system that can tolerate the presence of the microbiota. |

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| 11. How does having a community of microbial endosymbionts in our gut improve the acquisition of nutrients from our food?

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|   | a.  | Humans can digest all kinds of food, but the endosymbionts simplify the process, thereby reducing the amount of energy the human has to spend on digestion. |
|   | b.  | The microbes in our gut have genes that humans do not have, which effectively increases the digestive capabilities of the human, allowing digestion of foods that humans could not otherwise digest. |
|   | c.  | The microbes in our gut enhance the digestive capabilities that humans already have, making the acquisition of nutrients faster. |
|   | d.  | Humans can digest all kinds of food, but the endosymbionts are found lower in the digestive system, which allows a second chance at digesting food that did not get digested higher up in the digestive tract. |

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| 12. When the human microbiota is disrupted due to illness or antibiotic use, how can the microbial communities be re-established?

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|   | a.  | The microbiota can be re-established by taking prebiotics and eating probiotics. |
|   | b.  | The microbiota cannot be re-established after it has been altered by illness or antibiotic use; a new community becomes established. |
|   | c.  | The microbiota can be re-established by taking probiotics and eating prebiotics. |
|   | d.  | The microbiota cannot be re-established; the person has to modify their diet from that point. |

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| 13. How can change in an environmental factor, such as climate, positively impact some species and negatively impact other species?

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|   | a.  | Some species will lose their food source. |
|   | b.  | Some species will gain a new food source. |
|   | c.  | Some species will not be able to move into the expanded habitat because they have lost the ability to disperse out of their current habitat. |
|   | d.  | Some species will see expansion of their habitat or food source as the environmental factor changes, and some species will see contraction of their habitat or food source. |

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| 14. Humans have lived on Earth for a very long time. Why is there such a strong negative pressure on diversity in current times?

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|   | a.  | The human population has not increased too quickly, but our technology is increasing and creating problems for other species. |
|   | b.  | The increasing human population is causing genetic mutations in other species. |
|   | c.  | The human population is increasing at an unprecedented rate, and the other species are unable to adapt to the changing environment the human population is creating. |
|   | d.  | The human population is increasing, and we are domesticating too many animals and plants. |

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| *ANSWER:* | c |

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| 15. Why should humans care about biodiversity?

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|   | a.  | As biodiversity drops, ecosystems do not provide the basic functions, such as nutrient cycling, for human survival. |
|   | b.  | Ecosystem functions change as biodiversity drops, but humans can overcome that with technology. |
|   | c.  | As biodiversity drops, there is a drop in the variety of foods that humans eat. |
|   | d.  | Ecosystem functions are separate from biodiversity. As long as there is one of each kind of organism, the ecosystem will function and humans will not be impacted. |

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| 16. Why must the scientific community be involved in the decisions about the use of natural resources?

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|   | a.  | Government should control what scientists are studying to make sure natural resources are exploited to their fullest extent. |
|   | b.  | Scientists have insight into the natural ecosystems and how use of natural resources may have a long-term impact on the environment and humans. Other groups, such as government or consumers, may not see beyond their own interests. |
|   | c.  | The insight of scientists is limited, and they only consider the natural world, without regard for what government and consumers need. |
|   | d.  | Scientists only know what happens in the natural world without any idea as to how incorporate government or consumer demands. |

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| *ANSWER:* | b |

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| 17. Chlorophyll is exactly the same in all photosynthetic species.

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|   | a.  | True |
|   | b.  | False |

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| *ANSWER:* | False |

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| 18. Antibiotic use can disrupt the human microbiota.

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|   | a.  | True |
|   | b.  | False |

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| *ANSWER:* | True |

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