

Short Answer:

10. The study of environmental science sometimes involves examining the overuse of environmental resources.
- a) Identify one *general* effect of an overuse of a resource. (2)
  - b) For the effect listed, describe a more *sustainable strategy* for resource utilization. (2)
  - c) Describe how the events from Easter Island can be indicative of environmental issues on Earth today. (3)

**Student 1 – A)** Overuse of a resource leads to decline in populations that live and thrive in the presence of that resource such as frogs in tropical rainforests that are being deforested. **B)** A more sustainable strategy for tropical rainforests is to stop viewing the forest as a profit and money and start viewing it as a home for thousands of species of living organisms. The only way to be more sustainable is to cut down less trees or ideally stop cutting down rainforests altogether. **C)** The events of Easter Island were that the inhabitants there just decided to use resources freely and as they pleased resulting in overuse and complete depletion of the resources required to live there. This is similar to today's issues because humans seem to live with an attitude that we will never run out of resources so it's acceptable to live in a way that uses as many resources as we need to live the life we want.

**Student 2 – A)** The overuse of fossil fuels leads to climate change. **B)** Driving electric cars that receive their energy from hydroelectric or solar powered sources may help to prevent climate change. **C)** The resources on Easter Island ran out with the growth of its population. Eventually, the land could no longer sustain the people and the people died out (Or had to leave). The same thing is happening on Earth as a whole. We are consuming our resources at an alarming rate. This will eventually lead to our departure for the planet.

**Student 3 – A)** The land from which the resource is overused can become unusable/poor quality land. **B)** Taking bits of a resource at a time and replacing them when possible to ensure the land continues with similar ecosystem. **C)** The people of Easter Island stripped the land of resources and made it unusable. We do the same when we tear down ecosystems like rain forests. This indicated that we are headed towards a time where we will no longer have viable land and we will not be able to use it to produce what we need to survive.

11. Having read chapter one of Kolbert's book and chapter one of the Friedland & Relyea text,
- a) Explain how environmental indicators can be used to monitor systems in nature. (2)
  - b) Consider both *Pfiesteria* on the Neuse River and the frogs of Central America to explain how indicators can demonstrate the human interaction with natural systems and our impact(s) upon them, either detrimental, beneficial or both. (3)

**Student 1 – A)** Environmental indicators help to notify us about the state of our planet. For example, if the CO<sub>2</sub> levels are too high, it means that we are burning too much fossil fuels. These indicators show us how we are doing in preserving the environment. If the indicators are abnormal, it means that something is wrong and we must do something about it. **B)** The mass death of fish in the Neuse River resulted from the excess dumping of nutrient rich waste into the water. This caused the *Pfiesteria* to become fish-killers. If we didn't connect the nutrients in the water to the death of the fish, we wouldn't have realized that we were at fault and then fixed the problem. In the case of Chytrid Frog disease, without the indicators (mass extinction), we would have been too late to notice any of the frogs dying, and thus would have been too late to save the species we managed to save.

**Student 2 – A)** Environmental indicators are used to monitor systems in nature by suggesting consequences of human behavior. They attempt to link causes and effect by giving us an effect, which is the value by which the indicators are shifting up or down. The indicators show us what is happening to the planet and set a solid foundation to move forward and start changing our habits. The indicators are like a score for human relationships with earth.

**B)** The Pfiesteria case and frogs of central America show that humans work to fix situations and save animals in order to be a hero, when its most likely that they are the reason these things happen. The Pfiesteria only developed to toxin emitting stages because humans had dumped nutrients to the ground around the river and eventually the chemicals they dumped ended up in the river. Then the humans began to study why the fish were dying so that they could come to their rescue even through no rescue would be needed without the chemicals getting to the river. This is a detrimental relationship between man and nature. The frog situation was both detrimental and beneficial. It was beneficial because the frogs were taken from an environment that was infected. It's bad because they were placed in a fake artificial ecosystem with no real purpose to live and have a cycle of life like in nature.

**Student 3 – A)** Environmental indicators can be used to monitor systems in nature because indicators can show how well an ecosystem is doing. If an ecosystem is thriving the indicators will be on the better side of the spectrum, and if the ecosystem is not doing well it will be visible in the indicators, so scientists look to indicators to track the wellbeing of an ecosystem. **B)** Both the Pfiesteria and the frogs demonstrate interactions between humans and natural systems because they are both examples of humans indirectly being involved with species dying. Humans cause the Pfiesteria to become carnivorous by adding too much nutrients (from fertilizer) to the system and indirectly killed off other fish in the area. Humans also caused the frogs to get Bd because they spread it across the world through globalization and indirectly killed the frogs too. They both are representative of humans' detrimental impacts on the environment. We are responsible for a large amount of living things dying and when we try to clean up the messes we make, things become worse-our efforts do not make our original damage any less detrimental.