



AP[®] Environmental Science 1999 Sample Student Responses

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a) Alice Evans: An increasing number of individuals are turning to the organic foods, which do not use chemical pesticides to control pests. Alice's argument is incorrect & is the result of uninformed farmers. There are many new forms of ecological pest management which do not use chemicals to target pest. They use natural balances in nature such

as predator-prey balances (introducing a natural predator) to keep insect populations in check. They also use devices such as genetic engineering to produce sterile males. These strategies aim, not at eliminating the pest population, but at keeping them at levels where they do not cause substantial damage. In addition, consumers are becoming increasingly informed about how farmers over-spray to meet consumer demand. In response, ~~there are~~ a growing number of shoppers are demanding less-perfect fruits.

Judy Johnson: Judy is correct about the vicious cycle of pest control. According to the scientific process of resurgence, when a pesticide is initially sprayed it kills almost all of the organisms except for the ones who have a natural resistance to the pesticide because of natural genetic variation in the environment. These species (resistant-ones) reproduce, causing a resurgence of pests who are resistant to the pesticide. The chemical industry must then develop new pesticides for the resistant bugs.

Bessie Smith: Bessie is correct. Insurance-spraying and other forms of over-spraying of pesticides have drastic impacts on the environment. When it rains, much of these harmful pesticides runs off into neighboring land and eventually into major waterways. The result is a hazard for neighbors & the entire waterways.

Wendell Mullison: Wendell is incorrect in his saying.

The pesticides, while they may not seem too harmful in small doses, bioaccumulate in the body -- that is, they build up in fatty tissues. They also biomagnify through the food chain -- meaning that their concentration in different organisms gets larger as the organism gets larger. Although government acts such as FIFRA (Fed. Insecticide & Fungicide Reg. Act) are supposed to monitor the use of hazardous pesticides, many pesticides are not detected as being harmful before their harm has been done. Also, chemical companies have had a large say in government work against pesticides, which has (at some level) allowed for hazardous chemicals to be used.

b) Aphids are a pest that threaten & eat farmer's crops. A viable method of correcting this problem would be to use ecological pest management (without pesticides). Such natural control could be achieved by introducing a natural predator into the environment. Such a predator could be ladybugs, which do not harm the crops but eat the aphids as food. Also, by planting strips of alternating crops, the farmer could keep certain pests from building up on his lands.

a Charles Ehler: This statement brings up the fact that most pesticides do cause cancer and other fatal problems in humans. Another example would be the strawberry-pickers in California that are getting cancer because of the pesticides used. The enormous health risks are not worth the small gain from pesticides.

Wendell Mullison: This is a naive statement because

chemical companies do not tend to test their products extensively. They do not usually test all variables against human and environmental health. Also, they want to sell their product and bad reviews won't make people want to buy them. So, they either tend to falsify information or do simple tests that don't offer a holistic evaluation of the chemical.

Judy Johnson: This is a very true statement. Most pests are R-strategists, so they reproduce quickly and therefore, their genes can evolve more quickly. Most pesticides will eventually have no effect on the pest so newer, stronger chemicals need to be created. A good way to prevent this is to bring in natural predators of the pest. A prime example is ladybugs and aphids. It is always better to do things the natural way. Humans tend not to take in the whole picture, or don't take into consideration other factors that might occur from them doing what they do.

Ben Jackson: This statement may be true, but it also shows how humans don't look into the holistic view of nature. Sure. The pesticide may kill that specific pest and the crops will flourish. However, no one knows exactly what role that pest played in the environment. It is entirely possible that that specific pest contained a factor that its entire ecosystem depended on, even though it could've been small. The point is that humans don't take in the holistic view of nature and tend to only think about the present instead of a sustainable society for the future. Pesticides is just one good example.

b. Aphids eat the leaves on crops and reduce yields and health of the crop. A viable method of controlling this pest would be to import ladybugs to eat the aphids. Since ladybugs do minimal damage to the crop, they would be beneficial to the farmer. They also provide something good to look at instead of fields of dead bugs. This would also help farmers because it would require less work on their part and cost a lot less than expensive chemicals. This is also a sustainable system so the only work involved is the start-up.

(a) Robert Rodriguez's comment is true. Pesticides are used way too widespread. They are most often washed off by irrigation and end up running off into streams, rivers, lakes, and groundwater. Here they are consumed by humans and animals alike.

Maurice Gordon is wrong. The idea that there is not enough food in the world to feed everyone is a myth. Currently the world produces more than enough to feed everyone, but it is our distribution method that leaves some hungry. Without pesticides or with fewer, we might produce less, but we still could produce enough to feed much more than $\frac{2}{3}$ of the world if not all of it.

Judy Johnson is right. Insects and other pests have very short lifecycles. As a result any pesticide, even a very successful one becomes useless very quickly. There will always be a few mutated organisms whose genes allow them to survive the pesticide. They live and reproduce to pass on their resistant genes. With such short lifecycles and generations, these resistant pests can be strong and thriving populations in no time at all.

Wendell Mullison is wrong. Health risks are very large and real. New chemicals are not tested ^{as much} as some think. Companies care after profit not protection. Therefore they see no reason to overly test their products. Also, they can't test new pesticides on humans, so how do they learn their effects on humans?

(b) The locusts is an agricultural pests. They can destroy whole fields of grain and other crops. One way of control.

Rats are pests which carry diseases. They are largely responsible for the bubonic plague and the many deaths during the middle ages. If humans just kept more cats as pets, there would be many fewer rats and the problem would be controlled.