Cornfield Tradeoffs

Weigh evidence about the benefits and harms of a GM crop.

ENV.1.10 "Enrichment: Engage in scientific argument from evidence the benefits versus harm of genetically modified organisms."

NAME _____ DATE _____

1 READ AND MARK

Read it twice

YOUR JOB Underline evidence of a benefit of Bt corn, circle evidence of a cost or risk, and number any conditions that affect whether a claim applies. Use your marks to weigh both sides of the argument.

Should This Farm Plant Bt Corn?

1. On a corn farm, caterpillars called European corn borers can tunnel through stalks and ears. Some genetically modified (GM) corn carries a gene from the bacterium *Bacillus thuringiensis*. Its cells make a Bt protein that kills susceptible borers when they eat the plant. In field comparisons, Bt corn often suffers less borer damage and needs fewer insecticide sprays than similar non-Bt corn when borers are abundant. Fewer sprays may also reduce exposure of other insects to broad-spectrum chemicals. These findings do not mean every Bt field needs no spraying: other pests can still attack the crop.

2. A benefit can fade if a pest population evolves resistance. In several regions, some pest populations have developed resistance to particular Bt proteins after repeated exposure. Susceptible insects die, while resistant ones survive and reproduce, so future Bt crops may lose protection. Planting a nearby refuge of non-Bt corn can help slow this process by allowing susceptible insects to survive and mate with resistant insects. Bt seeds may also cost more than conventional seeds. In addition, pollen from Bt corn can fertilize neighboring non-Bt corn, which matters to growers who need to keep their crop free of the trait.

3. Scientists do not settle the debate by calling all GM crops either safe or harmful. They compare outcomes for a specific crop and trait under specific conditions. For Bt corn, useful evidence includes borer counts, crop damage, insecticide applications, resistant pest counts, and effects on other insects. A lower spray count supports one environmental benefit, but it does not erase the risk of resistance or concerns about pollen reaching another field. Pollen movement alone does not show that an ecosystem has been harmed. A strong recommendation weighs the likely benefits against the costs and risks at the farm in question.

2 ANSWER WITH EVIDENCE

Use the passage

1. What evidence supports the claim that Bt corn can reduce insecticide use? When is that benefit most likely?

2. Use evidence from the passage to explain why resistance threatens a benefit of Bt corn and how a refuge may help.

3. Does Bt pollen reaching neighboring corn prove harm to an ecosystem? Support your answer with evidence from the passage.

4. A speaker claims, “Bt corn always reduces environmental harm.” Give one piece of evidence that supports the claim and one that challenges the word “always.”

3 YOUR TURN

Your own words

A grower reports that borers have been scarce for two years and that the field borders a neighbor’s non-Bt corn. Write one paragraph recommending whether the grower should plant Bt corn now or wait for more evidence. Use two pieces of evidence from the passage, address a counterargument, and name one local measurement that could change your recommendation.

Cornfield Tradeoffs

PART 1 · READ AND MARK

Underline evidence of a benefit of Bt corn, circle evidence of a cost or risk, and number any conditions that affect whether a claim applies. Use your marks to weigh both sides of the argument. Accept any marking that follows this job and points at the right text.

PART 2 · ANSWERS

#	QUESTION	ANSWER
1	What evidence supports the claim that Bt corn can reduce insecticide use? When is that benefit most likely?	**Field comparisons often find fewer sprays for Bt corn than for similar non-Bt corn when borers are abundant.**
2	Use evidence from the passage to explain why resistance threatens a benefit of Bt corn and how a refuge may help.	**Some pests have developed resistance to Bt proteins, so Bt corn may lose protection. A non-Bt refuge lets susceptible insects survive and mate with resistant insects, helping slow resistance.**
3	Does Bt pollen reaching neighboring corn prove harm to an ecosystem? Support your answer with evidence from the passage.	**No. The pollen can fertilize non-Bt corn and affect a grower who needs a crop free of the trait, but pollen movement alone does not show ecosystem harm.**
4	A speaker claims, "Bt corn always reduces environmental harm." Give one piece of evidence that supports the claim and one that challenges the word "always."	**Fewer sprays when borers are abundant may reduce other insects' exposure to broad-spectrum chemicals. Other pests can still require spraying, and resistance can reduce Bt corn's protection.**

PART 3 · YOUR TURN (SAMPLE ANSWER)

I would wait and monitor before buying Bt seed for this field. Field comparisons show less damage and fewer sprays mainly when borers are abundant, but they have been scarce here. Bt seed may also cost more, and pollen could reach the neighbor's non-Bt corn. Someone might argue that planting Bt corn now would prevent a sudden borer outbreak. That is possible, but the likely benefit is uncertain without current evidence of pest pressure. I would count borers in this field this season; high counts would make planting Bt corn more persuasive.

Accept either recommendation if it uses two accurate pieces of passage evidence, addresses a counterargument, and identifies a relevant local measurement. Do not accept pollen movement alone as proof of ecosystem harm.