From Tuber to Table

Weigh the benefits and risks of growing food from plant parts

BOT.3.2 "Enrichment: Research and present an agronomically important crop (e.g., potato, sweet potato, pineapple, or strawberry) that is produced via vegetative propagation (non-GMOs) for human consumption..."

NAME _____ DATE _____

1 READ AND MARK

Read it twice

YOUR JOB Underline and number 1 to 3 the stages from planting material to shoot to new tubers. Circle two benefits and box two risks of this method, using the passage to support each choice.

A Potato Field Without Seeds

(1) A potato plant can make more potato plants without making seeds. In a field of conventionally bred, non-genetically engineered Yukon Gold potatoes, growers plant small tubers or cut pieces called seed potatoes. Each piece needs at least one eye, a bud that can grow into a shoot. The new plant develops roots and leaves, then forms more edible tubers underground. This is vegetative propagation because a piece of the parent plant starts the next plant. Its offspring usually carry the same genetic makeup as the parent, rather than the mix of genes that results from sexual reproduction.

(2) That near match can help a grower meet a market's needs. If a healthy Yukon Gold plant has desirable yellow flesh and cooks well, planting its tubers can produce plants with the same inherited traits. A field of plants with similar traits can make harvest and sales more predictable. Tubers also hold stored food that supports a new shoot as it begins growing. These benefits follow from how the crop starts, not from genetic engineering: growers select and replant plant parts. However, growing conditions still affect yield and quality, so identical genes do not guarantee identical harvests.

(3) The same method creates risks. A virus in a parent plant can pass into tubers saved for planting, allowing infection to persist into another season. Aphids can also spread some potato viruses between plants. If many plants share similar inherited defenses, a disease that damages one may threaten others too, though similar genetics do not guarantee infection. To lower risk, growers can buy certified seed potatoes, which are inspected and tested under seed programs for certain diseases, rather than repeatedly replanting untested tubers. Certification reduces risk but cannot promise a disease-free crop; using more than one variety can also reduce reliance on a single set of traits.

2 ANSWER WITH EVIDENCE

Use the passage

1. What evidence in the passage shows that planting a tuber piece is vegetative propagation rather than reproduction through seeds?

2. A grower wants potatoes with consistent inherited traits. How could planting Yukon Gold tubers help, and what limit does the passage place on that benefit?

3. Why might repeatedly planting tubers saved from an infected field make a virus problem last more than one season?

4. A grower plans to buy certified seed potatoes but plant only one variety. Which risk does each choice address, and what risk remains?

3 YOUR TURN

Your own words

Research a different non-genetically engineered food crop grown from plant parts. Write a short presentation script that names your source, explains the propagation method, and uses evidence to argue for one benefit and one possible negative effect.

From Tuber to Table

PART 1 · READ AND MARK

Underline and number 1 to 3 the stages from planting material to shoot to new tubers. Circle two benefits and box two risks of this method, using the passage to support each choice. Accept any marking that follows this job and points at the right text.

PART 2 · ANSWERS

#	QUESTION	ANSWER
1	What evidence in the passage shows that planting a tuber piece is vegetative propagation rather than reproduction through seeds?	**A piece of the parent tuber starts the new plant: an eye grows into a shoot, and the plant forms new tubers. No seed is used.**
2	A grower wants potatoes with consistent inherited traits. How could planting Yukon Gold tubers help, and what limit does the passage place on that benefit?	**Plants grown from the tubers usually have the parent's genetic makeup, making inherited traits more predictable. Growing conditions can still change yield and quality.**
3	Why might repeatedly planting tubers saved from an infected field make a virus problem last more than one season?	**A virus in a parent plant can pass into tubers saved for planting, so the next season's plants may begin infected.**
4	A grower plans to buy certified seed potatoes but plant only one variety. Which risk does each choice address, and what risk remains?	**Certified seed potatoes reduce the risk of planting infected tubers. Planting one variety still leaves the field reliant on a single set of inherited defenses, and certification cannot guarantee a disease-free crop.**

PART 3 · YOUR TURN (SAMPLE ANSWER)

Strawberries can be grown from runners on non-genetically engineered parent plants. The University of Minnesota Extension's "Growing strawberries in the home garden" explains that runners form new daughter plants and advises growers to start with disease-free plants. Runners let growers produce more plants from a parent with desirable fruit traits, without starting each plant from seed. But a disease in a parent plant may be carried into plants grown from its runners. Starting with disease-free plants helps lower that risk.

Accept other researched food crops if students identify a non-genetically engineered example and explain how a plant part produces a new plant. Arguments should connect a benefit and a possible negative effect to that method and name a credible source.