Growing Without Seeds

How plant copies help produce food

BOT.3.1 "Describe the various processes of asexual reproduction and vegetative propagation used by plants. Communicate the importance of these reproductive methods in regard to human food production."

NAME _____ DATE _____

1 READ AND MARK

Read it twice

YOUR JOB Underline each description of how a new plant starts without seeds, circle the names of food crops, and label one food-production benefit B and one risk R.

From One Plant to Many

1. At a strawberry farm, a long stem creeps across the soil. Where it touches down, it can form roots and a new plant. This stem, called a runner, is one example of vegetative propagation: a new plant grows from a parent's stem, root, or leaf rather than from a seed. The process is asexual because one parent supplies the plant tissue, and new cells form by mitosis. New strawberry plants from a runner usually have the same genes as the parent. Farmers can spread a productive variety across a field without waiting for seeds to sprout.

2. Potato growers can start a crop from pieces of a tuber, an underground stem that stores food. Each planted piece needs an eye, a bud that can grow into a shoot. The shoot makes leaves and roots, so one harvested potato can help produce several new plants. Cassava growers often plant sections of mature stems instead. Buds on each stem cutting grow into a new cassava plant. Both methods copy useful traits, such as a variety's yield or flavor. They also let growers multiply plants that may not produce seeds with the traits they want.

3. Banana plants can also send up shoots from underground stems. Growers separate these shoots and plant them to start new banana plants. For larger numbers, a lab can use tissue culture: workers place tiny pieces of healthy plant tissue in sterile conditions, where they grow into plantlets. These methods help farms produce familiar fruit in large amounts, but shared genes create a risk. If a disease can infect one plant, many genetically similar plants may be vulnerable. Growers can reduce that risk by starting with disease-free material, cleaning tools, and growing more than one variety.

2 ANSWER WITH EVIDENCE

Use the passage

1. Describe how a strawberry runner makes a new plant and explain how this helps a farmer expand a crop.

2. Explain how a grower can use one potato tuber to produce several new plants. What must each planted piece have?

3. Compare how a cassava stem cutting and a banana shoot start new plants. What food-production benefit do the methods share?

4. Explain how tissue culture produces banana plants and why growing many genetically similar plants could threaten a harvest.

3 YOUR TURN

Your own words

A food pantry wants more tomato plants from one high-yield plant without using seeds. Write four sentences explaining how to use stem cuttings, why the new plants could retain the parent's high-yield genes, how this could increase food production, and one step that limits disease risk.

Growing Without Seeds

PART 1 · READ AND MARK

Underline each description of how a new plant starts without seeds, circle the names of food crops, and label one food-production benefit B and one risk R. Accept any marking that follows this job and points at the right text.

PART 2 · ANSWERS

#	QUESTION	ANSWER
1	Describe how a strawberry runner makes a new plant and explain how this helps a farmer expand a crop.	**A runner forms roots and a new plant where it touches the soil. Farmers can use runners to spread a productive variety without waiting for seeds to sprout.**
2	Explain how a grower can use one potato tuber to produce several new plants. What must each planted piece have?	**The grower plants several pieces of the tuber. Each piece must have an eye, which grows into a shoot that forms a new plant.**
3	Compare how a cassava stem cutting and a banana shoot start new plants. What food-production benefit do the methods share?	**Buds on a planted cassava stem cutting grow into a new plant. A separated banana shoot grows into a new plant when planted. Both let growers multiply plants with useful traits.**
4	Explain how tissue culture produces banana plants and why growing many genetically similar plants could threaten a harvest.	**Tiny pieces of healthy banana tissue grow into plantlets in sterile conditions. Because the plants share genes, a disease that infects one may also infect many others.**

PART 3 · YOUR TURN (SAMPLE ANSWER)

Cut healthy stems with buds from the tomato plant and place them in moist growing medium until they root. Each cutting grows through mitosis, so the new plants retain the parent's genes for high yield. Planting several rooted cuttings could increase the number of plants that produce tomatoes for the food pantry. Start with disease-free stems and clean the cutting tools to lower the chance of spreading pathogens.

Accept equivalent descriptions of the plant parts and how they grow. For Part 3, accept a different sound disease precaution, such as removing infected plants, if the response also explains cuttings and their food-production benefit.