Three Ways to Spread

Compare how plant reproduction affects spread and inherited variation.

BOT.3.3 "Compare and contrast the consequences of the following reproductive methods: asexual reproduction, vegetative propagation, and sexual reproduction."

NAME _____ DATE _____

1 READ AND MARK

Read it twice

YOUR JOB Underline one detail about where offspring can grow for each reproductive method, and circle one detail about inherited variation for each method. Use your marks to compare the consequences of the three methods.

New Plants in a Vacant Lot

1. A vacant lot has three kinds of plant neighbors: dandelions, strawberry plants, and sunflowers. Some dandelions make seeds without pollen fertilizing an egg. This is a form of asexual reproduction called apomixis. Their windborne seeds can start plants far from the parent. Because these seeds form without the usual mixing of genes from two parents, the young plants are usually genetically very similar to the mother plant. This method allows reproduction even if pollinators are scarce. Yet a harmful change, such as a new disease, may affect many similar offspring in the same way.

2. Strawberry plants can spread by runners, thin stems that grow across the soil and take root. This is vegetative propagation, an asexual method that uses a parent plant's body parts rather than seeds. Each rooted runner can grow into a new plant with nearly the same genes as its parent. Runners can fill nearby bare ground quickly without pollination, but they usually do not carry new plants far away. Like dandelions produced without fertilization, these offspring have little inherited variation. Unlike those dandelions, strawberry plants spread through living stems, not through seeds carried by wind.

3. Sunflowers often produce seeds through sexual reproduction. When pollen from one plant fertilizes an egg in a flower on another plant, the resulting seed receives genes from both parents. Seeds can travel beyond the parent plant, although how far they travel depends on how they are dispersed. Mixing genes produces more inherited variation among offspring than either unfertilized dandelion seeds or strawberry runners usually do. Some offspring may withstand a new disease better, while others may not. Sexual reproduction depends on successful pollination and fertilization, so it can fail when pollinators or suitable pollen are unavailable. Strawberry plants can also make seeds sexually.

2 ANSWER WITH EVIDENCE

Use the passage

1. How are offspring from dandelion seeds made without fertilization and strawberry runners alike? How does the distance they can spread differ?

2. Dandelions and sunflowers can both produce seeds. How do the two seed-making methods differ in their need for pollination and in the variation of their offspring?

3. Compare the advantages and limits of strawberry runners and sexual reproduction in sunflowers when pollinators are scarce.

4. If a new disease reaches the lot, how might offspring from the three methods differ in their chances of surviving? Explain using inherited variation.

3 YOUR TURN

Your own words

A coastal plant can make windborne seeds without fertilization, grow new plants from short underground stems, or make windborne seeds after cross-pollination. In four sentences, compare the three methods for spread and inherited variation, then recommend one for a site facing a new disease and explain why.

Three Ways to Spread

PART 1 · READ AND MARK

Underline one detail about where offspring can grow for each reproductive method, and circle one detail about inherited variation for each method. Use your marks to compare the consequences of the three methods. Accept any marking that follows this job and points at the right text.

PART 2 · ANSWERS

#	QUESTION	ANSWER
1	How are offspring from dandelion seeds made without fertilization and strawberry runners alike? How does the distance they can spread differ?	**Both produce offspring with little inherited variation. Windborne dandelion seeds can travel far, while strawberry runners usually spread only nearby.**
2	Dandelions and sunflowers can both produce seeds. How do the two seed-making methods differ in their need for pollination and in the variation of their offspring?	**The dandelions described make seeds without pollination and produce genetically similar offspring. Sexual reproduction in sunflowers requires pollination and produces offspring with more inherited variation.**
3	Compare the advantages and limits of strawberry runners and sexual reproduction in sunflowers when pollinators are scarce.	**Runners can fill nearby ground without pollination but usually cannot spread far. Sexual reproduction can produce varied offspring whose seeds may travel farther, but it can fail without successful pollination.**
4	If a new disease reaches the lot, how might offspring from the three methods differ in their chances of surviving? Explain using inherited variation.	**Offspring from unfertilized dandelion seeds and strawberry runners have little inherited variation, so many may be affected similarly. Sexually produced sunflower offspring vary more, so some may withstand the disease better.**

PART 3 · YOUR TURN (SAMPLE ANSWER)

Unfertilized seeds can travel far on the wind, but their offspring usually have little inherited variation. Short underground stems produce genetically similar plants close to the parent. Cross-pollinated seeds can also travel far, and mixing genes gives their offspring more inherited variation. I would favor cross-pollination where a new disease is spreading because some varied offspring may resist it.

Accept answers that distinguish distance of spread from inherited variation. Disease resistance is a possibility, not a guarantee of sexual reproduction.