Name _____ Date _____

Asexual and Sexual Reproduction: Comparing Potato Offspring

Directions: Read the passage and use both tables: one compares the two kinds of reproduction, and the other shows the garden club's records.

Two Ways to Grow a Potato

Forget a potato in a dark cupboard for a few weeks, and pale sprouts may poke out of it. Planted in soil, a piece of that potato can grow into a whole new plant. A potato is a tuber, a swollen underground stem that stores food, and the small dents on its skin, called eyes, hold buds. A farmer can cut a tuber into pieces, each with at least one eye, and plant them. Each piece can grow into a new plant by asexual reproduction, which involves only one parent. The new plant gets all of its genes from that parent, so it is genetically identical to the parent, except for rare mutations, which are random changes in genes.

Potato plants can also reproduce sexually. After their flowers are pollinated, small green berries may form, each holding many seeds. The berries look like little tomatoes, but they are poisonous and should never be eaten. Each seed forms when a sperm cell from a pollen grain joins an egg cell, so the new plant gets some of its alleles from each. Because each seed usually gets a different mix of alleles, plants grown from seeds can differ from their parents and from one another.

A garden club decided to compare the two ways. The club started with plant A, which makes potatoes with red skin and a round shape. Members planted 8 tuber pieces from plant A. They also raised 8 plants from seeds that formed on plant A after its flowers were pollinated by a plant whose potatoes have yellow skin and a long shape. All 16 plants grew in the same garden bed with the same water and care. In the fall, the club recorded the skin color and shape of each plant's potatoes. The seed-grown plants made smaller potatoes in their first year, but their color and shape were easy to see.

How asexual and sexual reproduction compare in plants

Feature	Asexual reproduction	Sexual reproduction
Number of parents	One	Usually two
How a new plant starts	From a part of the parent, such as a tuber piece or a runner	From a seed, which forms when a sperm cell joins an egg cell
Offspring's genes compared with a parent's	Identical, except for rare mutations	A new mix of alleles
Genetic differences among the offspring	Very few, from rare mutations	Many
Plant examples	Potato tuber pieces, strawberry runners	Potato seeds, apple seeds

The garden club's records of each plant's potatoes

Plant	Grown from	Skin color	Shape
T1	Tuber piece of plant A	Red	Round
T2	Tuber piece of plant A	Red	Round
T3	Tuber piece of plant A	Red	Round
T4	Tuber piece of plant A	Red	Round
T5	Tuber piece of plant A	Red	Round
T6	Tuber piece of plant A	Red	Round
T7	Tuber piece of plant A	Red	Round
T8	Tuber piece of plant A	Red	Round
S1	Seed from plant A	Red	Round
S2	Seed from plant A	Yellow	Long
S3	Seed from plant A	Red	Long
S4	Seed from plant A	Red	Round
S5	Seed from plant A	Yellow	Round
S6	Seed from plant A	Red	Round
S7	Seed from plant A	Yellow	Long
S8	Seed from plant A	Red	Long

1. Why did all 8 plants grown from tuber pieces make red, round potatoes like plant A's?

A. They got all their genes from plant A, so they had the same alleles, except for any rare mutations.

B. Red skin and a round shape are dominant traits, so they always show up in offspring.

C. The food stored in each tuber piece decided the color and shape of its potatoes.

D. Each tuber piece got alleles from two parents, and the red and round alleles won out.

2. Which choice gives one reason the 8 seed-grown plants made potatoes of different colors and shapes?

A. The seed-grown plants got more water and care than the tuber-grown plants.

B. Each seed got its own mix of alleles from plant A and the yellow-skinned plant.

C. Each seed copied the traits of just one of its two parents.

D. Most seeds carry new mutations that change skin color and shape.

3. How many of the 8 seed-grown plants made potatoes that differed from plant A's in skin color, shape or both?

_____ plants

4. Why did the club grow all 16 plants in the same garden bed with the same water and care?

A. So that the seed-grown plants would make red, round potatoes like plant A's

B. So that soil, water and care would be the same for both groups, making them unlikely causes of any differences

C. So that all 16 plants would end up with the same genes

D. So that the tuber-grown plants could pass their alleles to the seed-grown plants

5. Which statement about the 16 plants do the club's color and shape records back up?

A. For these 16 plants, the seed-grown plants never matched plant A in skin color.

B. For these 16 plants, every seed-grown plant matched the yellow-skinned parent in color and shape.

C. For these 16 plants, the seed-grown plants matched plant A more closely than the tuber-grown plants did.

D. For these 16 plants, all 8 grown from tuber pieces matched plant A in skin color and shape, while the 8 grown from seeds varied.

6. A spider plant grows small plantlets at the ends of long stems, and each plantlet can take root and become a new plant. Using the comparison table, how do the new plant's genes compare with the parent plant's?

A. They are copied from the parent, but with the recessive alleles left out.

B. They match the parent's only for traits with dominant alleles.

C. They are identical to the parent's, except for any rare mutations.

D. They are a new mix of alleles from two parents.

7. A farmer grows a potato that customers love and wants next year's whole field to make potatoes just like it. Which plan fits that goal best?

A. Plant seeds from its berries, so each new plant gets a new mix of alleles.

B. Plant tuber pieces from it, so each new plant has its genes, except for rare mutations.

C. Plant seeds from its berries, because seeds always make copies of the plant they came from.

D. Plant tuber pieces next to other kinds of potatoes, so the plants can share their best traits.

8. Suppose a disease reaches the club's garden, and plant A's genes give no protection against it. Which group would more likely include some plants that survive?

A. Both groups about equally, because they grew in the same garden bed

B. The tuber-grown plants, because asexual reproduction makes plants stronger

C. The tuber-grown plants, because they are copies of a parent that grew well

D. The seed-grown plants, because their mixes of alleles differ from plant A's and from one another