What is Sexual Reproduction?

Worksheet

Sexual reproduction combines genetic material from two parents through the fusion of haploid gametes (egg and sperm) produced by meiosis, producing offspring that are genetically distinct from either parent.

Questions

1. What is produced when a haploid sperm fuses with a haploid egg?

A) A haploid gamete
B) A diploid zygote
C) A somatic cell
D) A polar body

2. Which cell division process produces gametes?

A) Mitosis
B) Binary fission
C) Meiosis
D) Budding

3. What is the main advantage of sexual reproduction over asexual reproduction?

A) Faster population growth
B) No partner needed
C) Greater genetic variation in offspring
D) Identical offspring every time

4. In humans, how many chromosomes does a haploid gamete contain?

A) 46
B) 23
C) 44
D) 92

5. In humans (2n = 46), how many chromosomes does each gamete carry after meiosis, and how many does the zygote have after fertilization?

6. Due to independent assortment alone, how many genetically different gametes can one human produce?

7. Two heterozygous pea plants (Aa x Aa) are crossed. What genotype and phenotype ratios result in the offspring?

8. Define: What is a gamete?

9. Define: Why does sexual reproduction increase genetic variation?

10. Define: What is fertilization?

Answer Key

1. B) A diploid zygote - Fertilization combines two haploid gametes into one diploid zygote.

2. C) Meiosis - Meiosis halves the chromosome number to produce haploid gametes.

3. C) Greater genetic variation in offspring - Combining genes from two parents (plus crossing over) creates genetic variation that helps populations adapt.

4. B) 23 - Human somatic cells have 46 chromosomes (2n); gametes are haploid with 23 (n).

5. Diploid number: 2n = 46 chromosomes Meiosis I and II reduce the chromosome number by half Each haploid gamete carries n = 23 chromosomes Fertilization combines 23 (egg) + 23 (sperm) = 46 chromosomes in the zygote

6. Humans have 23 pairs of homologous chromosomes Each pair can align two possible ways during meiosis I Number of combinations = 2^n = 2^23 2^23 = 8,388,608 genetically different possible gametes from independent assortment alone

7. Each parent produces A and a gametes in equal proportion Punnett square combinations: AA, Aa, Aa, aa Genotype ratio: 1 AA : 2 Aa : 1 aa If A is dominant, phenotype ratio is 3 dominant : 1 recessive

8. A haploid reproductive cell (egg or sperm) produced by meiosis that fuses with another gamete during fertilization.

9. Because meiosis (independent assortment and crossing over) plus the random fusion of two different parents' gametes produces offspring with new gene combinations.

10. The fusion of a haploid sperm and a haploid egg to form a diploid zygote.