# Using Punnett Squares to Predict the Outcomes of Crosses KEY

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **1. Nn × NN**   |  |  |  | | --- | --- | --- | |  | **N** | **n** | | **N** | **NN** | **Nn** | | **N** | **NN** | **Nn** |  1. Genotypic ratio:   **2:2**   1. Phenotypic ratio:   **4:0** | **2. Aa × aa**   |  |  |  | | --- | --- | --- | |  | **A** | **a** | | **a** | **Aa** | **aa** | | **a** | **Aa** | **aa** |  1. Genotypic ratio:   **2:2**   1. Phenotypic ratio:   **2:2** |
| **3. Tt × Tt**   |  |  |  | | --- | --- | --- | |  | **T** | **t** | | **T** | **TT** | **Tt** | | **t** | **Tt** | **tt** |  1. Genotypic ratio:   **1:2:1**   1. Phenotypic ratio:   **3:1** | **4. Cross 2 plants that are heterozygous for green pods.**   |  |  |  | | --- | --- | --- | |  | **G** | **g** | | **G** | **GG** | **Gg** | | **g** | **Gg** | **gg** |  1. Genotypic ratio:   **1:2:1**   1. Phenotypic ratio:   **3:1** |
| **5. Cross a plant that is heterozygous for axial flowers with a plant that has terminal flowers.**   |  |  |  | | --- | --- | --- | |  | **A** | **a** | | **a** | **Aa** | **aa** | | **a** | **Aa** | **aa** |  1. Genotypic ratio:   **2:2**   1. Phenotypic ratio:   **2:2** | **6. Cross a homozygous tall plant with a short plant.**   |  |  |  | | --- | --- | --- | |  | **T** | **T** | | **t** | **Tt** | **Tt** | | **t** | **Tt** | **Tt** |  1. Genotypic ratio:   **4:0**   1. Phenotypic ratio:   **4:0** |
| **7. Cross a plant that is heterozygous for smooth pods with a plant that has constricted pods.**   1. Genotypic ratio:   **2:2**   1. Phenotypic ratio:   **2:2**   |  |  |  | | --- | --- | --- | |  | **N** | **n** | | **n** | **Nn** | **nn** | | **n** | **Nn** | **nn** | | **8. When a tall plant is crossed with a short plant, some of the offspring are short. What are the genotypes of the parents? What are the genotypic and phenotypic ratios of the offspring?**   |  |  |  | | --- | --- | --- | |  | **T** | **t** | | **t** | **Tt** | **tt** | | **t** | **Tt** | **tt** |  1. Parent Genotypes: **Tt X tt** 2. Genotypic ratio:   **2:2**   1. Phenotypic ratio   **2:2** |
| **9. Three-fourths (¾) of the plants produced by a cross between two unknown pea plants have axial flowers and one-fourth (¼) have terminal flowers. What are the genotypes of the parent plants?**   1. Parent Genotypes: **AaXAa**  |  |  |  | | --- | --- | --- | |  | **A** | **a** | | **A** | **AA** | **Aa** | | **a** | **Aa** | **aa** | | **10. What are the genotypes of the parents of a cross would result in ½ of the offspring having green pods and ½ of the offspring having yellow pods?**   |  |  |  | | --- | --- | --- | |  | **G** | **g** | | **g** | **Gg** | **gg** | | **g** | **Gg** | **gg** |  1. Parent Genotypes: **GgXgg** |