How to work out what you get when you cross a tall plant with a small plant…

Background:

What do you get when you cross a tall plant with a small plant?

Mendel found that you get all tall plants.

Therefore tall must be dominant to small.

Mendel then found that if you cross those tall plants together, you get 3 tall plants and 1 small plant, there is a ratio of 3:1.

Work it out:

Homozygous: alleles are both the same.

If we cross a tall plant with a small plant:

Phenotype: tall x small

Genotype: TT tt

Heterozygous: they have one of each allele.

F1 generation: Tt Tt Tt Tt

Because T is dominant over t, all of the plants are tall.

If we cross 2 of these plants together we get:

Phenotype: tall x small

Genotype: Tt Tt

F2 generation: TT Tt Tt tt

These are all tall this one is small

There are 3 tall plants and 1 small plant, the ratio is 3:1.

To make this easier, you can draw Punnet Squares to work out the crosses:

Fill in the boxes to get the offspring

Parent alleles across the top and down the side

|  |  |  |
| --- | --- | --- |
|  | **T** | **t** |
| **T** | TT | Tt |
| **t** | Tt | tt |

Now it’s your turn: If we cross red flowers with white flowers we get red flowers.

Which colour is dominant? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Which colour is recessive? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

What letter will you use for the red allele? \_\_\_\_\_\_\_\_\_

What letter will you use for the white allele? \_\_\_\_\_\_\_\_

We are crossing a red flower with a white flower, what are the phenotypes?

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ x \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

What are the genotypes if we cross homozygous flowers?

\_\_\_\_\_\_\_\_\_\_\_ x \_\_\_\_\_\_\_\_\_\_\_\_

Fill in the Punnet Square:

|  |  |  |
| --- | --- | --- |
|  |  |  |
|  |  |  |
|  |  |  |

What do the F1 flowers look like? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Now cross two of these flowers together, what are the phenotypes?

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ x \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

What are the genotypes (heterozygous flowers this time)?

\_\_\_\_\_\_\_\_\_\_\_ x \_\_\_\_\_\_\_\_\_\_\_\_

Fill in the Punnet Square:

|  |  |  |
| --- | --- | --- |
|  |  |  |
|  |  |  |
|  |  |  |

What do the F2 flowers look like? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

What is the ratio? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

From now on, set out your answers to the following questions in the same way in your notes.

Write out the results for both the F1 and F2 generations.

1. Cross a dominant, homozygous brown eyed mother, with a recessive homozygous blue eyed father.

2. Cross a dominant blue flower with a recessive white flower.

3. Cross a broad leaf (dominant) with a narrow leaf (recessive) plant.