

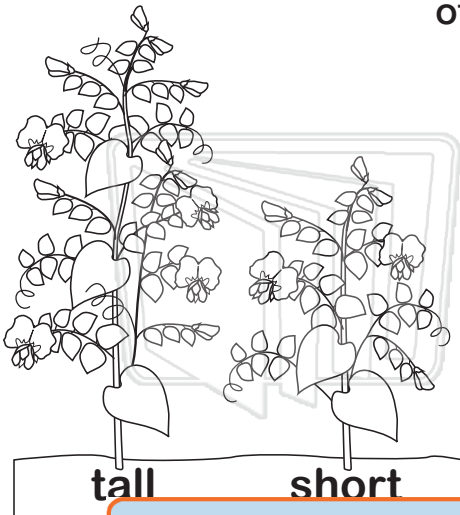


# Genetics - The Study of Heredity

Sci  
F

Name \_\_\_\_\_ Class \_\_\_\_\_ Date \_\_\_\_\_

**Gregor Mendel** (1822-1884) is known for his **pea plant experiments** that demonstrated the process of **heredity**. His discoveries form the foundation of **genetics** – the study of heredity.



**P Generation**

In a typical experiment, Mendel crossed purebred tall-stemmed plants with purebred short-stemmed plants (**P generation**).



## PREVIEW

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t

t

t

t

t

t

t

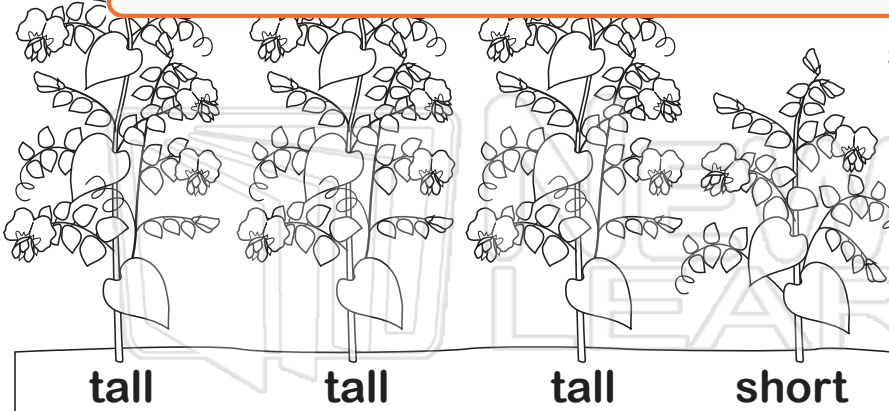
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**F<sub>2</sub> Generation**

had about 75% tall and 25% short-stemmed plants.




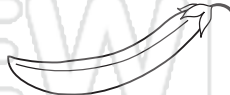

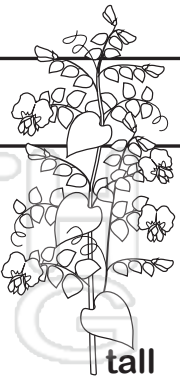




Mendel hypothesized that each parent passes to the offspring a **factor** or set of *genetic information* which controls a **trait**. The factors, now called **genes**, exist in pairs known as **alleles**, one inherited from each parent.



# Genetics - The Study of Heredity

Name \_\_\_\_\_ Class \_\_\_\_\_ Date \_\_\_\_\_

An **allele** is a different form of a **gene**. A **dominant allele** is one whose trait will always show up in its presence. A **recessive allele** is one whose trait will be masked whenever the dominant allele is present.

|                  | seed shape  | seed color  | pod shape  | pod color  | stem height   |   |
|------------------|---|---|--|--|---|---|
| dominant allele  | <br>round    | <br>yellow | <br>smooth  | <br>green  |  |  |
| recessive allele | <br>wrinkled | <br>green  | <br>pinched | <br>yellow | short<br>(recessive)  | tall<br>(dominant)  |

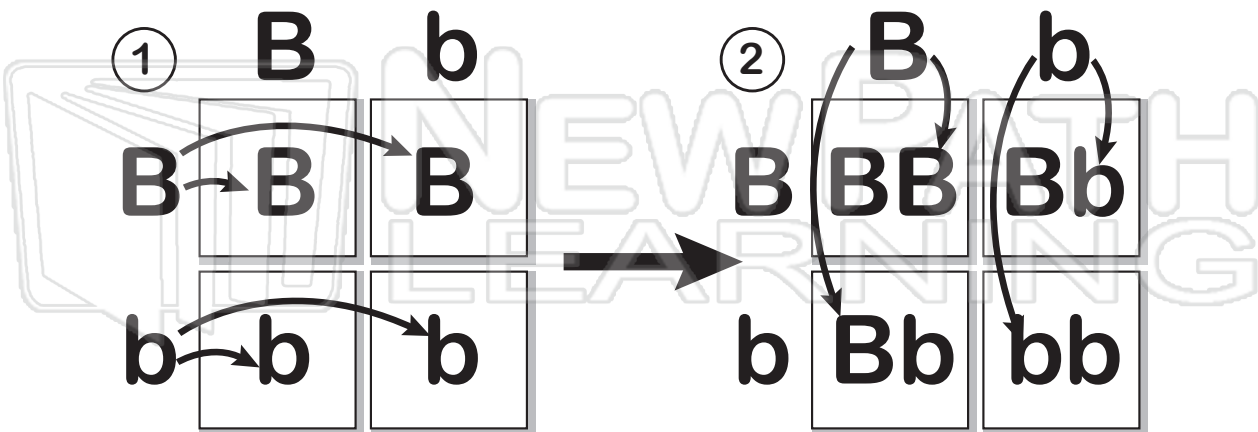
A **phenotype** of a plant is the observable characteristics of an organism.



**PREVIEW**

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A **Punnett square** is a diagram that is used to predict the genotypes of an offspring from its parents' genotypes. It consists of a square divided into four smaller squares by a horizontal and a vertical line. Each of the four smaller squares contains a pair of alleles, one from each parent.





# Genetics - The Study of Heredity

Sci  
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Name \_\_\_\_\_ Class \_\_\_\_\_ Date \_\_\_\_\_

Green pea pods (G) are dominant to yellow pea pods (g).

Fill in the Punnett square below to show the possible offspring from a Gg x Gg cross. Then fill in the genotype and phenotype table.

|          |          |          |
|----------|----------|----------|
|          | <b>G</b> | <b>g</b> |
| <b>G</b> |          |          |
| <b>g</b> |          |          |

Offspring

Offspring

Offspring

|           | Phenotype | Genotype |
|-----------|-----------|----------|
| Offspring |           |          |
| Offspring |           |          |
| Offspring |           |          |

Freckle  
Fill in



What  
would

## PREVIEW

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In rank  
List t  
with



Tall pea plants (T) are dominant to short (t) plants. Two plants were crossed and all the plants in F<sub>1</sub> were tall. List the genotypes of the parents. Include all possibilities.



## Answer Key

Green pea pods (G) are dominant to yellow pea pods (g).

Fill in the Punnett square below to show the possible offspring from a Gg x Gg cross. Then fill in the genotype and phenotype table.

|          |           |           |
|----------|-----------|-----------|
|          | <b>G</b>  | <b>g</b>  |
| <b>G</b> | <b>GG</b> | <b>Gg</b> |
| <b>g</b> | <b>Gg</b> | <b>gg</b> |

|           | Phenotype   | Genotype |
|-----------|-------------|----------|
| Offspring | green pods  | GG       |
| Offspring | green pods  | Gg       |
| Offspring | yellow pods | gg       |

Free  
Fill in



What  
would

## PREVIEW

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In rank  
List t  
with

**BB, Bb**



Tall pea plants (T) are dominant to short (t) plants. Two plants were crossed and all the plants in F<sub>1</sub> were tall. List the genotypes of the parents. Include all possibilities.

**TT & Tt, TT & TT, TT & tt**