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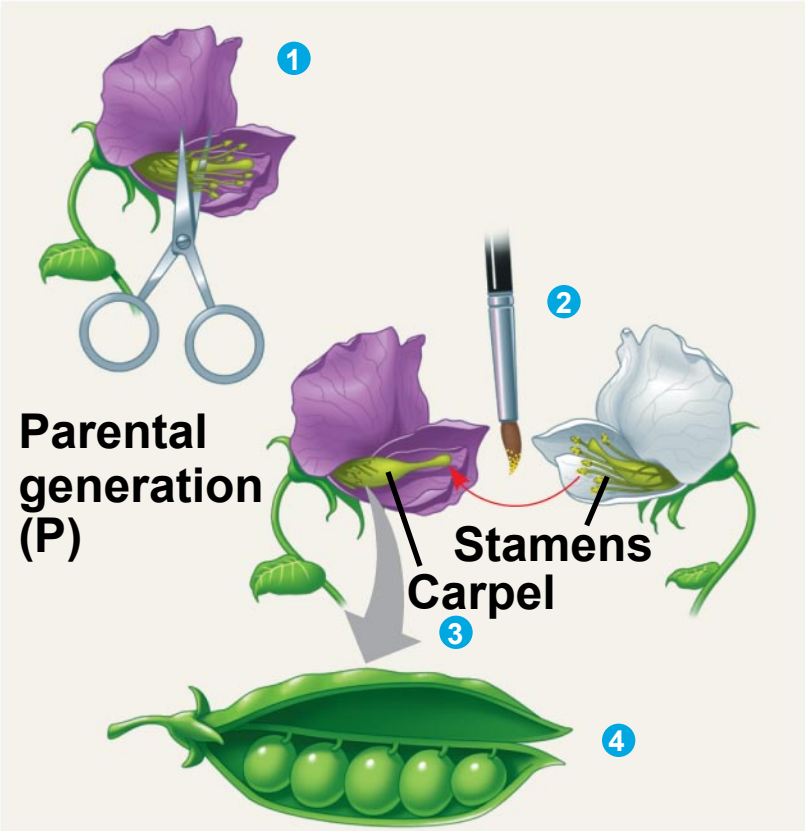
## TECHNIQUE




## RESULTS

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## EXPERIMENT

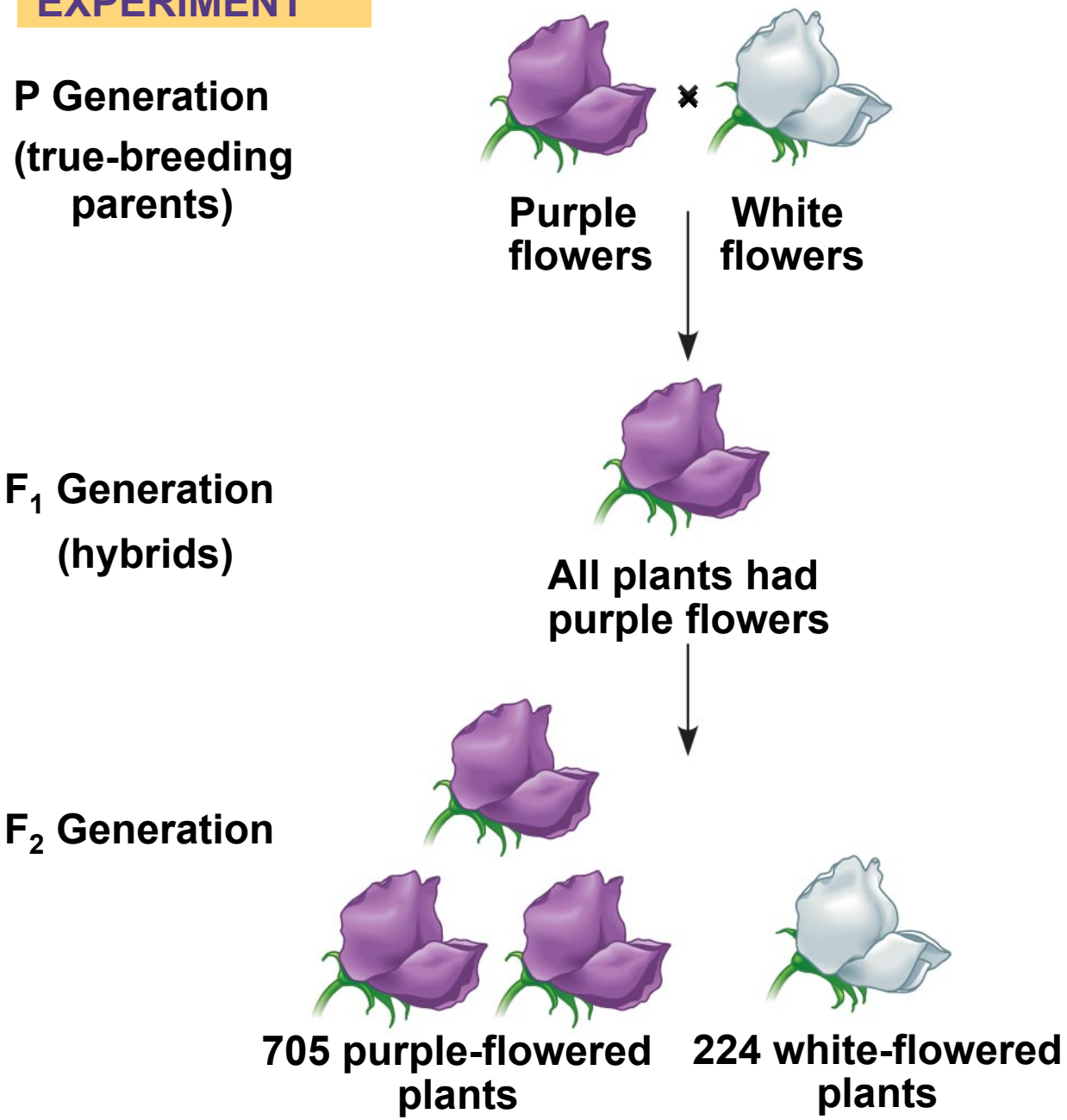


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**Table 14.1 The Results of Mendel's $F_1$ Crosses for Seven Characters in Pea Plants**

| Character | Dominant Trait | x | Recessive Trait | $F_2$ Generation Dominant:Recessive | Ratio |
|---|---|---|---|---|---|
| Flower color | Purple | × | White | 705:224 | 3.15:1 |
| Flower position | Axial | × | Terminal | 651:207 | 3.14:1 |
| Seed color | Yellow | × | Green | 6,022:2,001 | 3.01:1 |
| Seed shape | Round | × | Wrinkled | 5,474:1,850 | 2.96:1 |
| Pod shape | Inflated | × | Constricted | 882:299 | 2.95:1 |
| Pod color | Green | × | Yellow | 428:152 | 2.82:1 |
| Stem length | Tall | × | Dwarf | 787:277 | 2.84:1 |

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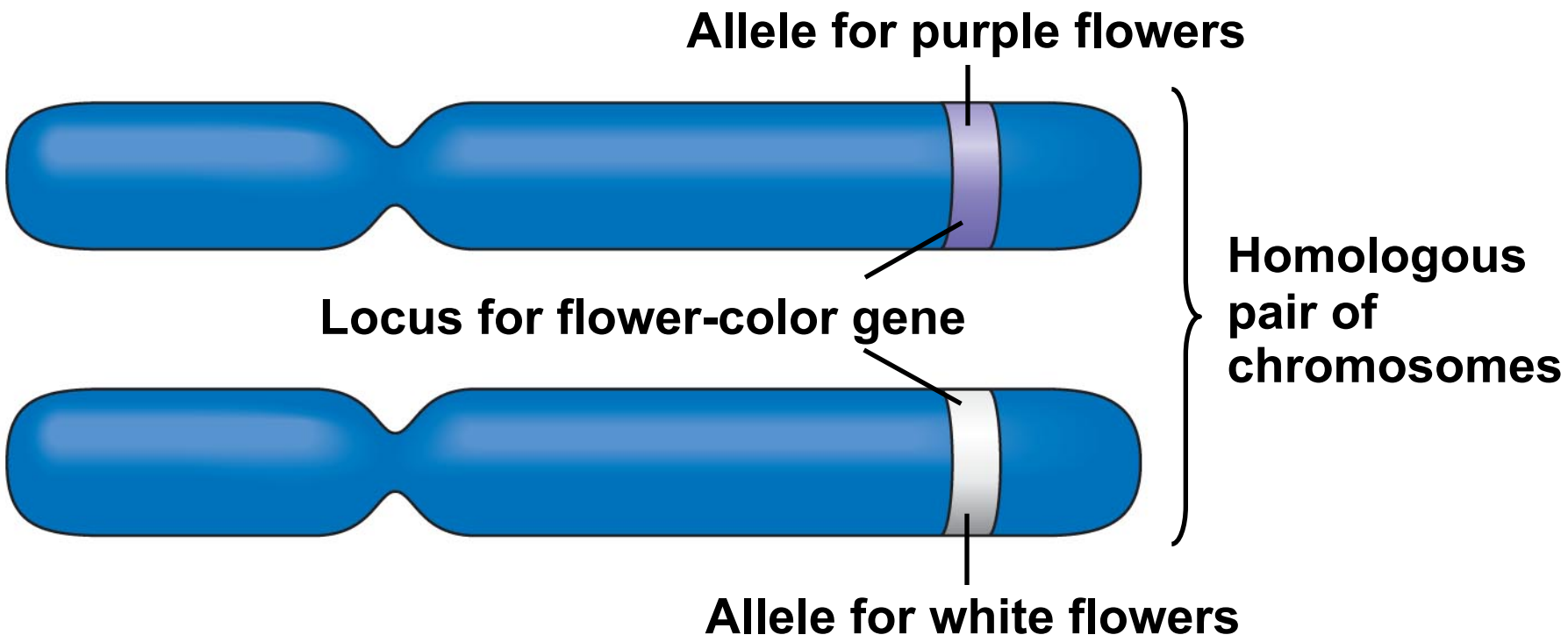


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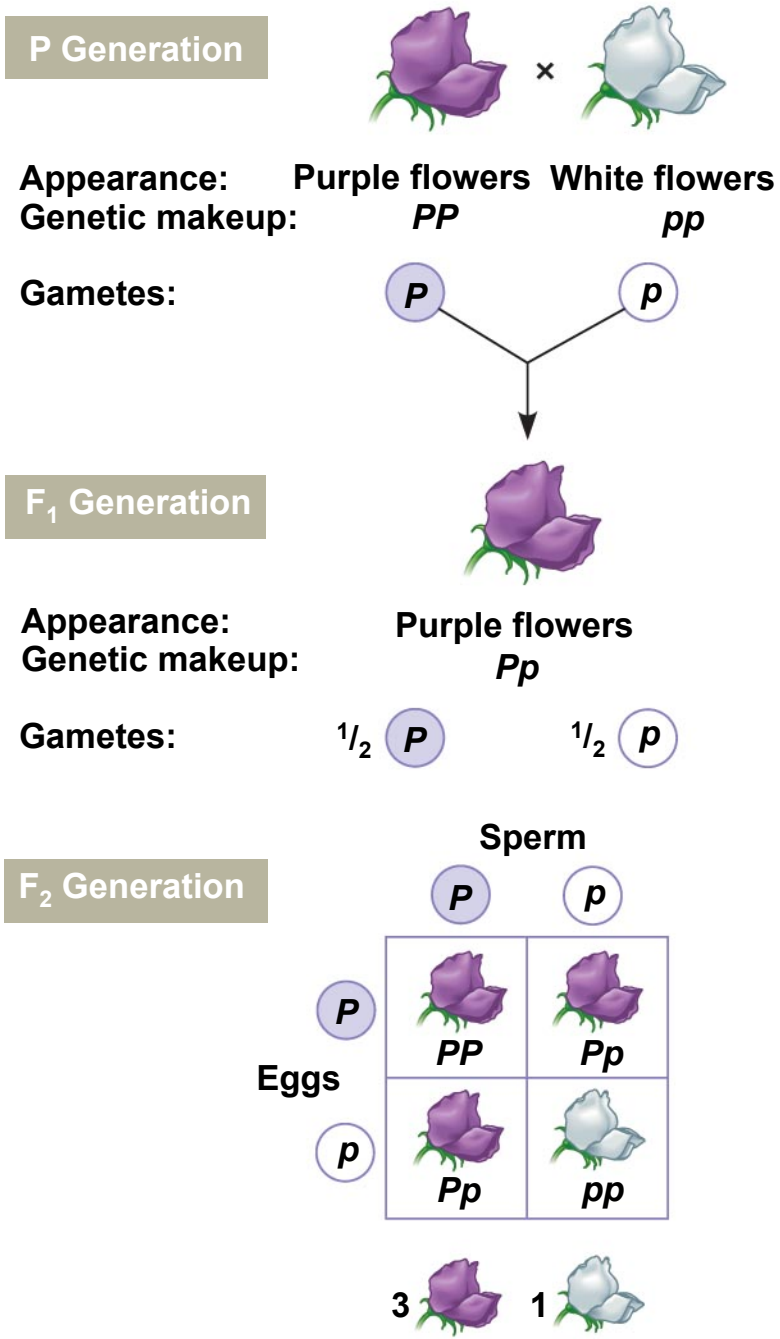


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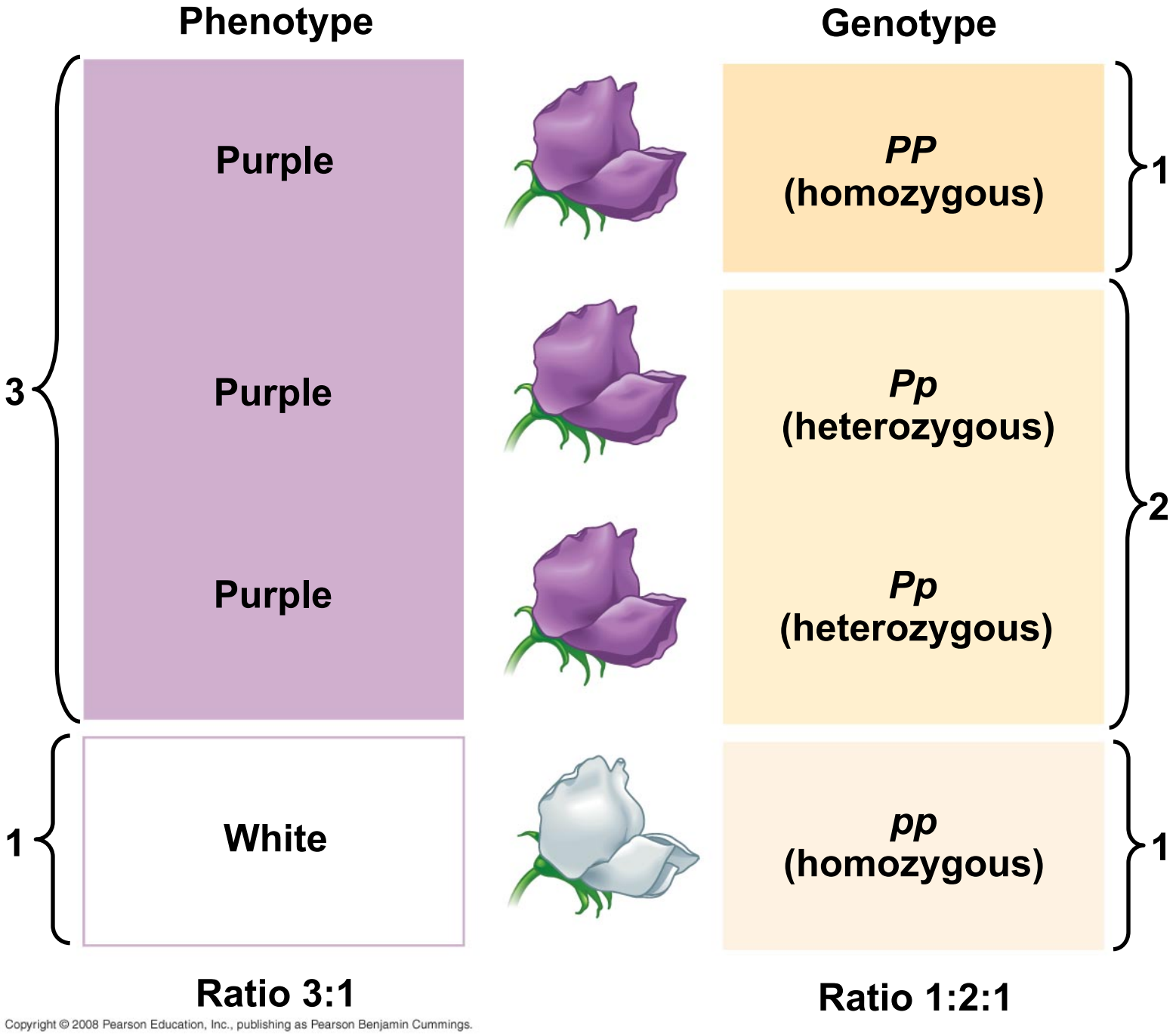


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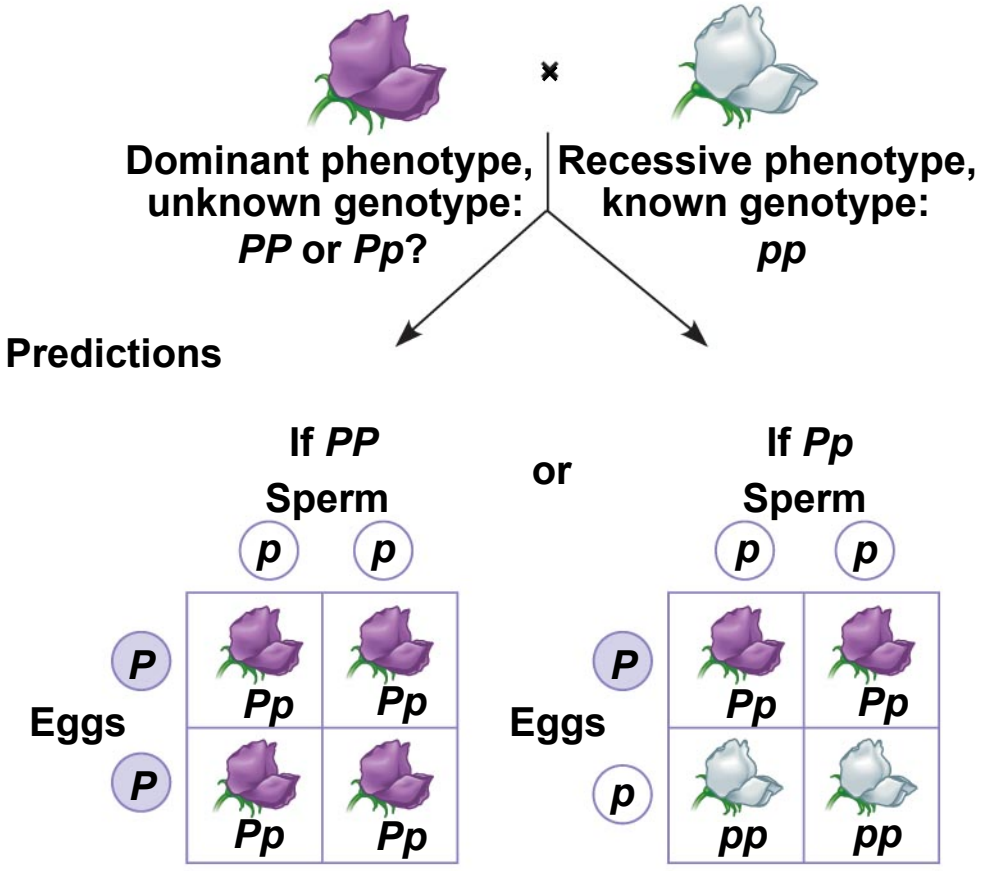
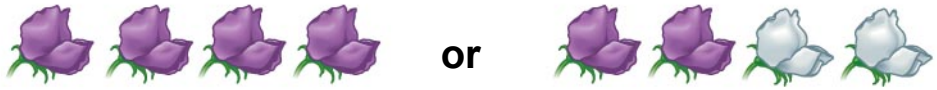
## TECHNIQUE




## RESULTS



All offspring purple

or

$^1/_2$ offspring purple and $^1/_2$ offspring white

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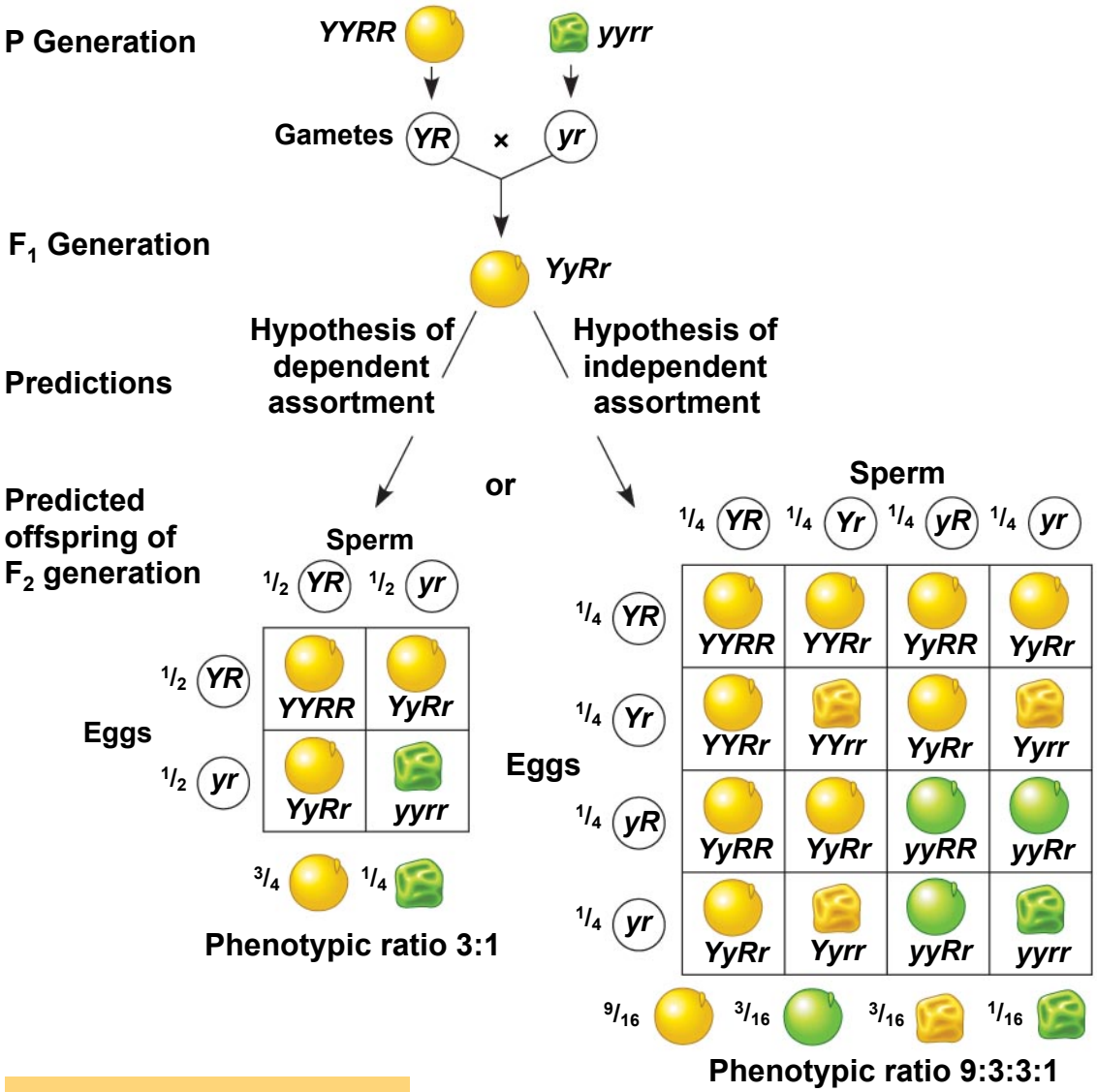
## EXPERIMENT




## RESULTS

315 108 101 32 Phenotypic ratio approximately 9:3:3:1

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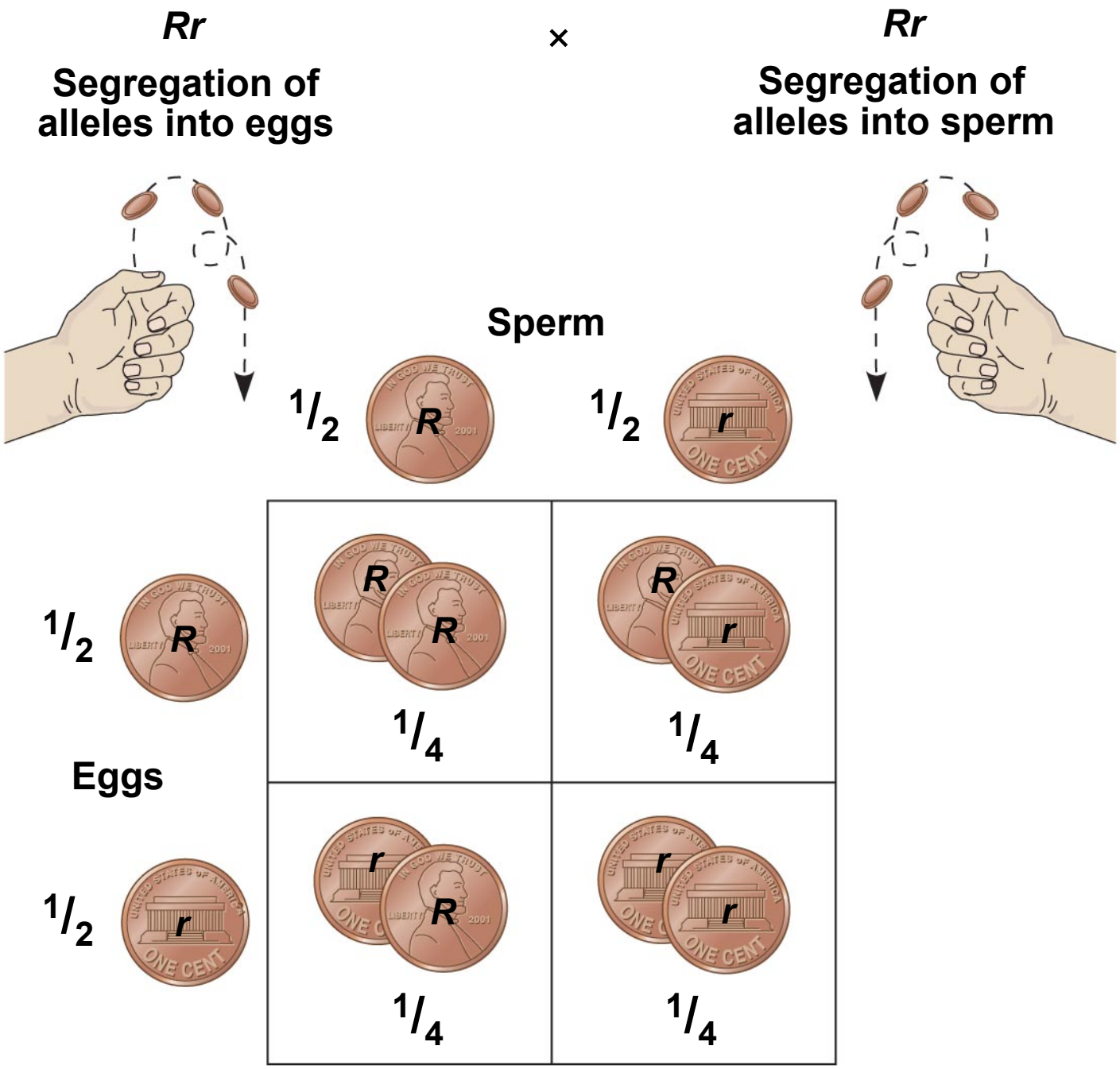


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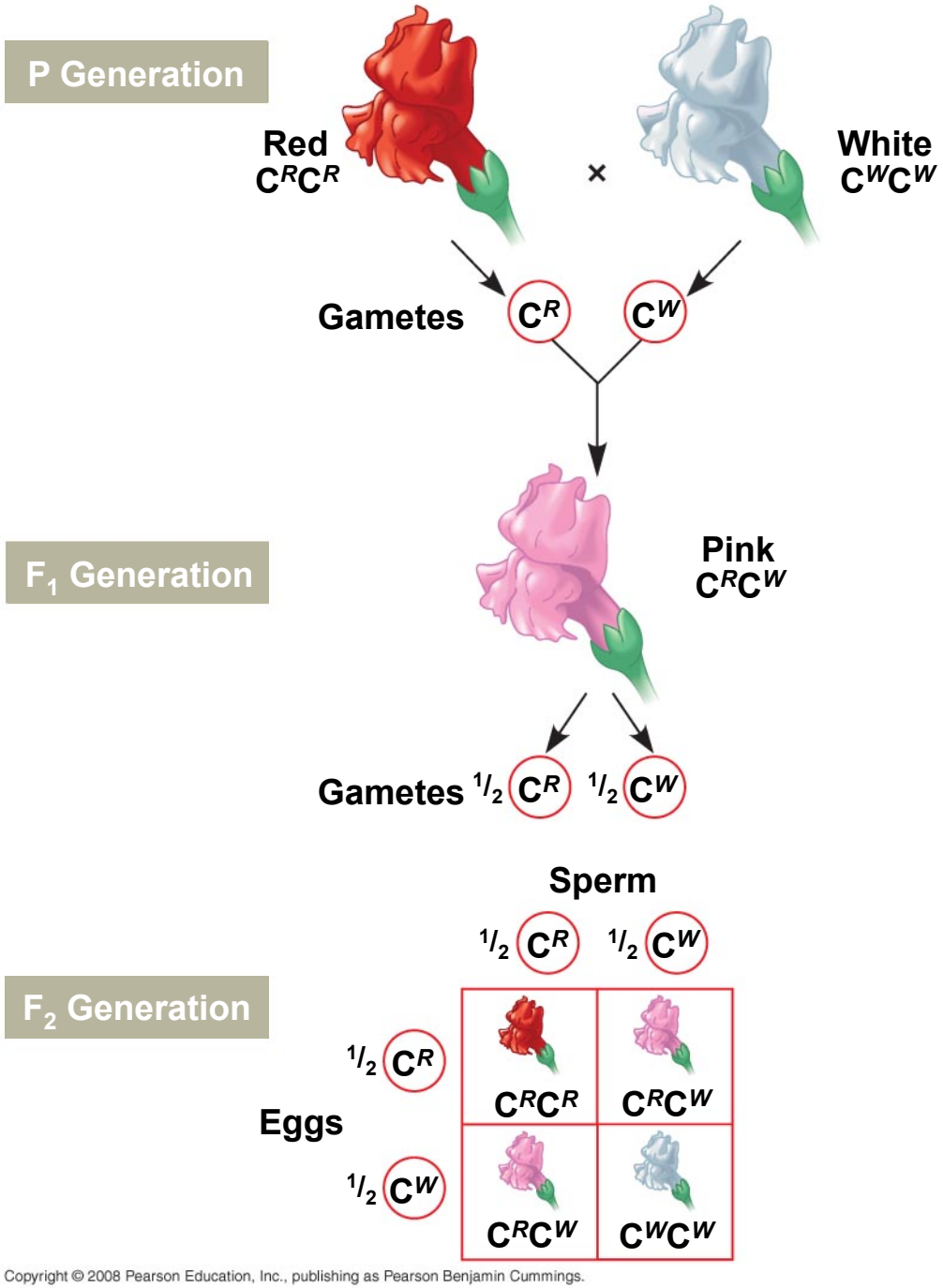


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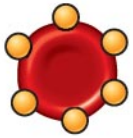
| Allele | Carbohydrate |
|---|---|
| $I^A$ | A |
| $I^B$ | B |
| $i$ | none |

(a) The three alleles for the ABO blood groups and their associated carbohydrates

| Genotype | Red blood cell appearance | Phenotype (blood group) |
|---|---|---|
| $I^AI^A$ or $I^Ai$ | | A |
| $I^BI^B$ or $I^Bi$ |  | B |
| $I^AI^B$ | | AB |
| $ii$ | | O |

(b) Blood group genotypes and phenotypes

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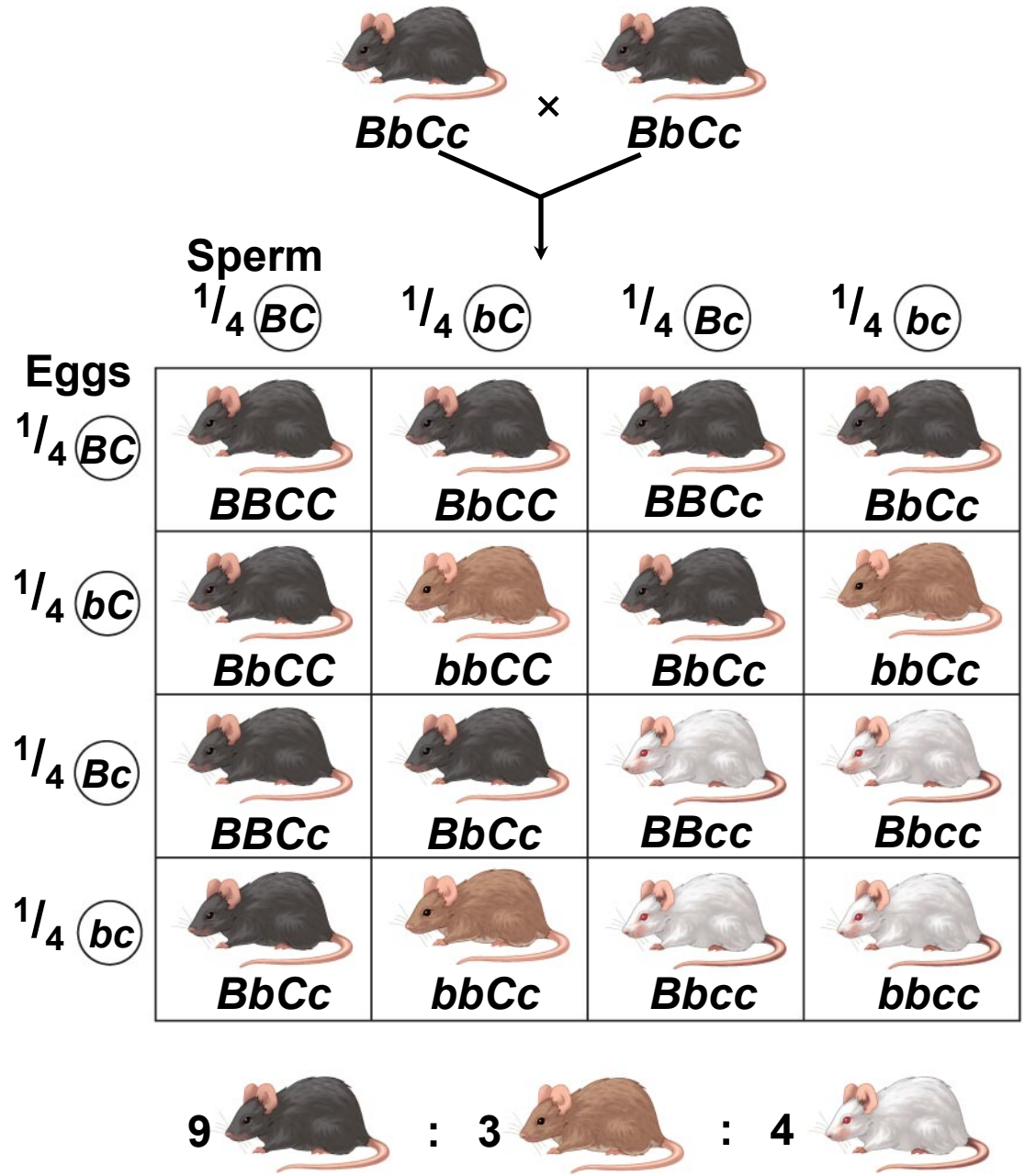


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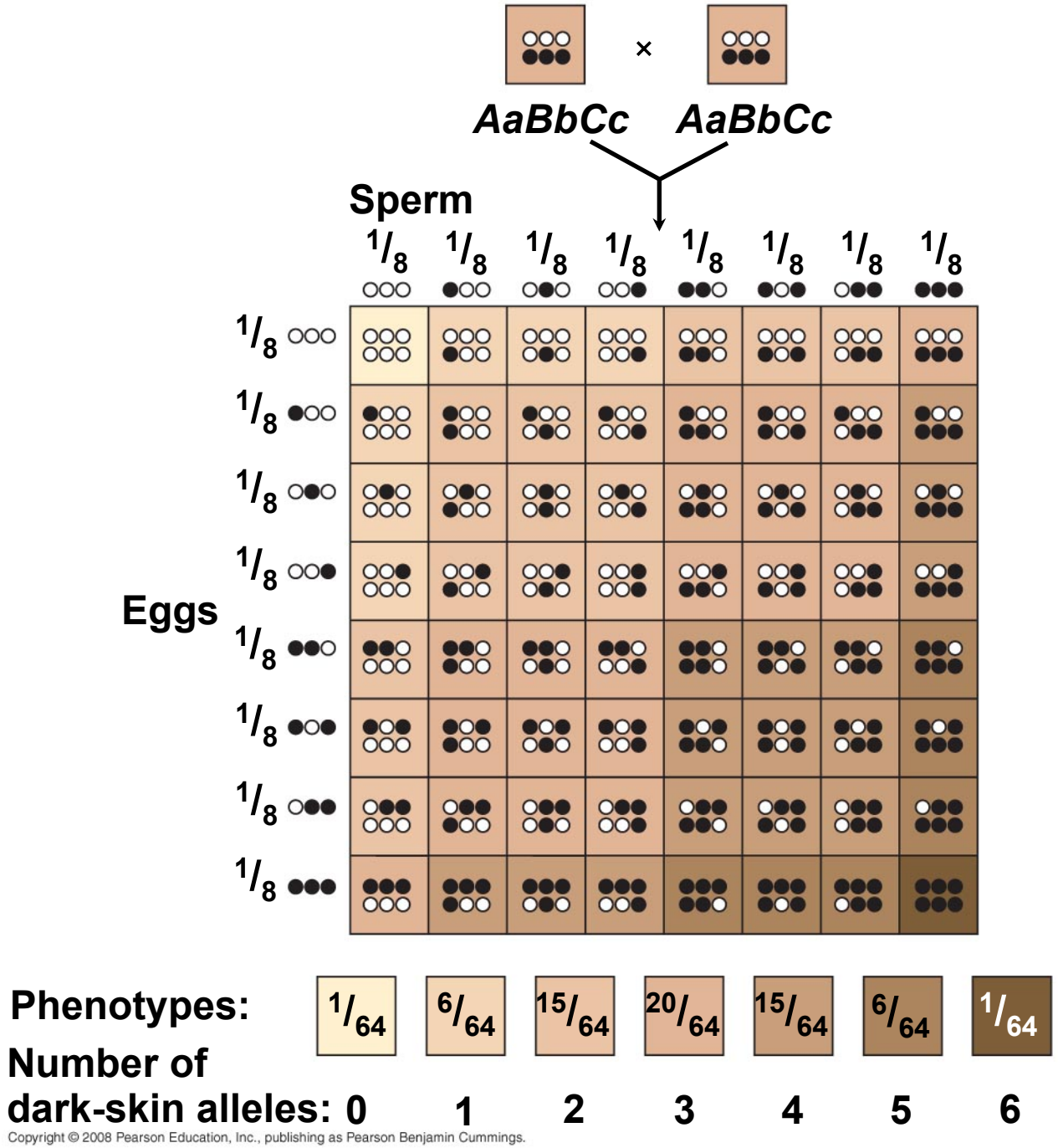


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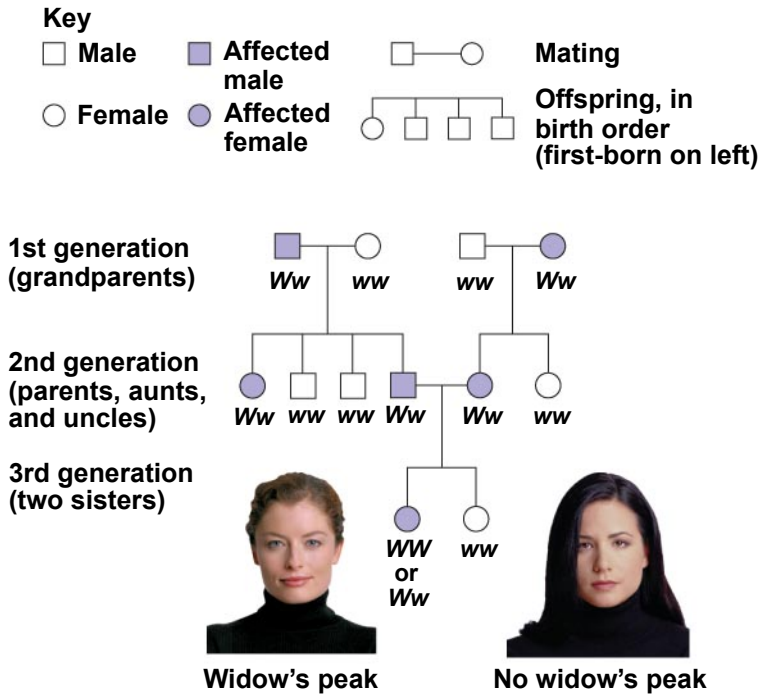
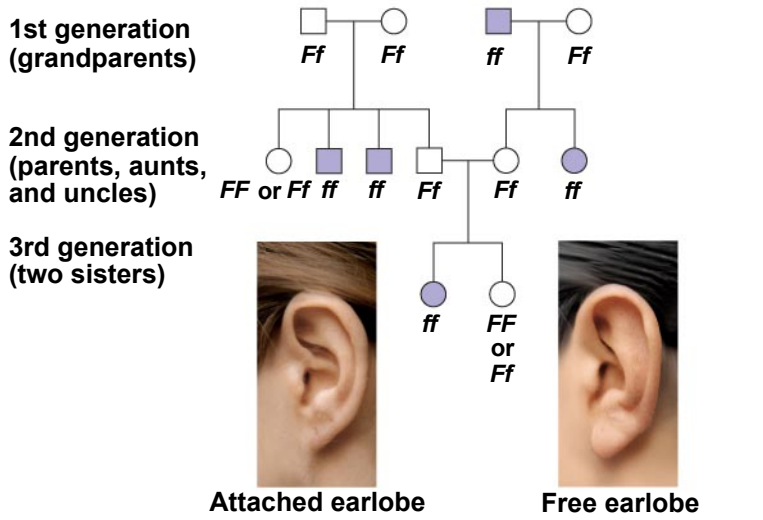



(a) Is a widow's peak a dominant or recessive trait?




(b) Is an attached earlobe a dominant or recessive trait?

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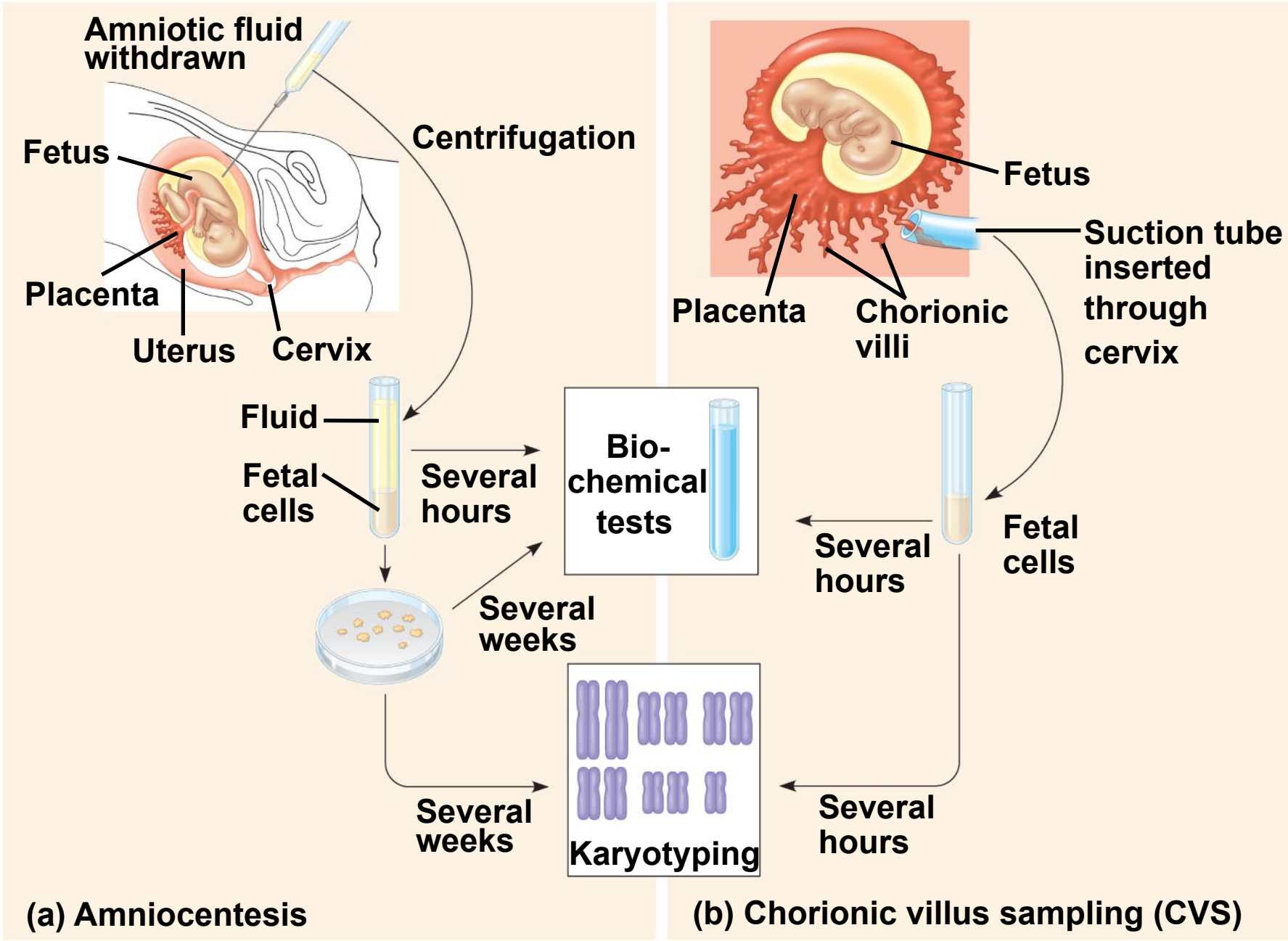


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| Degree of dominance | Description | Example |
|---|---|---|
| Complete dominance of one allele | Heterozygous phenotype same as that of homozygous dominant | *PP* *Pp* |
| Incomplete dominance of either allele | Heterozygous phenotype intermediate between the two homozygous phenotypes | $C^RC^R$ $C^RC^W$ $C^WC^W$ |
| Codominance | Heterozygotes: Both phenotypes expressed | $I^AI^B$ |
| Multiple alleles | In the whole population, some genes have more than two alleles | ABO blood group alleles<br>$I^A$, $I^B$, $i$ |
| Pleiotropy | One gene is able to affect multiple phenotypic characters | Sickle-cell disease |

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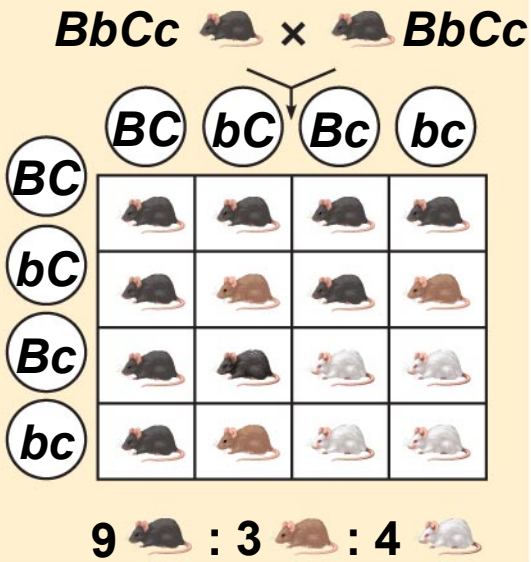
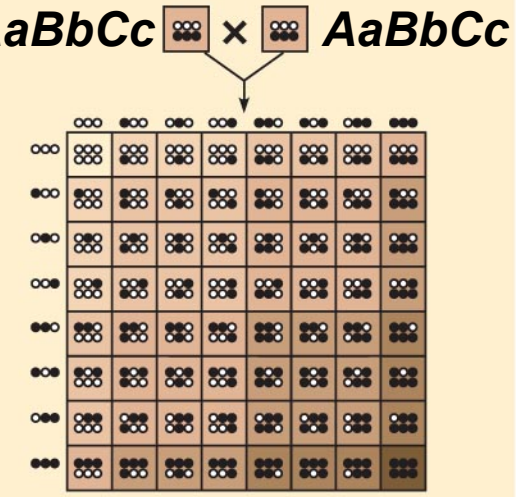
| Relationship among genes | Description | Example |
|---|---|---|
| Epistasis | One gene affects the expression of another |   |
| Polygenic inheritance | A single phenotypic character is affected by two or more genes |   |

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