CHAPTER 14
BASIC GENETICS/INHERITANCE

Figure 14.0 Painting of Mendel

Figure 14.0x Mendel

PATTERNS OF INHERITANCE

- EARLY SELECTIVE BREEDING: HORSES,CATTLE,FOWL,FRUIT AND FLOWERS .
- HYBRIDS
- HYBRIDIZATION

- INVOLVES CHROMOSOMES AND THEIR CHANGES DURING MEIOSIS
- MEIOSIS I/CO
- MEIOSIS II/
- CENTROMERES SPLIT

Figure 14.1 A genetic cross

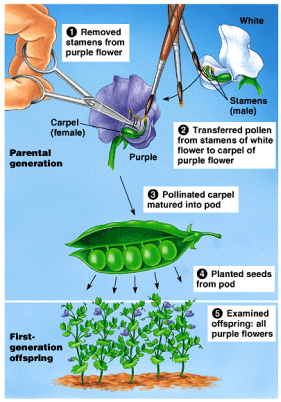

Figure 14.2 Mendel tracked heritable characters for three generations

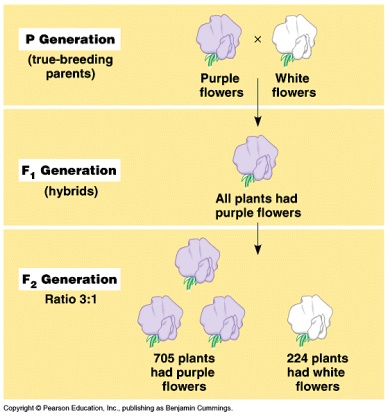

Figure 14.x1 Sweet pea flowers

Figure 14.3 Alleles, alternative versions of a gene

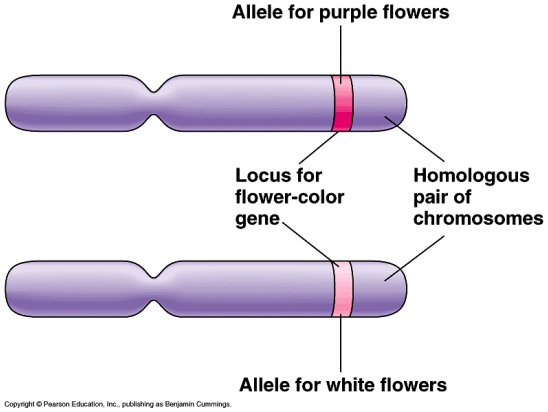

Table 14.1 The Results of Mendel's F_1 Crosses for Seven Characters in Pea Plants

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Character	Dominant Trait	×	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	6022:2001	3.01:1
Seed shape	Round	×	Wrinkled	5474:1850	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

Figure 14.x2 Round and wrinkled peas

EXPERIMENTAL GENETICS

- **GREGOR MENDEL/SWEET PEAS**
- **7 TRAITS/CROSS FERTILIZATION**
- **KNEW PARENTAL CROSSES**
- **TRUE BREEDING VARIETIES**
- **HYBRIDS/PARENTS/P1,P2 ETC.**
- **OFFSPRINGS, FILLIAL, F1,F1, ETC.**
- **# OF GENERATIONS**

Figure 14.4 Mendel's law of segregation (Layer 1)

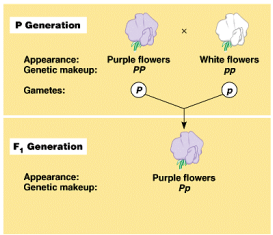
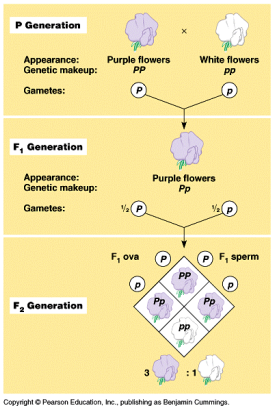


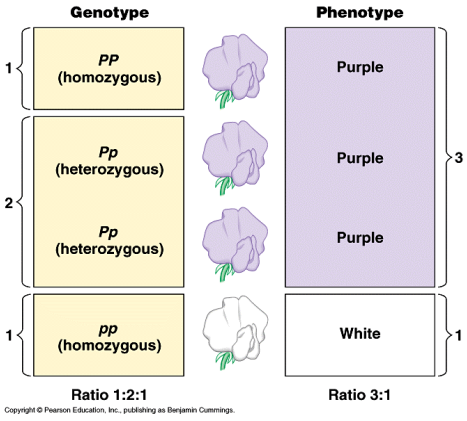
Figure 14.4 Mendel's law of segregation (Layer 2)



INHERITANCE PATTERNS

- **ALTERNATE FORMS OF GENES ARE ALLELES: Aa, Dd, ETC.**
- **FOR EACH TRAIT THERE ARE 2 GENES, 1 FROM EACH PARENT.**
- **SAME ALLELES: HOMOZYGOUS**
- **DIFFERENT ALLELES/HETEROZYGOUS**
- **DOMINANT: AA, Aa**
- **RECESSIVE: AA**

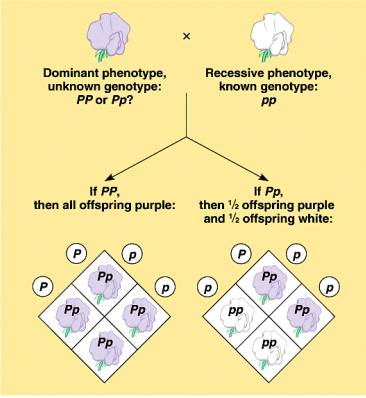
Figure 14.5 Genotype versus phenotype



INHERITANCE PATTERNS

- **A SPERM OR EGG CARRIES ONE ALLELE FOR EACH TRAIT, BECAUSE ALLELIC PAIRS SEGREGATE AT THE END OF MEIOSIS II TO FORM GAMETES**
- **DIFFERENT ALLELES, 1 IS FULLY EXPRESSED (DOMINANT) AND 1 IS NOT EXPRESSED (RECESSIVE).**

Figure 14.6 A testcross



MENDEL'S HYPOTHESIS

- **TRUE BREEDING ALLELES**
- **PP X pp, alleles P and p**
- **MONOHYBRID CROSS/PUNNETT SQ**
- **CROSS:**
- **P1 PP X pp, = F1 ALL Pp**
- **P2 Pp X Pp, = F2 25% PP, 50% Pp, 25% pp.**
- **GENOTYPIC RATIO 1:2:1, PR=3:1**

Figure 14.7 Testing two hypotheses for segregation in a dihybrid cross

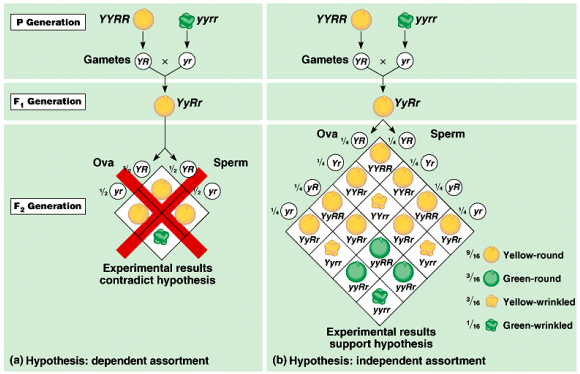


Figure 14.8 Segregation of alleles and fertilization as chance events