

1 **Chapter 7**

Mendelian Inheritance

2 **7.1**

- Genes are inherited on chromosomes
 - Allele
 - Different forms of a gene

3 **7.2**

- Heredity
 - Passing characteristics from parents to offspring
 - Used for thousands of years
 - Understood only recently
- Single gene traits
 - > 9,000 known in humans
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4 **7.3**

- Preformation (popular since 1600's)
- Blending inheritance
- Gregor Mendel (mid 1800's)
 - Similar to previous experiments
 - First to apply scientific method to the question
- Success factors
 - Garden pea
 - Focused on specific traits
 - First established true-breeding lines

5 **7.4**

- Dominant traits
- Recessive traits
- Classic cross (monohybrid)
 - P generation
 - F1 generation
 - F2 generation

6

- Mendel's explanation
 - Each parent gives a single set of instructions (genes) to offspring in the sperm or egg
 - Offspring receive 2 copies of instructions (genes)
 - Observed traits depend on two copies of each gene
- Homozygous
 - Two matching traits
- Heterozygous
 - Two different traits
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7

- Mendel's law of segregation
 - The two genes in an individual separate when they are passed to offspring

8 **7.5**

- Phenotype
 - Observable trait
- Genotype

- Genetic composition
- Analyze & predict outcomes
 - Punnett square
 - Normal color - dominant gene = A
 - Albino – recessive gene = a
 - P → F1 → F2
 - Ratio?

9  **7.6**

- Probability & genetics
 - Coin toss, rolling dice
 - Random events
 - Segregation, Fertilization
 - Making predictions
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10  **7.7**

- Test cross
 - Used to determine in individual (with the dominant phenotype) is homozygous dominant or heterozygous

11  **7.15**

- Crosses Involving Two Characters (dihybrid)
 - P generation
 - F1 generation
 - F2 generation
- Traits: Smooth yellow x wrinkled green
- Mendel's law of independent assortment
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12  **Dihybrid punnett squares**

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- Smooth = S
- Wrinkled = s
- Yellow = Y
- Green = y

13  **7.9**

- Incomplete dominance
 - Heterozygote is an intermediate
 - Snapdragons
 - Abbreviations
 - Neither completely dominant or recessive
 - CANNOT use R r
 - C^W = white
 - C^R = red
 - P
 - F1
 - F2
 -

14 

- Codominance
 - Both traits expressed (not mixed)
 - Sickle cell anemia

- 15 **7.10**
- Multiple alleles
 - Blood type
 - O = ii
 - A = $I^A I^A$ or $I^A i$
 - B = $I^B I^B$ or $I^B i$
 - AB = $I^A I^B$
- 16 **7.11**
- Polygenic traits
 - Many genes & alleles
 - Continuous variation
 - Height
 - Skin color
 - autism
- 17 **7.12**
- Pleiotrophy
 - Single gene influencing multiple traits
 - Sickle cell & malaria
- 18 **7.12**
- Sex-linked traits
 - Genes located on chromosomes which determine gender
 - Red-green color-blindness
- 19 **7.14**
- Environmental effects
 - Diet
 - Phenylketonurics
 - Phenylalanine
 - Temperature
 - Many other factors
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- 20 **7.8**
- Pedigrees
 - family history of the disease
 - determine
 - Dominant or recessive
 - X-linked or autosomal
 - probabilities for future inheritance
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