

## Family Reunion

A family reunion opens the door to talk about cancer, DNA, protein synthesis, genetically determined diseases and biotechnology.

Readings about the **Protein and Nucleic Acid Structure** can be found in **Chapter 2**.

Readings about **DNA & RNA Structure, Transcription, Translation, & Mutations** are found in **Chapter 7**.

Readings about **Mitosis, Cell Cycle, and Cancer** can be found in **Chapter 8**.

Readings about **Mitosis** can be found in **Chapter 9**.

Readings about **Mendelian, X-linked, and co-dominant genetics** can be found in **Chapter 10**.

### Cell Cycle and Cancer

- The **cell cycle (G1, S, G2, M)** is summarized in Figure 8.10 p. 153
  - The cell cycle is **described** on p. 154
  - **Mitosis** is part of the cell cycle and described in detail on pp. 155-156
    - You do **not** need to know the phases of mitosis, just the input and output.
    - If you are not sure what the **checkpoints** are, read p. 157.
  - If you are not sure what causes **cancer**, read pp. 157-158.
- Confused about **when DNA (chromosomes) replicate**? Read pp. 150-151

### Nucleic Acid Structure

- The **structure of DNA** is explained on p. 34-35
- If you are not sure what a **nucleotide** is, see p. 35 and Fig. 7.5 on p. 124
- If you are not sure what is the relationship between a molecule of **DNA, nucleotide**, and a **nitrogenous base (Adenine, Cytosine, Thymine, Guanine)**, see p. 35
- Need to review how DNA and RNA differ? See Fig. 2.24 and 7.9
- Don't remember the **types of RNA** (mRNA, tRNA, rRNA)? See p. 125
- Not sure how bases **pair**? See p. 125
- Want to know more about **how DNA is made (replicates)**? See Fig 8.4 or Read pp 150-151 for more detail
- Want to know more about **when DNA is made (replicates)**? See p. 150

### Protein Synthesis, Transcription and Translation

- Not sure what an **amino acid** is? See p. 32
- Need to learn more about **protein structure**? See p. 32
- Not sure what a **polypeptide** is? See p. 32
- For an **explanation** of how DNA and RNA determine protein structure, see p. 126
- Need more explanation of **Transcription**, see p. 128
- Need more explanation of **Translation**, see pp. 130-133 (don't worry about details of steps)
  - Not sure what a **codon** is? See p. 130

- Need to see the mRNA-Codon-Amino Acid **Table**? Go to p. 130
- Not sure what **start** and **stop** codons are? See p. 130
- Need more explanation of the role of **ribosomes**? See p. 131-132 (don't worry about the structure details)

### Mutations

- Need a **basic** explanation of mutation? see p. 138
- Can't distinguish between **substitution**, **addition**, and **deletion** mutations? See pp. 138-139
  - Not sure **when mutations make a difference** and when they don't (**silent**, **missense**, and **nonsense** mutations)? See pp. 138-139
  - Need an example of **how mutations make a difference**? See Fig. 7.21 on p. 139 about **sickle-cell anemia**
  - Not sure what is meant by **frameshift** mutations? See Fig 7.22 on p. 139
- Need to know more about **what causes a mutation**? Read pp. 139-140 & p. 151

### Chromosomes

- For a **terrific summary** relationship among **chromosome**, **diploid**, **haploid**, **gene**, **allele**, **homologous pair**, **autosome**, **sex-chromosome** and more, Read p. 188 carefully
- Your understanding of how **DNA and chromosomes** are related might be helped by reviewing Fig 8.9 on p. 153
- Not sure **how many molecules of DNA there are in a chromosome**? Read p. 154
- Not sure why, if all cells contain the same genes and chromosomes, **some cells are different than others**? Read p. 135
- Not sure what we mean by **homologous** chromosomes? Read p. 169
- Confused between **autosomal** and **sex** chromosomes? Read p. 169
- Need some idea about **how many genes there are on a chromosome**? Read p. 169
- Do all organisms have the same number of chromosomes? See p. 153
- Want to know why you always see chromosomes as little X's? Read p. 152-153

### Meiosis

- Not sure what **gametes** are? See p. 170
- Not sure what is meant by **haploid**? See P. 170
- Not sure where meiosis occurs? See p. 170
  - Seen the terms **somatic** and **germ** cells, but not sure what those are? See p. 170
- Not sure what the **function** of meiosis is? See p. 171
- Need to check on the **outcome** of meiosis? See p. 171
- For a brief **overview of the steps** of meiosis, see Fig. 9.6
  - If you really want the details of the steps, read pp. 172-173
- If you read or hear the term, "crossing-over", but don't know what it is, read p. 174
  - As you are reading, you might need to know what a chromatid is, so look on p. 153
- Not sure how meiosis can lead to so many **different genetic combinations** in gametes (and why siblings don't look alike)? See p. 175, especially Fig. 9.9

## Inheritance

- Want a good review of High School genetics or an intro to the basics of genetics through **Mendel's experiments on Peas**? Read pp. 189 – 194
  - Brief definitions of relevant **genetics terms** are in Table 10.1 on p. 191
    - If you are unsure of the difference between **dominant** and **recessive**, go to p. 189
    - If you are unfamiliar with the terms **true-breeding**, **self-fertilization**, and **cross-fertilization**, go to p. 189
    - If you are confusing the words **gene and allele**, go back and look at p. 169
    - If you are unsure how **homozygous** and **heterozygous** differ, go to p. 190
    - If you are unsure of the difference between **genotype** and **phenotype**, go to p. 190
    - If you encounter the terms wild-type and mutant and don't know what they are, see p. 190
    - If you can't explain **how meiosis, crosses, and Punnet squares are related**, read p 193-194, especially Fig 10.9
    - To see how **cystic fibrosis** inheritance can be predicted, see Fig 10.10
    - You may have created **Punnet Squares** to determine the genotypes of offspring in High-school, so to review or learn about them, read pp. 192-193.
- Unsure about **codominance**? Read pp. 199-200.
  - To learn about **Blood Types**, read p. 199-200 especially Fig. 10.18
    - Be sure to review which antigens are produced in each phenotype
    - Not sure which blood types produce which **antibodies** or can **receive or give** blood from which others, or what happens when they are incompatible? Read p. 613
    - We use the designations A, B, and o for the alleles instead of  $i^A$ ,  $i^B$ , and  $i$
    - This is also the place to learn about incomplete dominance if you wish
- Confused about **X-linked traits**? Read pp. 201 – 203
  - Want to review how **sex is determined**? See p. 201
  - Not sure why **males are more likely to express** X-linked traits? Read p. 202
  - Need to know more about **hemophilia**? See p. 203
  - Need to know more about **color-blindness**? See p. 203
  - Table 10.2 provides a nice **list of X-linked dominant and recessive traits**
- To learn more about the connection between genotype and phenotypic expression in the example of **phenylketonuria (PKU)**, read "Burning Question - Why does diet soda have a warning label?" on p. 191.
- Not sure **what affects the frequency of a trait** or allele in a population?
  - Read about **cystic fibrosis** in "Investigating Life: Does Natural Selection Maintain Some Genetic Illnesses?", found in your Connect Assignments for Family Reunion.
  - Read about **sickle cell anemia** on pp. 251 & 373