Review for Test 1

 Cell Cycle, DNA, Chromosomes, Genes, and Genetics

***Note****: It is impossible to include everything we have taken in this test review. Studying this test review does not guarantee you will get 100% on the test. I have emphasized particularly common areas of difficulty. I have also highlighted some important connections to the next topics we will take so you can begin to make these connections.*

Cell Cycle (1 01, 1 02)

**The Big Picture 🡪 What’s the Purpose of the Cell Cycle?**

* What is the purpose of the cell cycle? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Are body cells, sex cells or both involved in the mitosis phases? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Why not sex cells? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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What do sex cells do instead of mitosis then? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Why do sex cells need a different process? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

* How many cells result when a cell cycle involving mitosis is complete? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

What is their proper name? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Are they **diploid or haploid**? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

What does haploid mean? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

* What cells in the human body have to have half of the number of chromosomes at the end of the cell

cycle? \_\_\_\_\_\_\_\_\_\_\_\_\_\_

* Why do these cells need half of the chromosome number compared to body cells?\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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(try to use the words gamete, fertilization, and zygote – see your sheet called Patterns in Human

Characteristics. You will have to use these words for the next half of the unit as well)

* Which cells in the human body have to be haploid? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Fill in the appropriate word in the blanks: Choices may be given under the blank.
1. In a human cell, the original cell (in prophase) would contain 46 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

(single, double)

stranded chromosomes and the two daughter cells would contain 46 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

 (single, double)

stranded chromosomes.

1. The chromosomes become double stranded during the following phase of the cell cycle:

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. This process is called \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

(choose one of 6 phases) (insert best word from the unit)

1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_ cells use the cell cycle to replace themselves OR to replace injured cells.

(Body, Sex)

1. \_\_\_\_\_\_\_\_\_\_ cells do a slightly different(but related) process called meiosis to reproduce themselves.

(Body, Sex)

**Details About the Cell Cycle**

* What are the official names of the 3 general stages of the cell cycle (ie before, during and after)? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Name the 6 individual phases in proper order (Remember IPMAT and Cytoplasm Division)

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

* Which of the stages is also called cytokinesis? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Draw, label, and explain the 6 phases of the cell cycle. (ON AN ATTACHED SHEET PLEASE)
* Include

 cell membrane, nuclear membrane, chromatin, double stranded chromosomes, centromere

 single stranded chromosomes, spindle fiber, and centriole

**Differences Between Plant & Animal Cell Cycles**

* A plant cell has a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ while an animal cell does not. This means that during cytoplasm division (cytokinesis), there must be an extra structure that forms between the daughter cells to make the cell wall. This structure is called the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. A difference in PROPHASE is that the animal cell has \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ to hold the spindle fibers in place. The plant cell does not.

**Common Errors from Quizzes and Assignments**

When **exactly** do the chromosomes become double stranded?

\*During which phase of the cell cycle does this happen?\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ This process is called

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Are the chromosomes still double stranded in prophase? \_\_\_\_\_\_\_ When do they

first become single stranded? When centromeres divide, which phase must the cell be in? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

What exactly is the difference between chromatin & double stranded chromosomes?

\*When the cell is in interphase, the chromosomes are at first in the form of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. This is

 like a ball of wool that has been unwound. Draw this:

 In interphase, replication happens and the chromosomes become \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. After

mitosis, the chromosomes will become chromatin again, until mitosis starts again.

**DNA, Genes, Chromosomes (1 13)**

Draw and label a model of DNA. Label sugar, phosphate, at least 4 nitrogen bases (A, T, C, G).

Chromosomes are \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. They are made entirely of tightly wound\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. DNA is made of a bunch of nucleotides strung together in the shape of a twisted ladder called a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

Draw a chromosome. Draw a homologous chromosome beside it. Homologous chromosomes carry \_\_\_\_\_\_\_\_ for the same \_\_\_\_\_\_\_\_\_\_ Give an example of a possible genotype for the trait of blue/brown eye color on your drawing.

What is a gene? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Genetics )(1 11, 1 12, 1 13)**

**(Single Trait Inheritance only**

**Single Trait Inheritance (1 11)**

Be prepared to look at graphed results of a survey on human traits and IMPROVE the labeling on it using proper vocabulary!! Be ready to interpret (analyze) the graph by describing **patterns** in the inherited traits.

**Writing Genotypes and Phenotypes (1 12)**

* In this type of inheritance, there is a trait that is “either-or”. For example, **either** blue eyes or brown eyes.
* When you receive a trait from your biological parents, we say you “inherited” traits. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Dominant and Recessive**

* In terms of traits, describe what it means for one form (allele) of a trait to be dominant \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

* How do you know whether a form (allele) for a trait is dominant or recessive? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

(Choose the most reliable way. Simply surveying people is not as reliable because you might just get a sample of the population that does not show the dominant trait as often as a larger more reliable sample of the population).

**Homozygous and Heterozygous**

* Write a checkmark beside the genotypes that show a human who is **heterozygous** for brown eye color:

BB \_\_\_\_ Bb\_\_\_\_\_ bb\_\_\_\_\_

* Write a checkmark beside the genotypes that show a human who is **homozygous** for brown eye color:
* BB \_\_\_\_ Bb\_\_\_\_\_ bb\_\_\_\_\_
* **Write Genotypes**
* Write the following genotypes (and practice using the corrected answers on your worksheet).PRACTICE IS WHAT MAKES YOU STRONG WITH THIS CONCEPT!!!!
* YOU WILL BE GIVEN A COPY OF THE DOMINANT/RECESSIVE CHART ON THE TEST
1. heterozygous for dimpled cheeks \_\_\_\_\_\_\_
2. homozygous for curly hair \_\_\_\_\_\_
3. homozygous for smooth chin \_\_\_\_\_\_
4. Write the following genotypes (and practice using the corrected answers on your worksheet).
5. heterozygous tongue roller \_\_\_\_\_\_\_\_

What does it mean when an organism is “homozygous” for a certain trait? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

What is a genotype? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

What is a phenotype? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**2Genotypes for One Phenotype**

* There can sometimes be 2 genotypes for 1 phenotype. For example, if I observe a human and I see that they have free (detached) earlobes, that description is called their phenotype. I can observe the expression of that trait in that human. However, I do not see their genotype. There are two possible genotypes. What are they and why?
* **Biotechnology(1 16, 1 17)**

Be able to describe at least one of the following:

Human Blueprint Project, Wheat Breeding, tree DNA, Shepody potato

* **Format of the Test**

**Things I was Told to Add to this Review Package**

