**Reproduction, Cell Division and Inheritance Study Guide**

1. Define Species:

2. Asexual reproduction involves \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ parent. The parent cell will divide into two \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_cells. Both cells that result have the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_same genetic makeup. Binary fission is when a cell divides into two and a parent becomes and offspring. However, other organisms like \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ can create spores that have all the same genetic information. Other organisms can produce an \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of the body that detaches and becomes a new individual, this is known as budding.

3. Sexual reproduction involves \_\_\_\_\_\_\_\_\_\_\_\_\_\_ parents. The genetic make up has a high amount of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, which means each cell is unique and none are exactly the same. To reproduce sexually, sex cells, or \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, need to be produced. There are two separate versions of sex cells, these are known as \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ or sperm. Both cells are \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, which means they have half the number of chromosomes. When the cells come together, they become \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, having the full number of chromosomes.

4. What is the difference between the production of sperm and the production of an egg?

5. Describe the process of cloning. Why haven’t we cloned humans?

6. Describe the process of mitosis, step-by-step. Share information about chromosomes and the resulting cells

Interphase –

Prophase-

Metaphase-

Anaphase-

Telophase-

Cytokinesis-

7. In what way are single celled organisms using mitosis? In what way do multicellular organisms use mitosis?

8. Describe the process of meiosis, step-by-step. Share information about chromosomes an the resulting cells.

Interphase –

Prophase I-

Metaphase I-

Anaphase I-

Telophase I-

Cytokinesis I-

Prophase II-

Metaphase II-

Anaphase II-

Telophase II-

Cytokinesis II-

9. Meiosis has the ability of increased variation by allowing chromosomes to \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. This means that the homologous pairs of chromosomes transfer a section of a chromosome to its pair. This gives the process of meiosis increased variation.

10. Define Inheritance:

11. Complete the chart below:

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| Points of Comparison | Mitosis | Meiosis |
| Number of cell Divisions |  |  |
| Exchange of genetic material between chromosomes |  |  |
| Number of functioning cells produced from original |  |  |
| Genetic Makeup of final cells produced |  |  |
| Function of cells produced in multicellular organisms |  |  |

12. When an egg and sperm combine through fertilization, the resulting cell are known as \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

13. Plants have two methods of pollination. One method is known as \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, this is when the sperm from a separate plant fertilizes the egg. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and wind aid in this process. Self-pollination is when an egg is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ by a sperm from the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ plant.

14. Define Gene:

15.Define Allele:

16. Give an example of a dominant and recessive allele of a gene. What would the phenotype and genotype of each dominant and recessive form look.

17. Gene expression is when a gene produces a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. Sometimes the gene will not function the same when under different \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ conditions. For examples, plants without light will not produce \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. Genes are expressed due to the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ genes.

18. Complete a punnett squares for green verses yellow plants: 1st = Homozygous recessive parent with a homozygous dominant parent. 2nd = 2 Heterozygous parents. 3rd = Heterozygous parent with a homozygous recessive parent. What percentage of each will be green or yellow?

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19. Not all genes are as simply as dominant expression over recessive expression. For examples, \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ is when both alleles show up as the phenotype. This means if homozygous dominant created a red flower and homozygous recessive created a white flower, the heterozygous form would create a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ colored flower. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ is when both alleles show up. For example, a flower could have red and white pedals separate from one another.

20. Some traits are sex-linked traits. This means they are associated with either the X or Y chromosome. Explain by color blindness (an X linked trait) is more common in males than females.

21.Define mutation:

22. Mutations that are passed on to offspring can only occur in \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. These are called germ cell mutations. Mutations that occur within the body can be passed on to daughter cells during mitosis are somatic cell mutations. There are two forms of mutations. There are \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ mutations occurring in cell division when DNA is shuffled. The result is a structural change in DNA or the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of an entire chromosome.

23. There are 4 major types of chromosomal mutations that can occur. In \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, a piece of DNA breaks away from one chromosome and attaches to a different chromosome. A deletion is when a piece of, or an entire \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, is lost of is not \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. Inversion is when a piece of DNA breaks away and then \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ in the opposite direction. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ or non-separation is when a chromosome does not split apart from is homologous pair in meiosis. An example of non-disjunction would \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

24. Gene mutations are small-scale mutations. There are several gene mutations as well. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ mutations is when a single nitrogenous base is added, substituted or \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ from a gene. This means a new protein is created.

25. Define Mutagen: Give several examples of mutatgens:

26. Define Carcinogen:

27. Name three factors that cancer is related to.

28. Define Oncogene:

29. Benign tumors are uncontrollable cell growth but are held together by a capsule, meaning they do not \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. Malignant cancers break away from the original mass and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ throughout the body. There are three main types of cancer. Lymphoma is a solid tumor in \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ producing tissues. Leukemia affect \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_cells. Carcinoma are cancers that effect skin and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ tissue. Cancer is caused by uncontrolled cell growth through which type of cell division?\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

30. Briefly describe how the blood types differ from each other. Why can you not receive a blood transfusion from blood types that are not yours?