Chromosomes and EVERYTHING

DO NOW:

1. Genes and chromosomes are related because \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

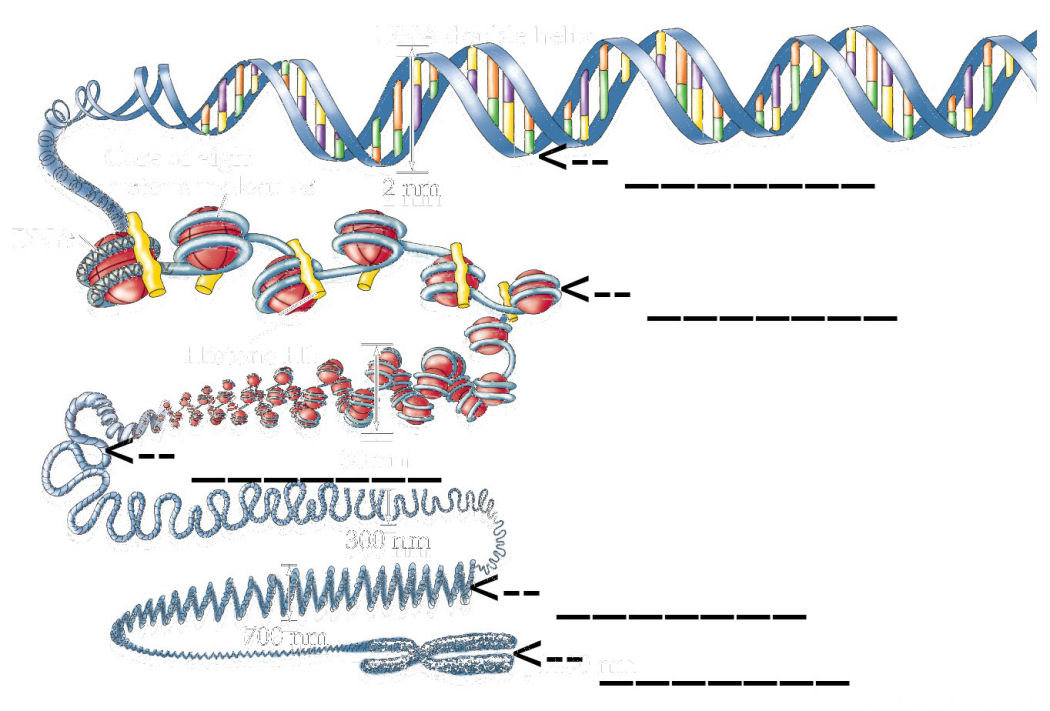
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Chromosomes

Organisms are made of 1 or more \_\_\_\_\_\_\_\_\_\_. Inside of each cell’s nucleus, there are a number of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. These are made up of many different \_\_\_\_\_\_\_\_\_\_\_, which determine many of the characteristics of an organism.

When are chromosomes visible in a cell? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

Chromosome Sketch: In the space below, sketch and label a chromosome that has 2 identical chromatids joined by a centromere. You may use your model as a guide.



Chromosomes

1. Chromosomes are made of two different types of macromolecules, bundled tightly together: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

2. Histones are \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ that help \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

3. Draw a picture of a single chromosome. Label the sister chromatids and the centromere:

4. Complete the following table about types of chromosomes:

|  |  |  |
| --- | --- | --- |
| Type of chromosomes |  | Sex chromosomes |
| Determine gender? | No |  |
| Total number in typical human |  | 2 |
| How many came from human male parent? | 22 |  |
| How many came from human female parent? |  | 1 |

5. How many chromosomes in total does a typical human have? \_\_\_\_\_\_\_\_\_\_\_\_\_\_

6. A horse is a diploid animal, and most of its cells have 62 chromosomes.

A. how many pairs of homologous chromosomes does a horse have? \_\_\_\_\_\_

B. What 2 types of horse cells have only 31 chromosomes? \_\_\_\_\_\_ and \_\_\_\_\_\_\_

7. Draw a karyotype of a diploid animal that has a 2n chromosome number of 6. Label the homologous chromosomes.

8. What is the difference between sister chromatids and homologous chromosomes?

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

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9. Describe each of the following as haploid or diploid:

A. human skin cell \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

B. rat sperm cell \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

C. monkey kidney cell \_\_\_\_\_\_\_\_\_\_\_\_\_\_

D. X \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

E. XX \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

F. AbCdE \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

G. AabbCCddEe \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

10. The sperm cells of a certain species of moth contain 50 chromosomes. How many chromosomes are found in the wing cells of the moth? \_\_\_\_\_\_\_\_\_\_\_

11. Prokaryotes contain a single chromosome. Would these cells be haploid or diploid?

12. How many of your cell’s chromosomes are copies of your mother’s? \_\_\_\_\_\_\_\_\_

13. When are chromosomes visible in cells viewed with a microscope? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Vocabulary List: write a brief definition next to each term:

1. autosome: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

2. centromere: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

3. chromatid: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

4. diploid: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

5. haploid: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

6. histone: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

7. homologous chromosomes: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

8. karyotype: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

9. sex chromosome: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

10\* trisomy: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Directions: Match the term on the right with the definition given on the left. Each definition will be used once and only once.

|  |  |
| --- | --- |
| 1. \_\_\_\_ chromosome | **A**. A picture arranging chromosomes in pairs from largest to smallest |
| 2. \_\_\_\_ chromatid | **B**. specialized proteins around which DNA is wrapped in a chromosome |
| 3. \_\_\_\_ centromere | **C**. equally sized chromosomes that carry the same genetic information |
| 4. \_\_\_\_ karyotype | **D**. Each chromosome is normally made of 2 of these |
| 5. \_\_\_\_ histone | **E**. sperm and egg cells are \_\_\_\_\_\_\_\_\_\_ |
| 6. \_\_\_\_ autosome | **F**. chromosomes that have no effect on gender |
| 7. \_\_\_\_ sex chromosome | **G**. A tightly coiled structure made of DNA and proteins |
| 8. \_\_\_\_ homologous chromosomes | **H**. A cell that has 2 copies of each chromosome |
| 9. \_\_\_\_ diploid | **I**. chromosomes that determine the gender of an individual. |
| 10. \_\_\_\_ haploid | **J**. This structure holds two sister chromatids together |

Cell Replication Overview

There are 3 basic types of cellular division. Use the chart below to organize the characteristics of each one.

|  |  |  |  |
| --- | --- | --- | --- |
| **Type of cell division** | **Types of cells**  **that do it** | **Purpose** | **Example** |
| Binary fission |  |  |  |
| Mitosis |  |  |  |
| Meiosis |  |  |  |

For each of the examples below, classify the cell division taking place as binary fission, mitosis, or meiosis.

1. A skin cell divides in order to replace old cells that have died. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

2. An E. coli bacterium divides in spoiled potato salad at a picnic. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

3. A specialized cell in the ovaries of a woman divide to produce haploid egg cells. \_\_\_\_\_\_\_\_\_\_\_\_\_

4. A yeast cell buds and produces a new yeast cell that is identical to it. \_\_\_\_\_\_\_\_\_\_\_\_\_

5. As a puppy grows to become a dog, it’s body cells divide many times. \_\_\_\_\_\_\_\_\_\_\_\_\_\_

Illustrate each type of cell division. Make sure your drawing shows how many chromosomes are in the cells before and after they divide.

|  |  |  |
| --- | --- | --- |
| Initial Cell | Division | Resulting Cells |
|  | 🡪 binary fission 🡪 |  |
|  | 🡪 mitosis 🡪 |  |
|  | 🡪 meiosis 🡪 |  |

As instructed in class, construct a foldable notes organizer highlighting the steps of the cell cycle and mitosis. Here’s an overview:

