Meiosis Worksheet

Illustrate the steps of meiosis using a cell with four chromosomes (2n = 4).

Interphase:

* Components to show and label: centrosome, chromatin, nuclear envelope

# of chromosomes \_\_\_\_\_\_\_\_\_

# homologous pairs \_\_\_\_\_\_\_\_\_

# sister chromatids \_\_\_\_\_\_\_\_\_

2n =\_\_\_\_\_\_\_ n = \_\_\_\_\_\_\_\_\_\_

What happens during Interphase?

1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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

Prophase I:

* Components to show and label: Spindle, nuclear envelope, tetrad, sister chromatids, centromere
* Show 3 crossing over events: two crossing over events for chromosome pair 1, one crossing over event for chromosome pair 2

# of chromosomes \_\_\_\_\_\_\_\_\_

# homologous pairs \_\_\_\_\_\_\_\_\_

# sister chromatids \_\_\_\_\_\_\_\_\_

2n =\_\_\_\_\_\_\_ n = \_\_\_\_\_\_\_\_\_\_

What happens during prophase I?

1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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

1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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

1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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

1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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

Metaphase I:

* Components to show and label: microtubule, pair of homologous chromosomes, centromere, pair of sister chromatids
* Chromatids should still show the result of crossing over events

# of chromosomes \_\_\_\_\_\_\_\_\_

# homologous pairs \_\_\_\_\_\_\_\_\_

# sister chromatids \_\_\_\_\_\_\_\_\_

2n =\_\_\_\_\_\_\_ n = \_\_\_\_\_\_\_\_\_\_

What happens during metaphase I?

1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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

Anaphase I:

* Components to show and label: a microtubule, a chromosome, a pair of sister chromatids, centromere
* Chromatids should still show the result of crossing over events

# of chromosomes \_\_\_\_\_\_\_\_\_

# homologous pairs \_\_\_\_\_\_\_\_\_

# sister chromatids \_\_\_\_\_\_\_\_\_

What happens during anaphase I?

1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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

Telophase I and Cytokinesis:

* Components to show and label: nuclear envelope, chromosome, chromatid, centromere
* Chromatids should still show the result of crossing over events

# of chromosomes \_\_\_\_\_\_\_\_\_

# homologous pairs \_\_\_\_\_\_\_\_\_

# sister chromatids \_\_\_\_\_\_\_\_\_

What happens during Telophase I and Cytokinesis?

1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
3. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Summary

|  |  |  |
| --- | --- | --- |
|  | Start of Meiosis I | End of Meiosis I |
| # of cells |  |  |
| # of chromosomes |  |  |
| # of pairs of homologous chromosomes |  |  |
| # of sister chromatids |  |  |
| Haploid or diploid? |  |  |

Prophase II:

* Pick one of your cells and follow it through Meiosis II.
* Components to show and label: Spindle, nuclear envelope, sister chromatids, centromere
* Should still see evidence of crossing over

# of chromosomes \_\_\_\_\_\_\_\_\_

# homologous pairs \_\_\_\_\_\_\_\_\_

# sister chromatids \_\_\_\_\_\_\_\_\_

2n =\_\_\_\_\_\_\_ n = \_\_\_\_\_\_\_\_\_\_

What happens during prophase II?

1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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

1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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

Metaphase II:

* Components to show and label: microtubule, chromosome, sister chromatid, centromere
* Should still see evidence of crossing over

# of chromosomes \_\_\_\_\_\_\_\_\_

# homologous pairs \_\_\_\_\_\_\_\_\_

# sister chromatids \_\_\_\_\_\_\_\_\_

2n =\_\_\_\_\_\_\_ n = \_\_\_\_\_\_\_\_\_\_

What happens during metaphase II?

1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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

Anaphase II:

* Components to show and label: a microtubule, a chromosome
* Should still see evidence of crossing over

# of chromosomes \_\_\_\_\_\_\_\_\_

# homologous pairs \_\_\_\_\_\_\_\_\_

# sister chromatids \_\_\_\_\_\_\_\_\_

What happens during anaphase II?

1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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

Telophase II and Cytokinesis:

* Components to show and label: nuclear envelope, chromosome
* Chromosomes should still show the result of crossing over events

# of chromosomes \_\_\_\_\_\_\_\_\_

# homologous pairs \_\_\_\_\_\_\_\_\_

# sister chromatids \_\_\_\_\_\_\_\_\_

What happens during Telophase II and Cytokinesis?

1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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

1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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

1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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

Summary

|  |  |  |  |
| --- | --- | --- | --- |
|  | Start of Meiosis I | End of Meiosis I | End of Meiosis II |
| # of Cells |  |  |  |
| # of chromosomes |  |  |  |
| # of pairs of homologous chromosomes |  |  |  |
| # of sister chromatids |  |  |  |
| Haploid or diploid? |  |  |  |

Summary Questions

1. Draw **three** pairs of homologous chromosomes that have gone through S-phase prior to meiosis. Label the sister chromatids, chromosomes, and the distinct pairs of homologous chromosomes. How many sister chromatids are there in total? Chromosomes?
2. If a diploid cell containing 12 pairs of homologous chromosomes undergoes meiosis, how many chromosomes will each daughter cell have? Are the daughter cells haploid or diploid?
3. Why is crossing over important?