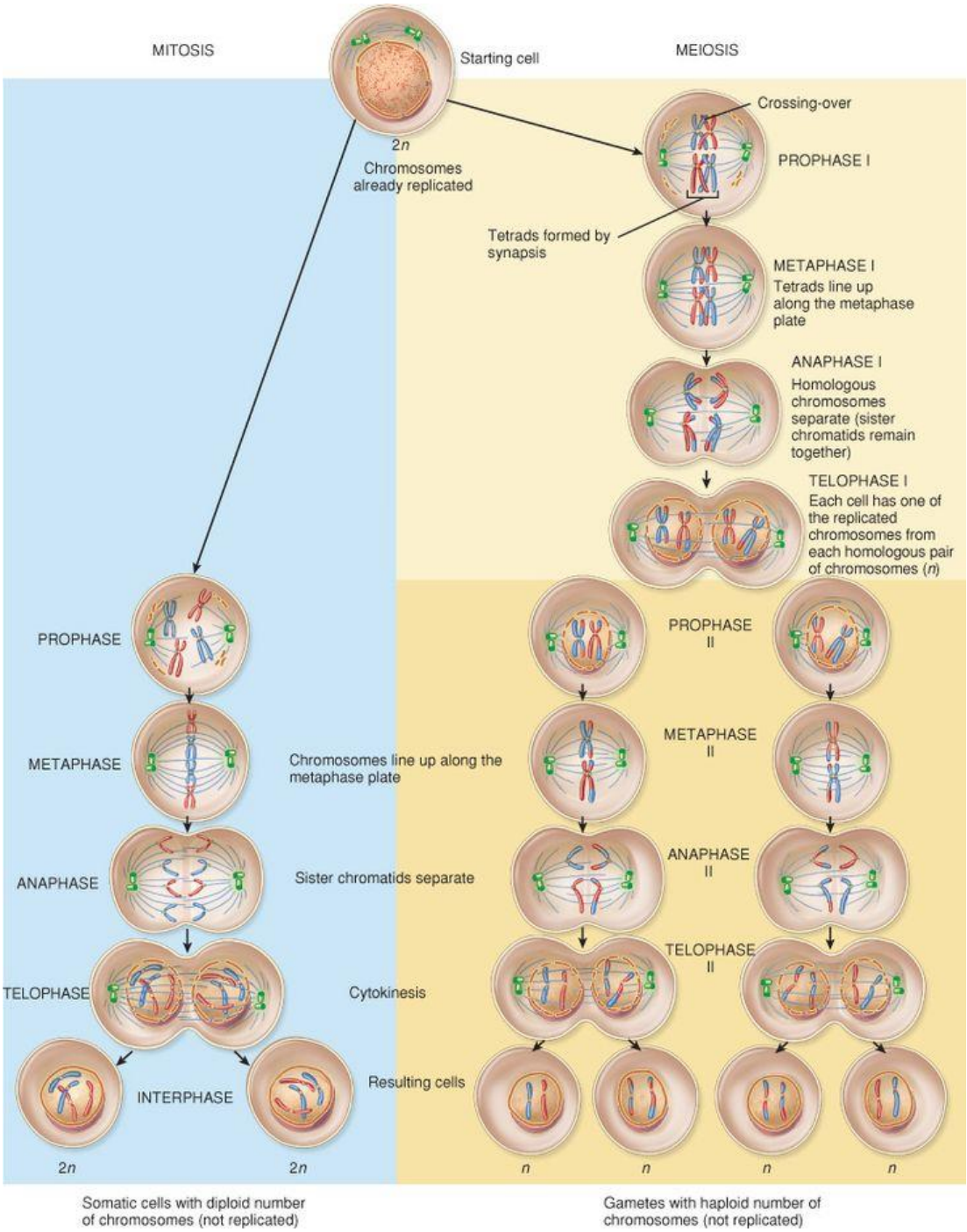
SCIENCE 10

NAME: _____

BLOCK: ___ DATE: _____

NOTES: MEIOSIS

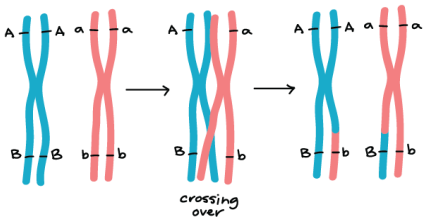
Mitosis is the process of cell division that allows an organism to create daughter cells which are genetically **identical** to the parent cell. This is useful for organisms who asexually reproduce, and also useful to all organisms as they grow and repair their tissues.	**Meiosis** is the process of cell division that allows an organism to create daughter cells with half the number of chromosomes (haploid) that are **genetically different**. This is useful for organisms who sexually reproduce and need to produce **gametes**, or sex cells, which will combine during reproduction to form a new organism.



Meiosis creates **genetic diversity** in two ways:

CROSSING OVER

- During prophase I
- Homologous pairs "clump" together in tetrads, and **cross over** to create unique gene combinations.



INDEPENDENT ASSORTMENT

- During metaphase I
- As homologous pairs line up as tetrads, the "side" each chromosome lines up is random.

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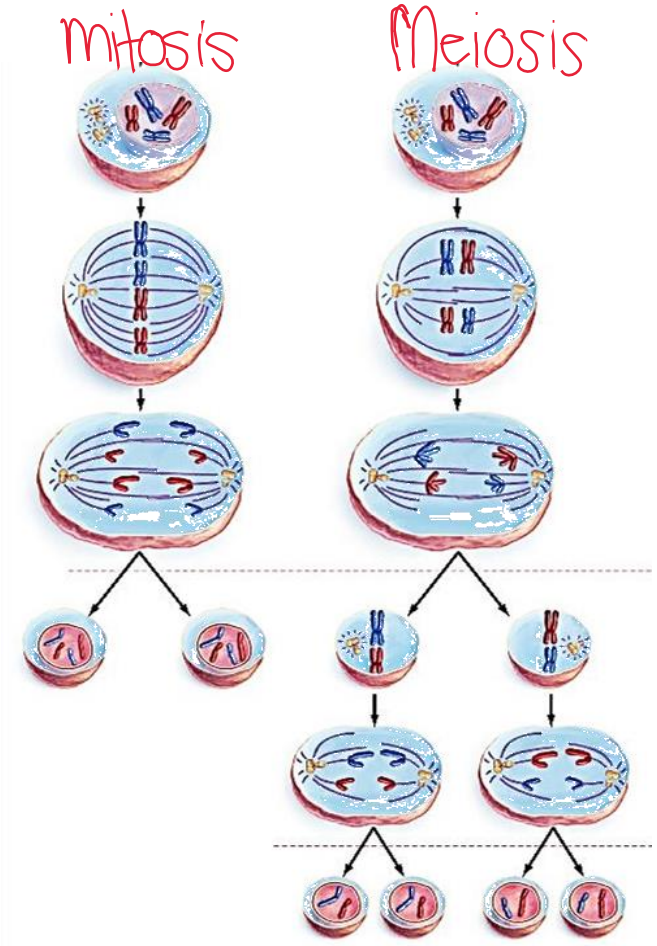
COMPARING MITOSIS AND MEIOSIS

1. In the figure to the right, label the column that shows meiosis and the column that shows mitosis.



2. What are some similarities between cell division by mitosis and cell division by meiosis?

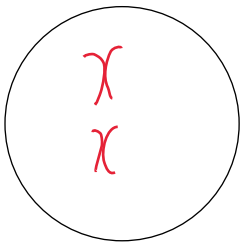
• DNA replication, line up at metaphase plate, sequence of stages.

3. Complete the table below to describe some important differences between mitosis and meiosis.

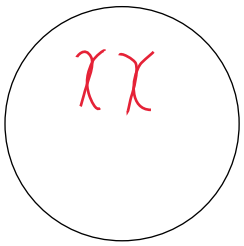
CHARACTERISTIC	MITOSIS	MEIOSIS
# of daughter cells	2	4
Type of cells produced *(sex cells or somatic cells)*	somatic	sex
Daughter cells genetically different or similar to parent cells? *(If different, say how)*	genetically identical	genetically different
# of cell divisions	1	2

4. The circles below represent cells in **metaphase** of mitosis and **metaphase I** of Meiosis. Show how **TWO** pairs of homologous chromosomes are lined up in each cell to compare mitosis to meiosis I.

MITOSIS



MEIOSIS I



5. Match each description below with one of the following options:

A. pairs of homologous chromosomes
B. sister chromatids

Mitosis separates B___ Meiosis I separates A___ Meiosis II separates B___

6. Explain why sexually reproducing organisms need to have two different types of cell division.

• Mitosis – repair, development, grow

• Meiosis – to create haploid cells to reproduce with a partner.