Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Pd: \_\_\_\_\_\_\_

**Mitosis Practice**

1. Draw and label a homologous pair of replicated chromosomes.

centromere

chromatid

1. A human body cell has 46 chromosomes. Use this information to answer the following (4 pts):
How many chromatids in prophase? \_92\_\_\_\_\_\_
How many centrioles in anaphase? \_\_\_\_2\_\_\_\_
How many total chromosomes in telophase? \_\_92\_\_\_\_
How many centromeres in metaphase? \_\_46\_\_\_\_\_
2. A fruit fly cell has 8 chromosomes. Use this information to answer the following (4 pts):
How many chromatids in metaphase? \_\_16\_\_
How many centromeres in prophase? \_\_8\_\_
How many chromosomes in anaphase? \_\_16\_\_
How many centrioles in telophase? \_\_\_2\_\_\_
3. Do sister chromatids have identical genetic information? How do you know? (3 pts)
**Sister chromatids have identical genetic information. This is true because the sister chromatids are each part of the same replicated chromosome. DNA replication ensures that the chromatids are identical.**
4. A cell with 6 chromosomes enters mitosis. Draw a picture of this cell at **anaphase** (4 pts). Label the **centrioles**, **spindle fibers**, and **chromosomes**.

5. Why is cytokinesis not technically a phase of mitosis? (2 pts)
**Mitosis is nuclear division; cytokinesis is cell division.**
6. Put the following events of mitosis in chronological order from 1-5:
Chromosomes line up in the middle of the cell \_\_3\_\_\_
Spindle fibers attach \_\_2 (or 1)\_\_\_\_\_\_
Centromeres divide and sister chromatids separate \_\_4\_\_\_\_\_
Nuclear envelope dissolves \_1 (or 2)\_\_\_\_\_\_
Nuclear envelope reforms \_\_\_5\_\_\_\_\_\_
7. How are sister chromatids different from a homologous pair?
**Sister chromatids are genetically identical; homologous pairs are genetically similar. Two sister chromatids comprise a single replicated chromosome, while one homologous pair contains two individual, distinct chromosomes.**
8. Two biologists are arguing about the phases of mitosis. They see the following cell under a microscope:

Brittany thinks this cell in in prophase but Nikki claims it is in metaphase. Who is correct and **how do you know**? (4 pts)
**This is metaphase. The line of chromosomes along the metaphase plate is the key feature of metaphase.**
9. Identify the phase during which the following things happen (8 pts):
Centromeres divide \_\_\_\_\_\_ana-\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
Nuclear envelope dissolves \_\_\_pro-\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
Chromosomes line up across the middle of the cell \_\_\_\_\_\_meta-\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
Spindle fibers form \_\_\_pro-\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
Nuclear envelope reforms \_telo-\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
Chromatids split apart \_\_ana-\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
Spindle fibers attach \_\_\_\_pro-\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
DNA condenses into visible chromosomes \_\_\_pro-\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
10. Why are there zero chromatids during anaphase and telophase? (2 pts)
**When the replicated chromosomes split apart, each chromatid becomes a chromosome.**
11. Would mitosis work without the spindle fibers? **Why or why not**? (3 pts)
**No—you need spindle fibers to move the chromosomes around and to ensure that each daughter nuclei gets one copy of every chromosome.**