

## MITOSIS COLORING

Cell division includes a very important process called *MITOSIS* where the nucleus creates a copy of all of its DNA so that each new cell is an exact copy of the parent cell and contains the exact same number of chromosomes. The cell cycle has five phases, but mitosis (nuclear) division occurs in four steps: *Prophase*, *Metaphase*, *Anaphase*, and *Telophase*. A phase called *interphase* is not actually part of mitosis, but is the resting phase that the cell is in when it is not dividing.

**1. Interphase.** A cell spends most of its time in this “in between” phase, performing cell activities like cellular respiration, osmosis, and for plant cells, photosynthesis. During this phase, the DNA is uncoiled and called chromatin. A pair of centrioles are present (but inactive in the cytoplasm) and the nucleolus is visible. At this time the cell grows, the DNA replicates and organelles grow in preparation for cell division. Color the centrioles red and the nuclear membrane yellow. ☐ Shade the chromatin blue. ☐

**2. Prophase.** This is the first step of mitosis. The *nuclear membrane* breaks apart and the *chromatin* condenses into chromosomes. The centrioles form a star shaped structure called the *aster* and a *spindle* forms between them. Color the aster pink ☐ and the spindle green. ☐ In all of the rest of the cell phases, these will be the same color.

Chromosomes are in the shape of an X where one half is the original chromosome and the other half is the copy. These two copies are called *chromatids*. Color all chromatids and chromosomes blue ☐.

**3. Metaphase.** During this stage of mitosis, the chromosomes line up in the middle of the cell along the *equator*. Each chromosome attaches itself to a spindle fiber.

**4. Anaphase.** During anaphase the chromatids are pulled apart by the spindle and move to opposite sides of the cell.

**5. Telophase.** Now that the chromosomes are separated, two nuclei are formed. The spindle fibers disappear; the chromosomes uncoil and become spaghetti-like chromatin again, and the nuclear membrane reappears. **Cytokinesis** is where the cytoplasm splits into two daughter cells and usually occurs simultaneously with telophase.

### Questions:

1. What is the name for the “in between” phase in cell divisions? \_\_\_\_\_
2. In interphase, the DNA is in the form of loose threads called \_\_\_\_\_.
3. During prophase, DNA condenses into X-shaped structures called: \_\_\_\_\_.
4. During metaphase the chromosomes line up along the \_\_\_\_\_ of the cell.
5. During what stage do the chromosomes pull apart? \_\_\_\_\_
6. The cytoplasm splits into two daughter cells during this process: \_\_\_\_\_.
7. What structure reappears during telophase? \_\_\_\_\_
8. During which stage does the DNA copy itself? \_\_\_\_\_
9. The spindle attaches to what structures? \_\_\_\_\_
10. During what phase does the spindle form? \_\_\_\_\_

**Color the image according to the directions.** All the structures in each phase should be colored. Label the phases on the lines above the image. **LABEL each of the underlined structures on the diagram.**

