**MITOSIS MASTERY INSTRUCTIONS**

**Set-Up:** Using the two long, brown pieces of twine, make a circle to represent the plasma membrane of your somatic animal cell (each piece is half of the circle). The gold ribbon represents your nuclear membrane (arrange the ribbon in a circle in the center of your cell. Place one of each colored (black, purple, blue, brown) chromosomes in the center of the nucleus (un-replicated). The brown beads with brown ribbon are your centrosomes with spindle fibers. Set them aside.

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| **Stage** | **What is Happening?** | **What does it look like?** | **What is the DNA called?** |
| **Interphase** | Each strand of **chromatin** replicates to form a sister **chromatid** (one **Chromosome**). The sister chromatids are attached at the **centroMERE.** The **centroSOME** also duplicates (but cannot be seen). | Add a sister chromatid (corresponding size and color) to each strand of chromatin. (This can be done by twisting two pipe cleaners together to form an “X”). | **Chromatin:** single strand  **Chromatid:** one strand of a pair (after replication)  **Chromosome:** two sister chromatids |
| **Prophase \*** | Chromatin condense, **centrosomes** appear and begin moving toward opposite poles. **Spindle Fibers** (microtubules) emerge from the centrosomes (**Spindle Apparatus)**. **Nuclear envelope** disappears. **Centrosomes** arrive at opposite poles. **Spindle fibers** attach to **centromeres**. | Remove nuclear envelope and place centrosomes at opposite ends of the cell. Attach a spindle fiber from each side to the centromere of each chromosome | **Chromosomes** |
| **Metaphase** | **Chromosomes** line up at the midline of the cell | Line up the chromosomes at the center of the cell | **Chromosomes** |
| **Anaphase** | **Chromosomes** move toward opposite poles | Pull each chromosome apart so one of each color is moving toward either poles | Each **sister chromatid** is now considered a **chromosome** |
| **Telophase** | **Cytoplasm** pinches in, **nuclear envelope** reforms. **Spindle Apparatus** breaks down | Pinch in the sides of the plasma membrane and replace two new nuclear envelopes around each set of chromosomes. Remove centrosome and spindles. | **Chromosomes** |
| **Cytokinesis** | **Cleavage furrow** forms and two new cells are formed. (End of cell division | Pinch off the plasma membrane so that you have two completely separate cells. | **Chromosomes** that will return to their **chromatin** state. |

\*The phases of mitosis are shaded