Why Do Cells Divide?

* **To reproduce their own kind!**
* **This can be a single cell or a multicellular organism.**

{This is the ROLE of cell division}

**Hmmm…test question?**

**What is the Result of Cell Division?**

* **Cell division results in genetically identical daughter cells.**
* **Two Copies of DNA and organelles are made and distributed to each daughter cell.**

**{Good Thing to Know!}**

**What is the cell cycle?**

* **All the activities of a cell from its parent’s division to its own division.**

{Important definition?}

**The Cell Cycle**

**INTERPHASE**

**Synthesis Phase (S)**

**INTERPHASE**

**INTERPHASE**

**First Gap Phase (G1)**

**Second Gap Phase (G2)**

**Mitosis Phase/Cytokinesis (M)**

**G1 Phase**

* **Regular cell work**
* **Protein supply increases**
* **Cell grows in size**

{These are the key characteristics of the G1 Phase.}

**Hmmm…test question?**

S Phase

* **DNA Replicates**
* **Two identical copies of each DNA molecule are made**

{DNA REPLICATION IS THE PURPOSE OF THE SYNTHESIS PHASE.}

**My that’s interesting!**

**G2 PHASE**

* **Cell continues to grow before dividing.**

**{Good Thing to Know!}**

**INTERPHASE**

* **Interphase accounts for 90% of the cell cycle**
* **It includes the G1, S, and G2 Phases**

{Important information?}

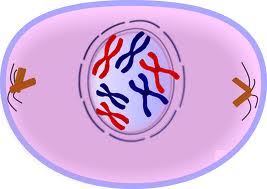
**Mitosis**

* **The process a cell undergoes to divide the nucleus. The result are two new nuclei each with a set of chromosomes equal to the parent nucleus.**
* **Protein supply increases**
* **Cell grows in size**

{Looks like we have an important definition here!}

**Hmmm…Interesting!**

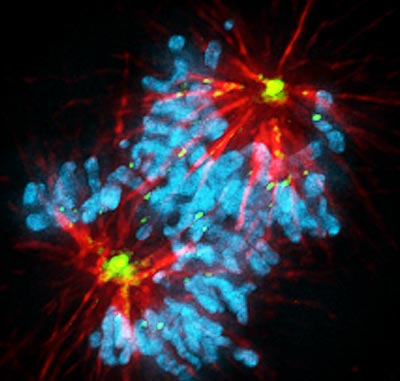
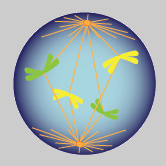
Prophase

[](http://www.google.com/imgres?q=prophase&hl=en&sa=X&qscrl=1&nord=1&rlz=1T4GGLL_enUS411US411&biw=1600&bih=654&tbm=isch&prmd=imvns&tbnid=NZrtm0VXeP3kqM:&imgrefurl=http://www.edupic.net/cells.htm&docid=ibOGJ58Uqok7CM&imgurl=http://www.edupic.net/Images/Mitosis/prophase.png&w=1125&h=794&ei=C3G8Tsa_HszprQeLwuDXAQ&zoom=1)

* **Chromatin strands begin coiling more tightly.**
* **Each strand has an indentical twin called a sister chromatid.**
* **Identical sister chromatids join together at the centromere. These are the chromosomes.**
* **The mitotic spindle begins to form.**

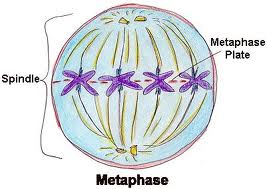
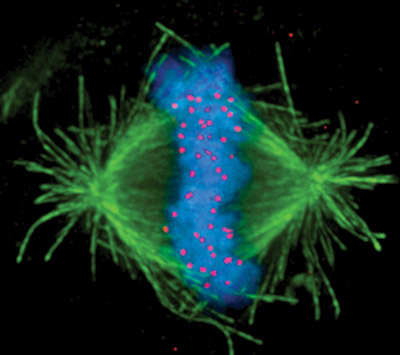
**Prometaphase**

* **The nuclear envelope fragments.**
* **Microtubules extend from each centrosome to the middle of the cell.**
* **Some of the microtubules attach to the kinetochores of the chromosomes.**



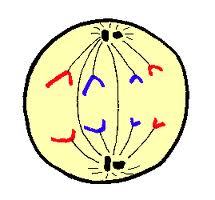
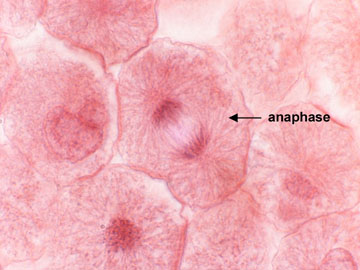
**Metaphase**

* **The centrosomes are now at opposite ends of the cell.**
* **The chromosomes line up at the metaphase plate.**
* **Each sister chromatid has a kineticore that is attached to a microtubule coming from the centrosomes.**

[](http://www.google.com/imgres?q=metaphase&hl=en&qscrl=1&nord=1&rlz=1T4GGLL_enUS411US411&biw=1600&bih=654&tbm=isch&tbnid=md1VCo5bjlfN2M:&imgrefurl=http://humanphisiology.wikispaces.com/03+-+Cell+Physiology&docid=2VSx9dX5AYC92M&imgurl=http://humanphisiology.wikispaces.com/file/view/metaphase_text.jpg&w=401&h=284&ei=8Hq8TuzVNcXWrQfK3vnGAQ&zoom=1) 

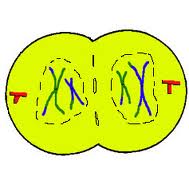
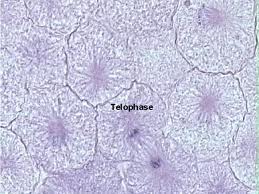
**Anaphase**

* **The chromatids separate.**
* **Each of the chromosomes move towards opposite ends of the cell as the microtubules shorten.**
* **By the end of Anaphase, the two ends of the cell have equal and complete chromosomes.**

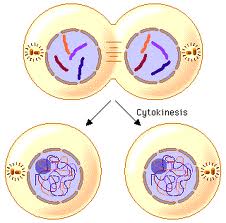
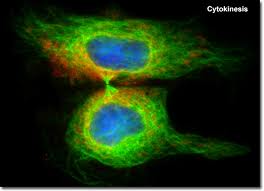
Telephase

* **Two daughter nuclei begin to form in the cell.**
* **Each form a nuclear envelope.**
* **The chromosomes become less condensed.**

[](http://www.google.com/imgres?q=telophase&hl=en&sa=X&qscrl=1&nord=1&rlz=1T4GGLL_enUS411US411&biw=1600&bih=654&tbm=isch&prmd=imvns&tbnid=5KvV8EVueBENJM:&imgrefurl=http://www.uic.edu/classes/bios/bios100/lecturesf04am/lect16.htm&docid=fS_ny6I5gba4aM&imgurl=http://www.uic.edu/classes/bios/bios100/lecturesf04am/telophase1m.jpg&w=237&h=236&ei=AX-8Tqm8OsvRrQfhk8jEAQ&zoom=1) [](http://www.google.com/imgres?q=telophase&hl=en&sa=X&qscrl=1&nord=1&rlz=1T4GGLL_enUS411US411&biw=1600&bih=654&tbm=isch&prmd=imvns&tbnid=49-54CSLDAtzvM:&imgrefurl=http://faculty.clintoncc.suny.edu/faculty/michael.gregory/files/bio%20101/bio%20101%20laboratory/mitosis/mitosis.htm&docid=-c2AZQ59rWDbtM&imgurl=http://faculty.clintoncc.suny.edu/faculty/michael.gregory/files/Bio%2520101/Bio%2520101%2520Laboratory/Mitosis/Photographs/whitefish_mitosis_telophaseX400.jpg&w=640&h=480&ei=AX-8Tqm8OsvRrQfhk8jEAQ&zoom=1)

**Cytokinesis**

* **In animal cells, cytokinesis involves the forming of a cleavage furrow.**
* **The cleavage furrow “pinches” the cell in two.**
* **The two new daughter cells are now formed and the cell cycle begins again.**

[](http://www.google.com/imgres?q=cytokinesis&hl=en&qscrl=1&nord=1&rlz=1T4GGLL_enUS411US411&biw=1600&bih=654&tbm=isch&tbnid=JSpCyXtB-P3lXM:&imgrefurl=http://www.tutorvista.com/biology/cytokinesis-pictures&docid=ResXsydVTp86kM&imgurl=http://images.tutorvista.com/content/feed/tvcs/cytokin.gif&w=320&h=315&ei=u4C8TtbYI4TKrAfOmMjTAQ&zoom=1)[](http://www.google.com/imgres?q=cytokinesis&hl=en&qscrl=1&nord=1&rlz=1T4GGLL_enUS411US411&biw=1600&bih=654&tbm=isch&tbnid=TwVahIPh_mtpCM:&imgrefurl=http://learnitalready.com/Cycle6.html&docid=ToeSyw7M0usBaM&imgurl=http://learnitalready.com/cytokinesis1large.jpg&w=508&h=368&ei=u4C8TtbYI4TKrAfOmMjTAQ&zoom=1)

* **Regular Cell Work**
* **Protein Supply Increases**
* **Cell Grows in Size**
* **DNA Replicates**
* **Cell Continues to Grow Before Dividing**