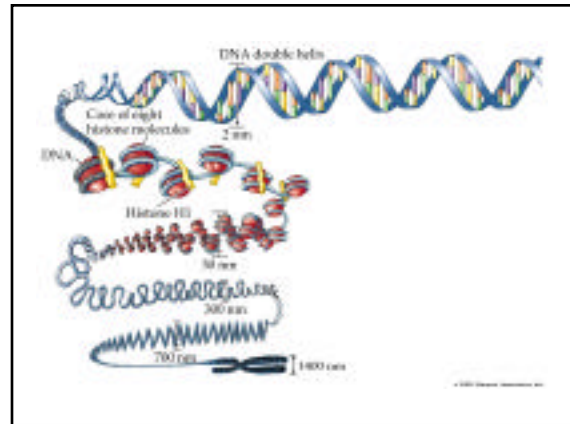
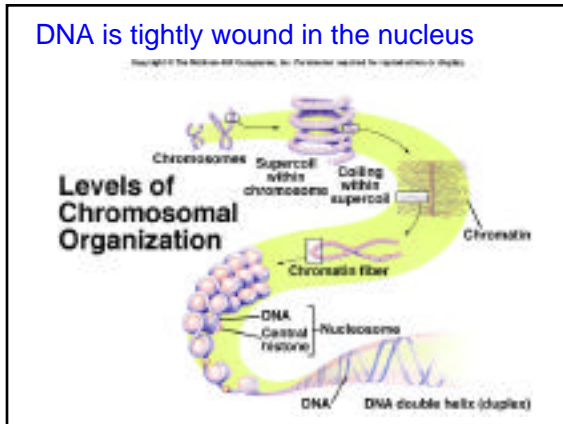
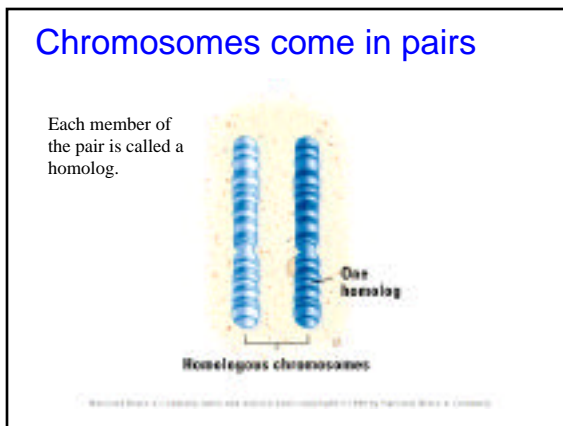


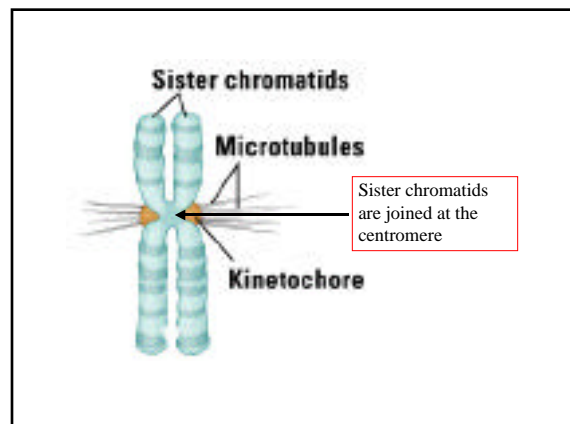
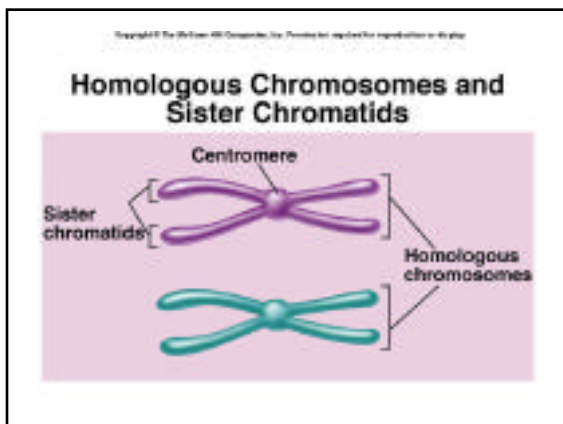
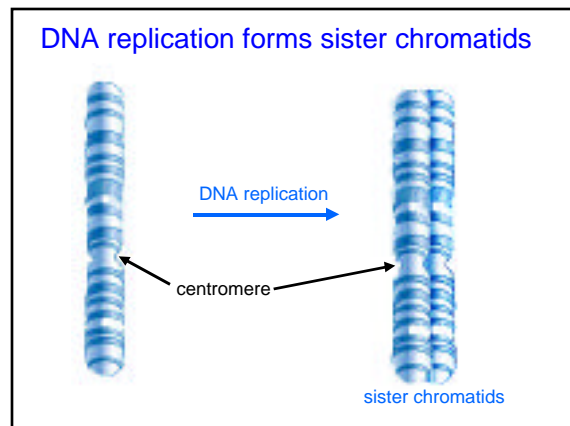
DNA is tightly wound in the nucleus

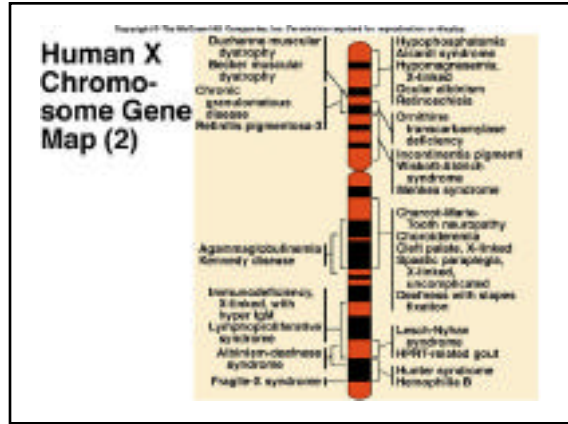
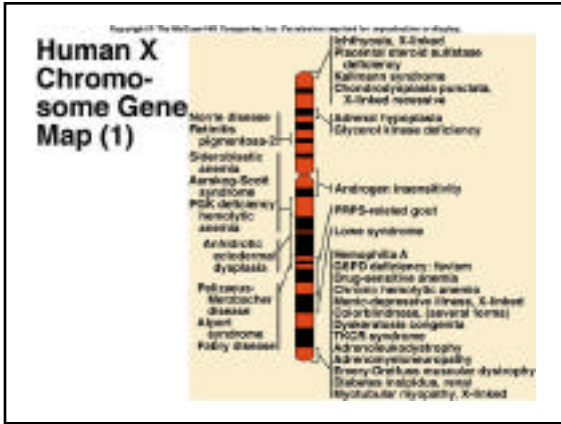


Chromosomes come in pairs



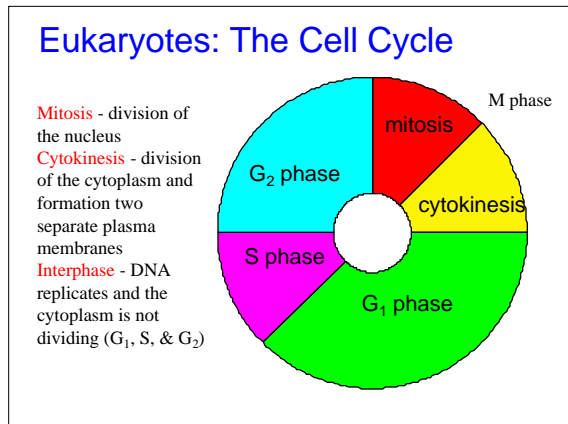
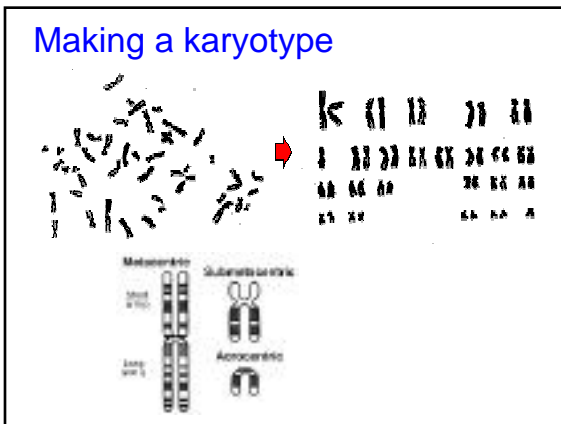
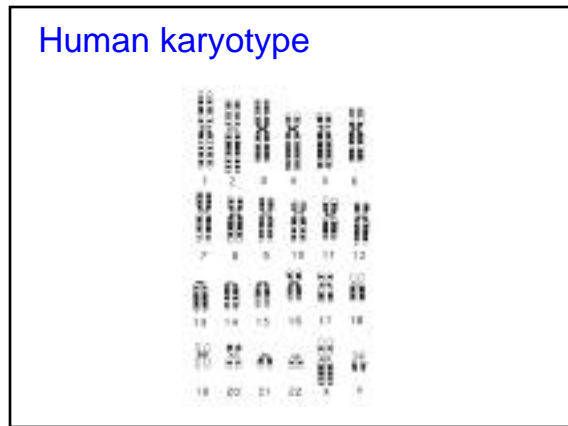
DNA replication forms sister chromatids



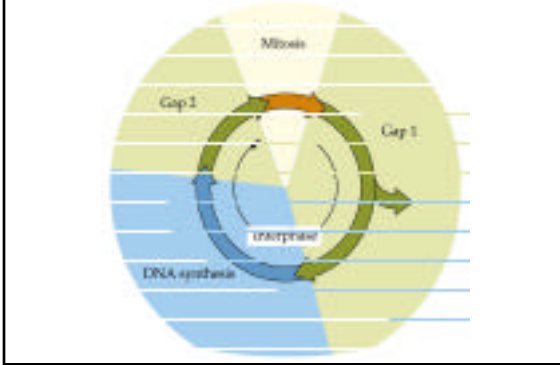


9.1 Numbers of Pairs of Chromosomes in Some Plant and Animal Species

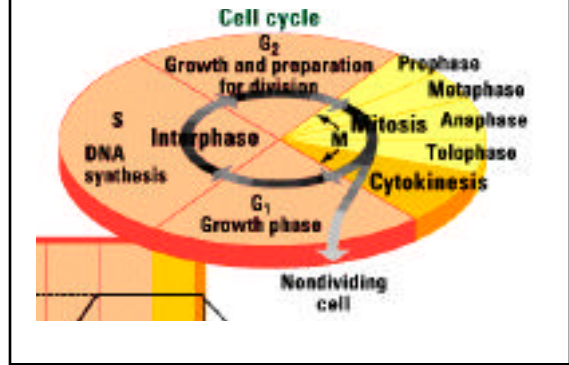
COMMON NAME	SPECIES	NUMBER OF CHROMOSOME PAIRS
Mosquito	<i>Culex pipiens</i>	3
Housefly	<i>Musca domestica</i>	6
Toad	<i>Bufo americanus</i>	11
Rice	<i>Oryza sativa</i>	12
Frog	<i>Rana pipiens</i>	13
Alligator	<i>Alligator mississippiensis</i>	16
Rhesus monkey	<i>Macaca mulatta</i>	21
Wheat	<i>Triticum aestivum</i>	21
Human	<i>Homo sapiens</i>	23
Potato	<i>Solanum tuberosum</i>	24
Donkey	<i>Equus asinus</i>	31
Horse	<i>Equus caballus</i>	32
Dog	<i>Canis familiaris</i>	39
Carp	<i>Cyprinus carpio</i>	52



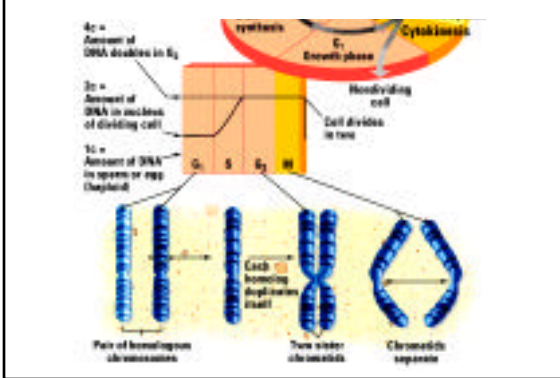
Cell cycle



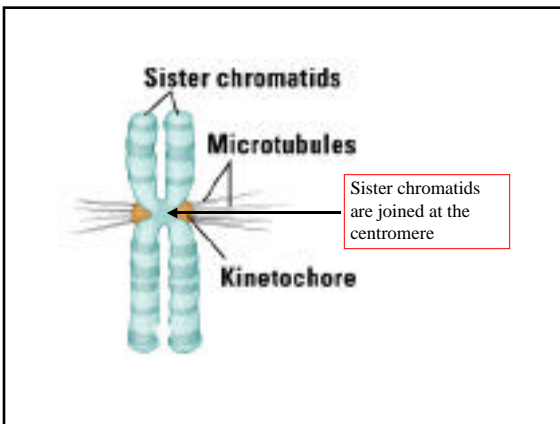
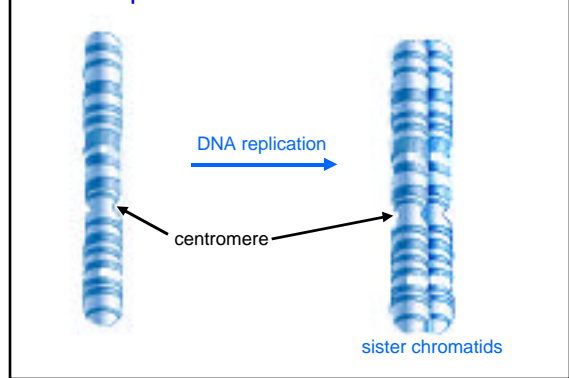
Eukaryotes: the cell cycle



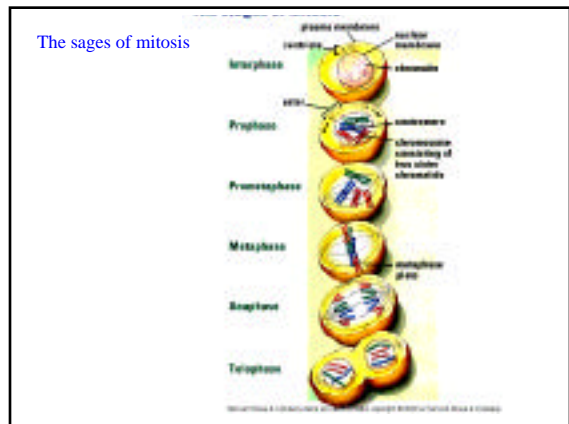
The amount of DNA increases during the cell cycle



DNA replication forms sister chromatids



The stages of mitosis

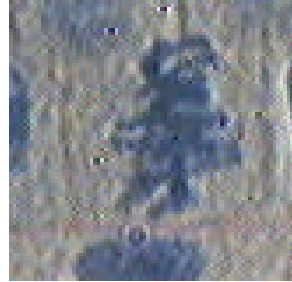


Prophase



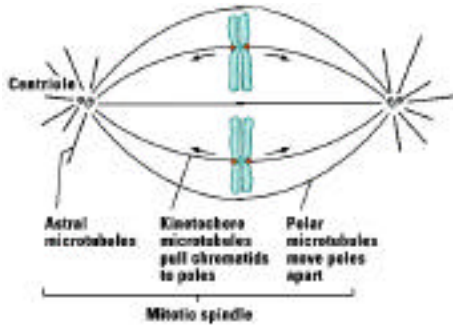
Chromosomes form
Two chromatids
Mitotic spindle develops

Metaphase



Chromosomes align in
a single plane

Animals cells

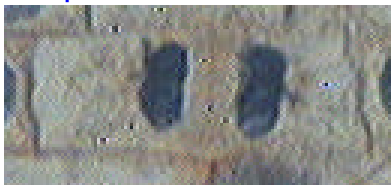


Anaphase



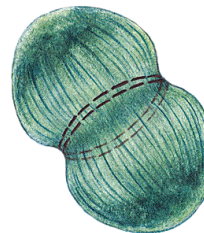
Chromatid separation

Telophase



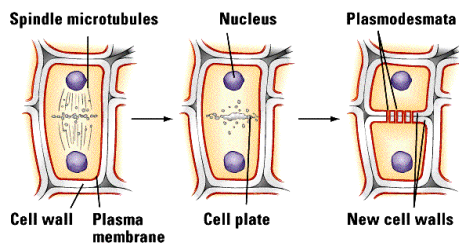
The mitotic apparatus disappears - includes kinetochore,
polar and astral microtubules

A contractile ring is formed in animal cells



A bundle of actin filaments

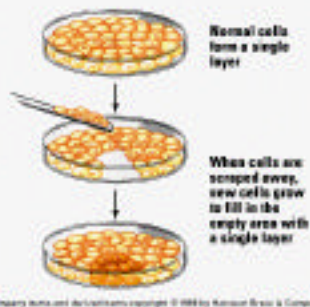
A cell plate is formed in plant cells



Regulation of the cell cycle

- ✓ Cell senescence
 - Limits the number of time the cell can divide
- ✓ Growth control
 - Contact inhibition

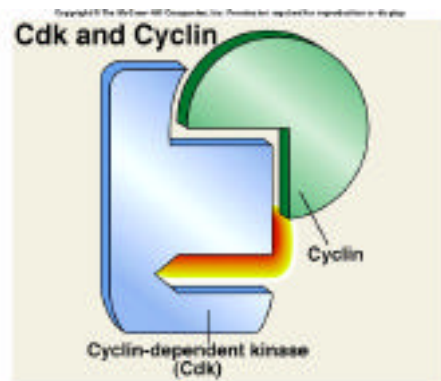
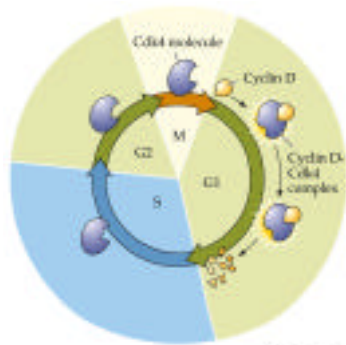
Cells regulate their division by means of contact inhibition

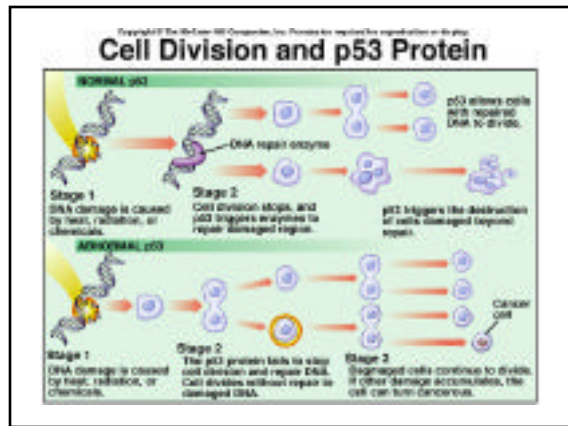
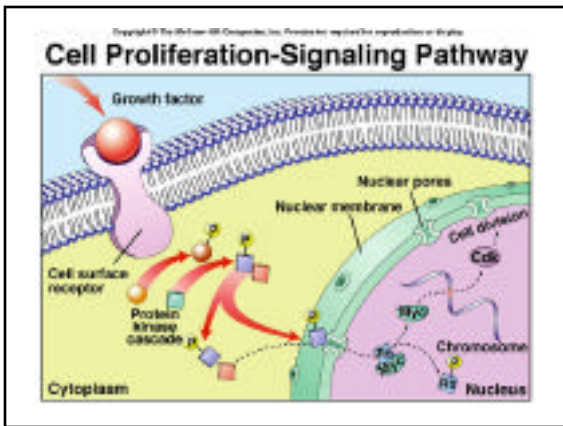
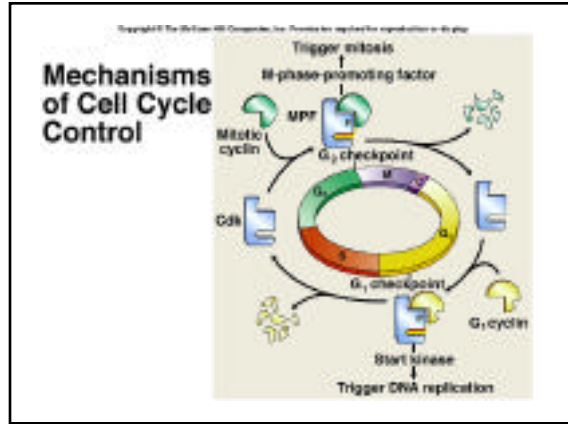
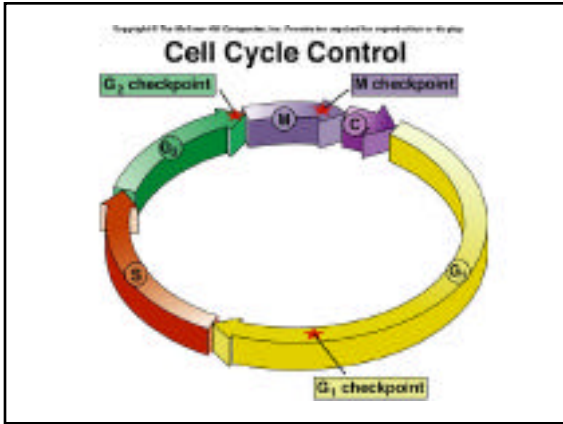


Levels of specific proteins in the cell control mitosis

- ✓ Maturation-phase Promoting Factor (MPF) triggers mitosis
- ✓ Changing levels of cyclin and cyclin dependent kinase proteins determines cell division.

Cyclin bind to a cyclin-dependent kinase



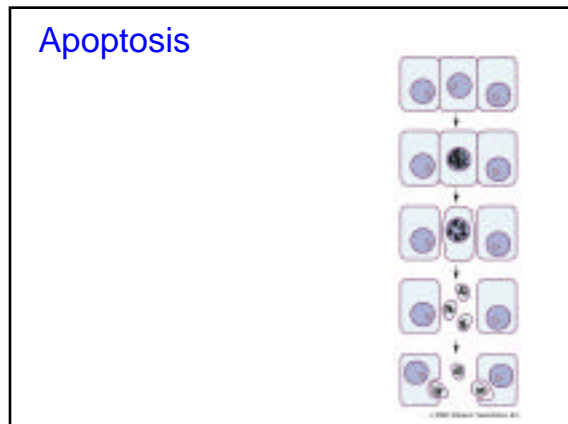


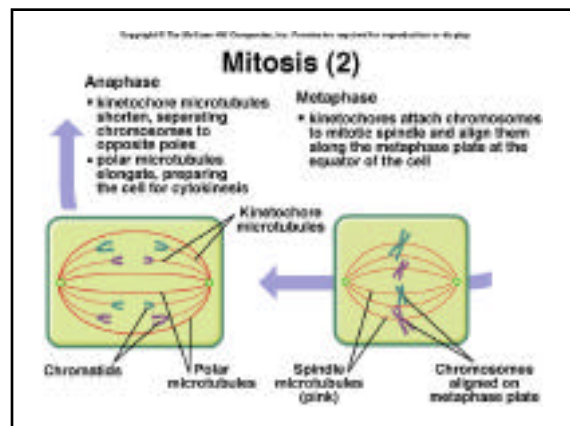
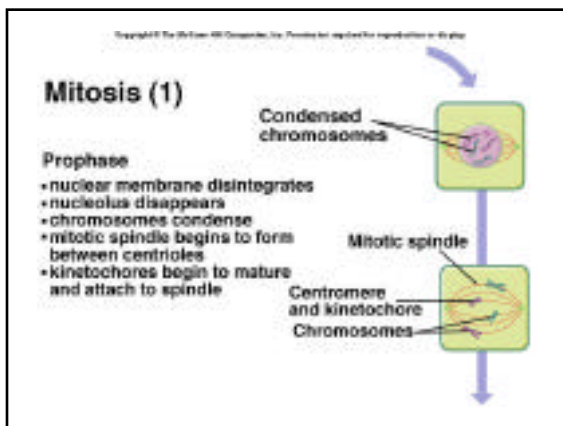
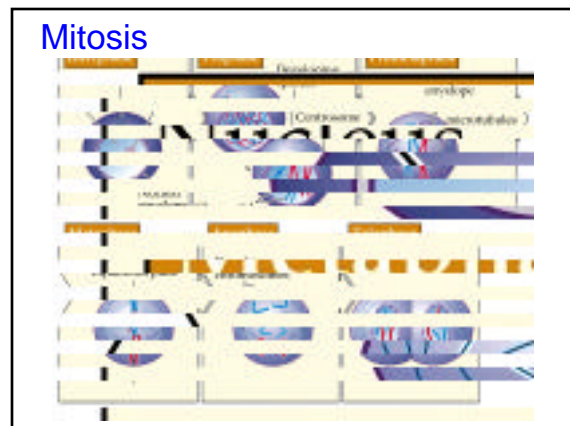
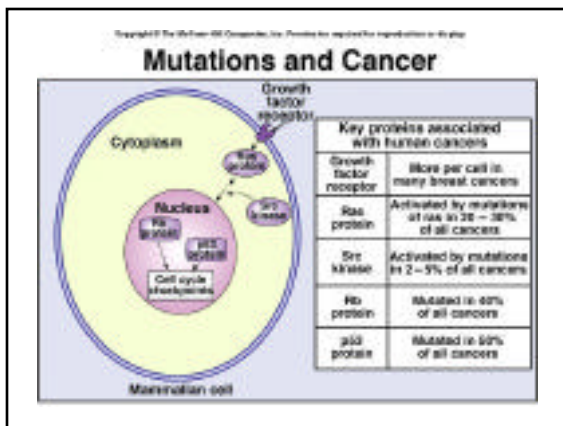
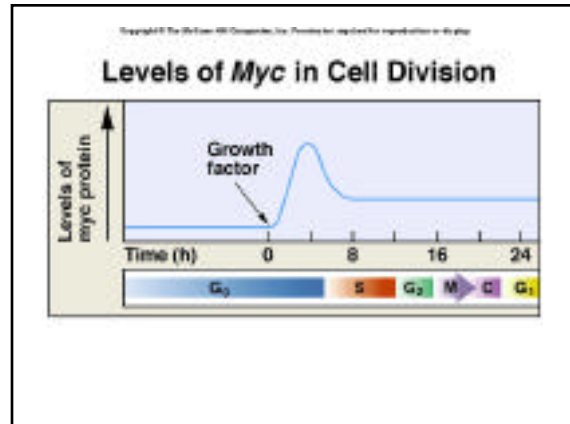
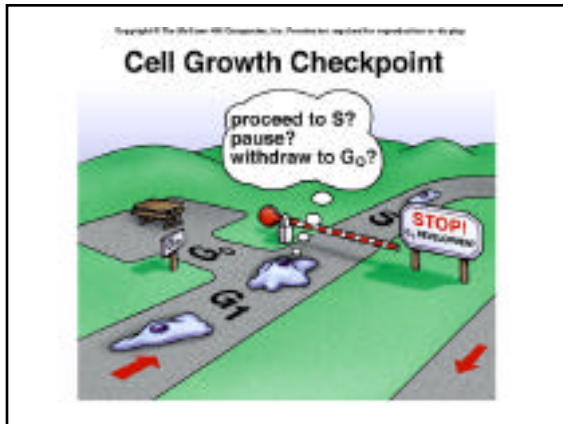
Cell death

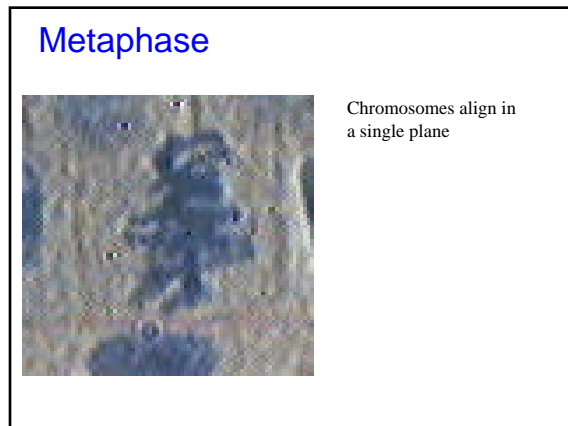
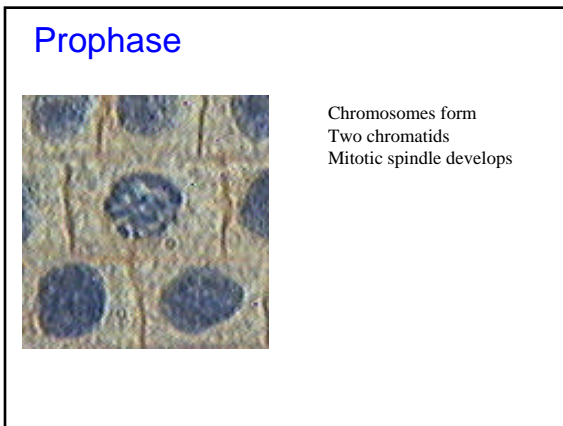
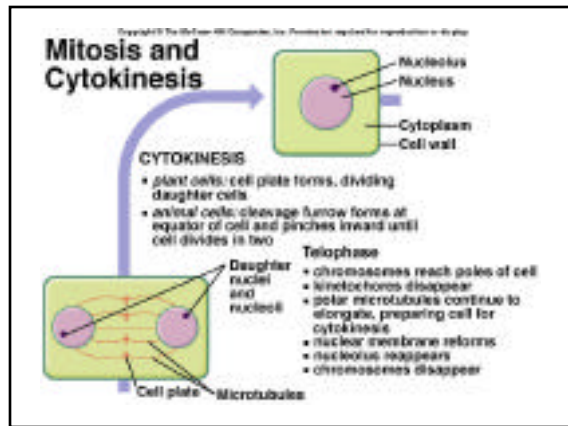
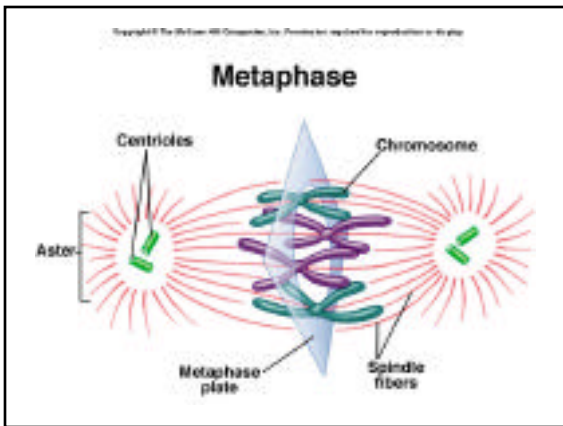
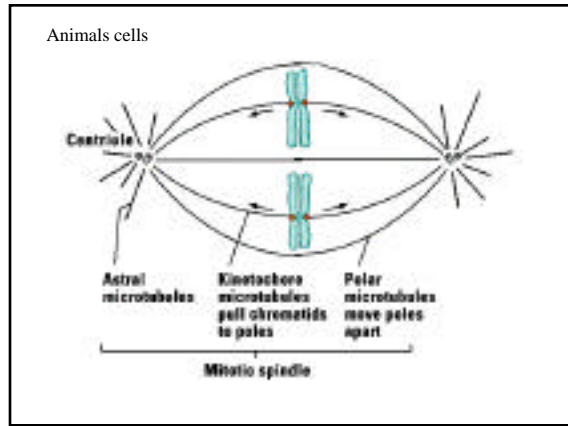
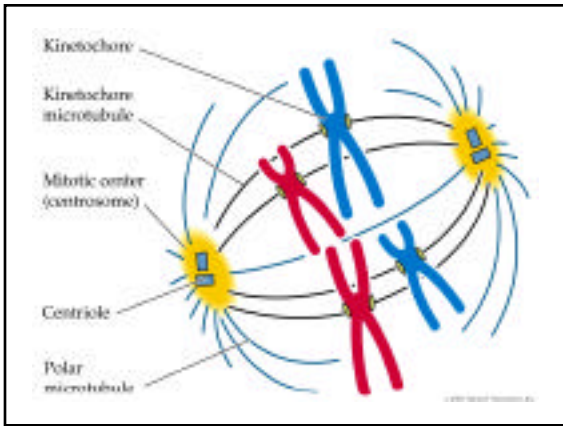
9.2 Two Different Ways for Cells to Die

	NECROSIS	APOPTOSIS
Stimuli	Low O ₂ , toxins, ATP depletion, damage	Specific, genetically programmed physiological signals
ATP required	No	Yes
Cellular pattern	Swelling, organelle disruption, tissue death	Chromatin condensation, membrane blebbing, single-cell death
DNA breakdown	Random fragments	Nucleosome-sized fragments
Plasma membrane	Burst	Blebbled
Fate of dead cells	Ingested by phagocytes	Ingested by neighboring cells
Reaction in tissue	Inflammation	

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Anaphase

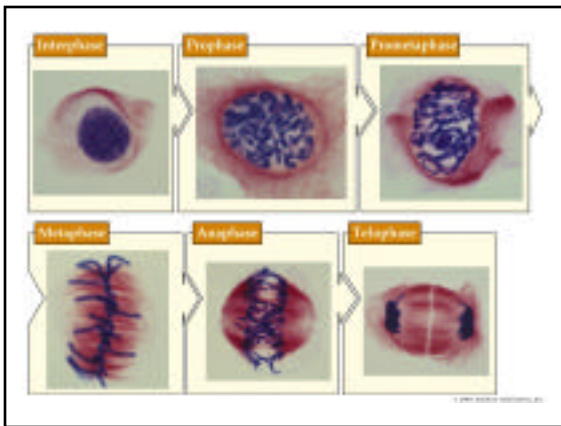


Chromatid separation

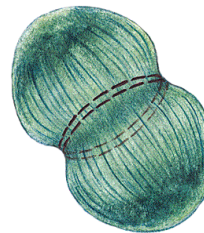
Telophase



The mitotic apparatus disappears - includes kinetochore, polar and astral microtubules



A contractile ring is formed in animal cells



A bundle of actin filaments

A cell plate is formed in plant cells

