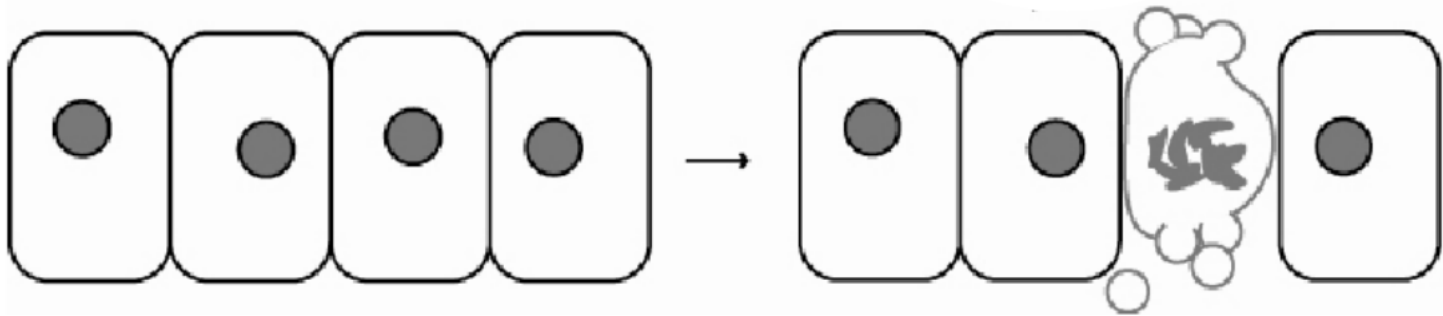


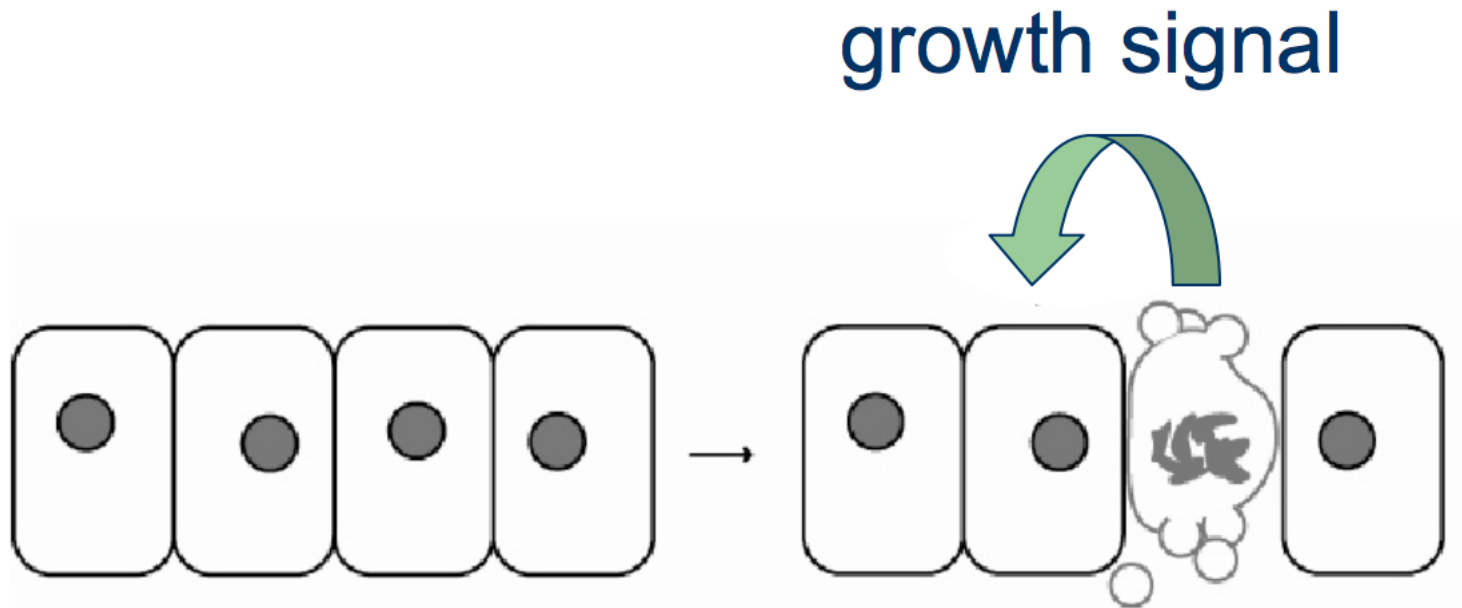
Bell Ringer

You are a skin cell in the human body. The cell next to you has just died. Another cell needs to be made to replace the dead cell. How would you accomplish this?



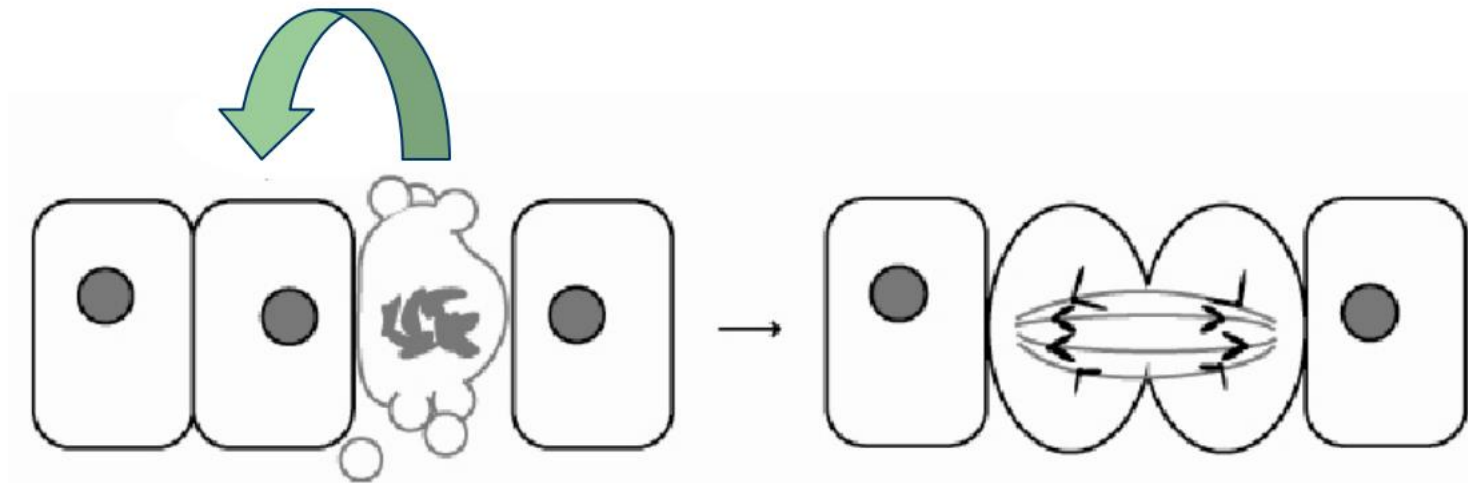
Bell Ringer

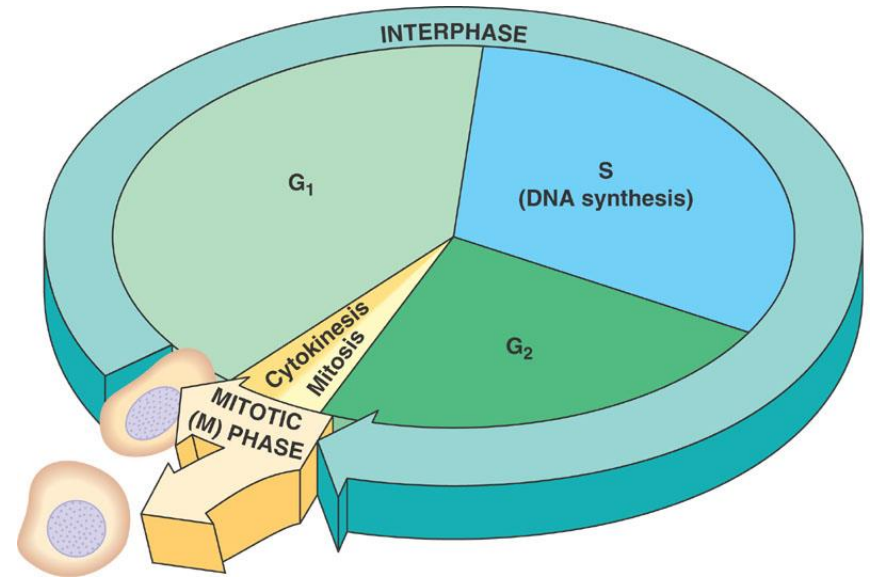
Dying cells produce a growth signal that triggers cell division in neighboring cells.



Bell Ringer

Dying cells produce a growth signal that triggers cell division in neighboring cells.





CELL CYCLE

What is a cell?

The smallest unit of life.

D

E

A

R

What is a cell?

The smallest unit of life.

D – Have **DNA**

E – Use **energy**

A – Respond and **adapt** to their environment

R – **Reproduce**, grow and develop

What is a cell?

The smallest unit of life.

D – Have **DNA**

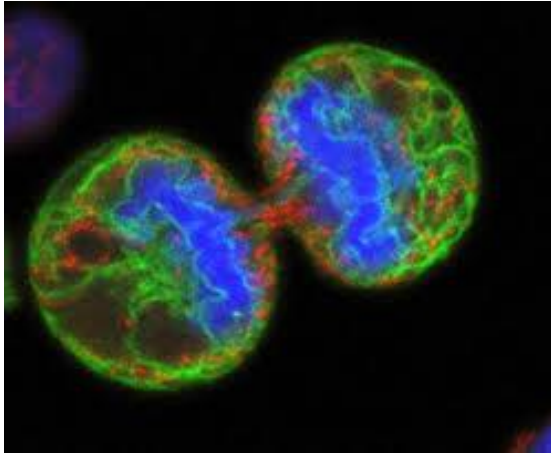
E – Use **energy**

A – Respond and **adapt** to their environment

R – Reproduce, grow and develop

All living things are made of cells

Cells must be able to grow and reproduce.

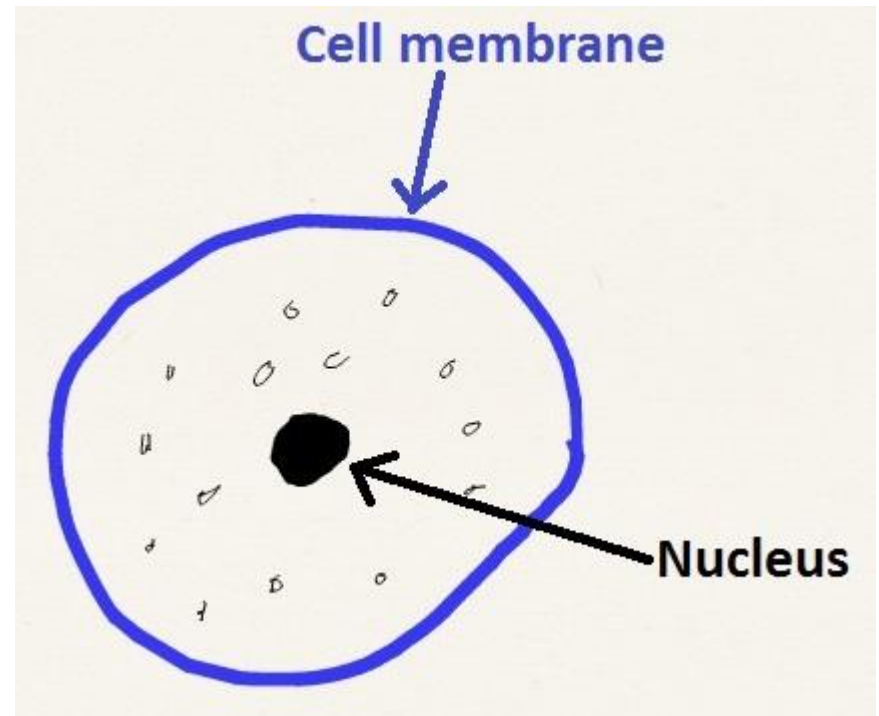


Parts of a cell

Cell membrane = flexible structure that contains and protects the cell.

Nucleus = “brain” of the cell, surrounded by a membrane.

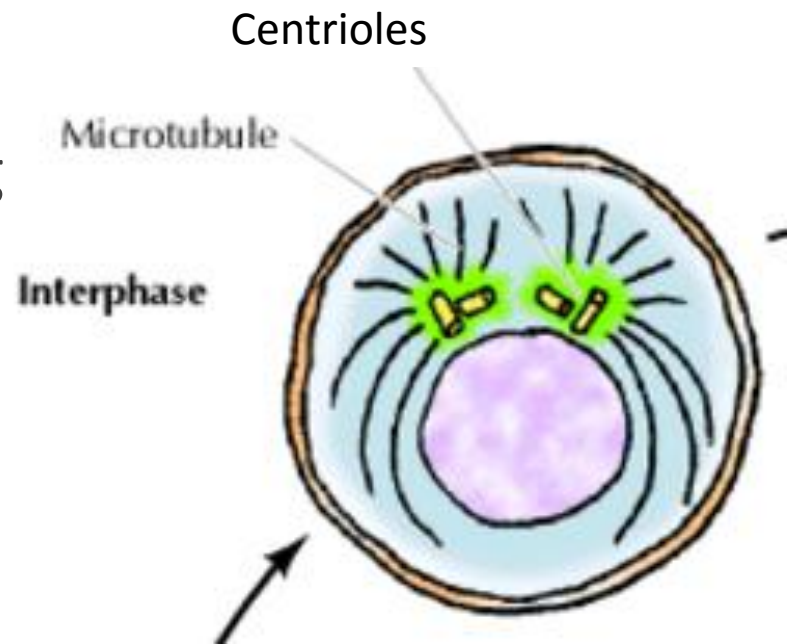
Cytoplasm = the jelly-like substance in which the cell's parts are suspended.



Parts of a cell

Centrioles = structures that produce spindle fibers. They always come in pairs.

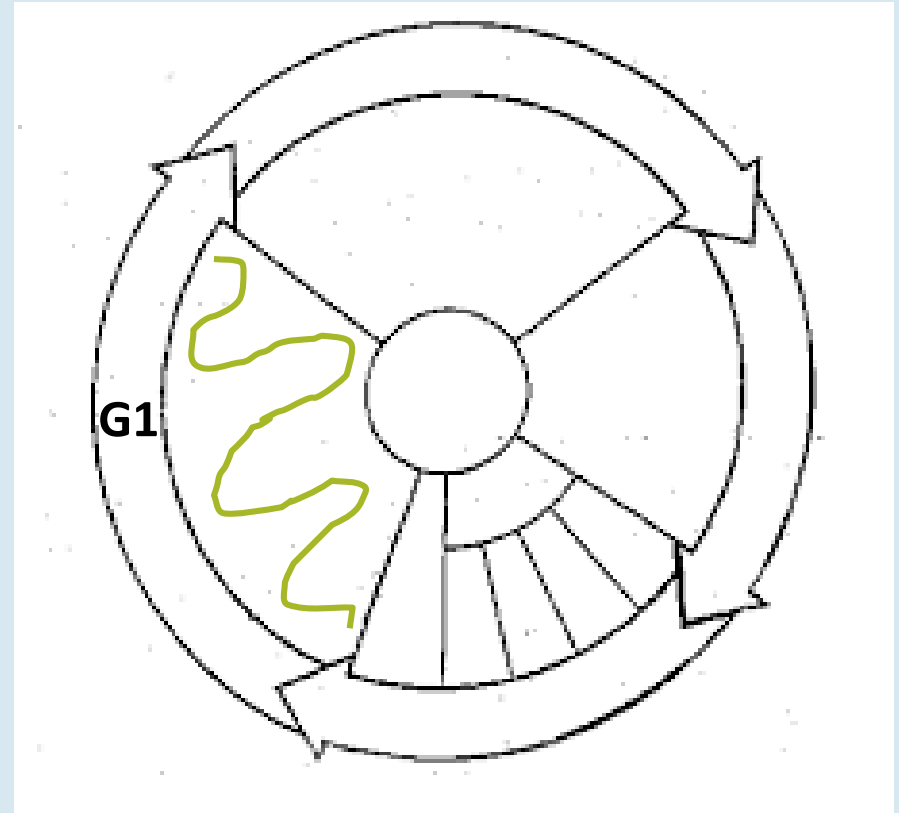
- Spindle fibers pull the chromosomes apart during cell division.



Life of a cell

Phase = Growth 1 (G1)

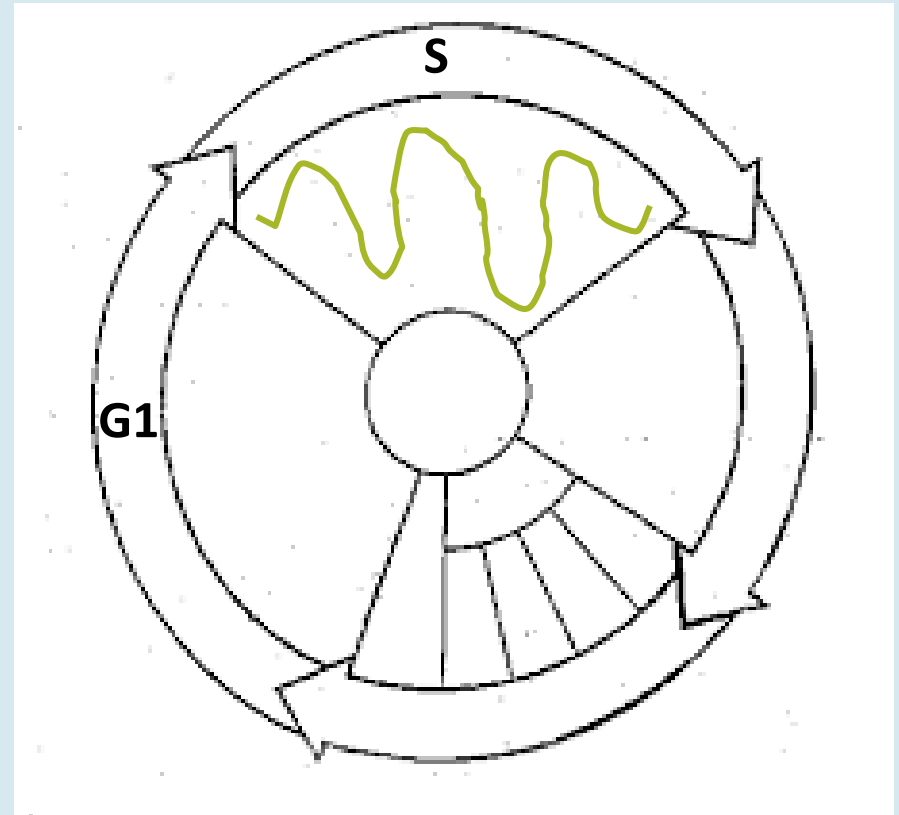
- Cell grows
- All cell contents *except chromosomes* are duplicated.



Life of a cell

Phase = Synthesis (S)

- All 46 chromosomes are replicated.



Chromosome number

n represents the number of different chromosomes that belong to a species.

What is n for humans?

Chromosome number

n represents the number of different chromosomes that belong to a species.

What is n for humans? n = 23

Chromosome number

Humans have 2 copies of each chromosome.

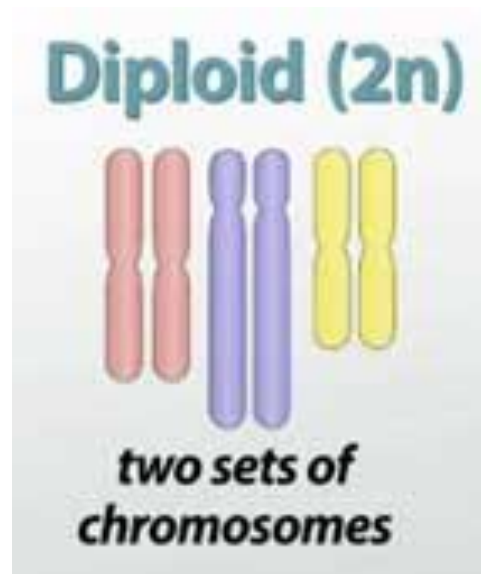
Our chromosome number is **2n**.

Chromosome number

Humans have 2 copies of each chromosome.

Our chromosome number is **2n**.

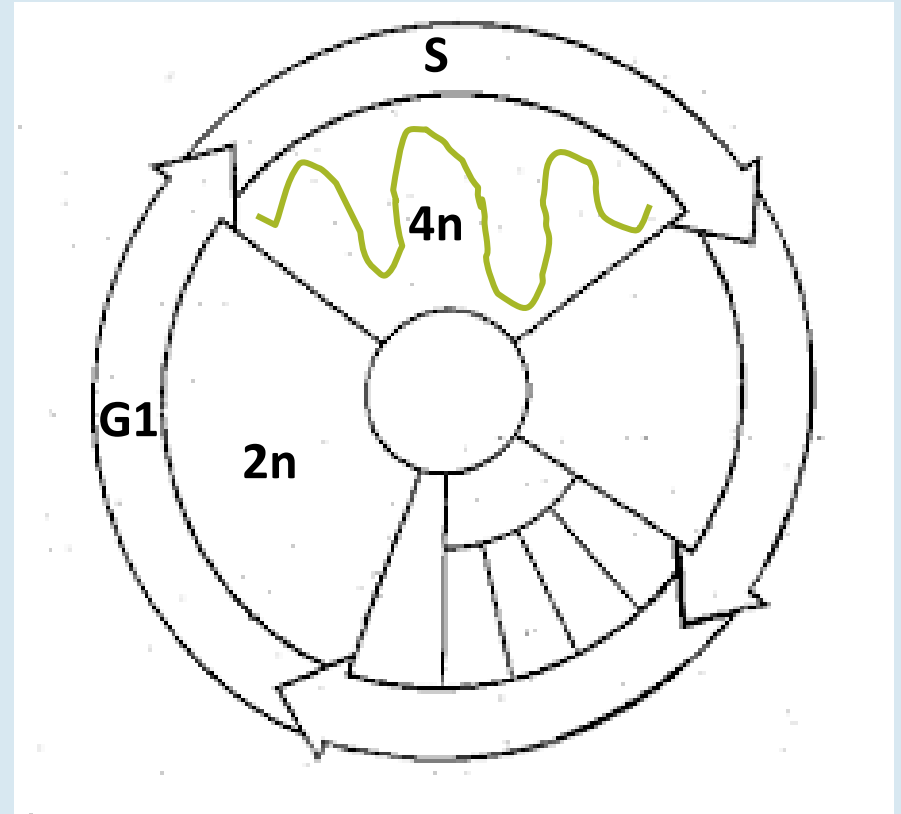
- AKA **diploid** (di- = two, -ploid = # of chromosomes)



Life of a cell

Phase = Synthesis (S)

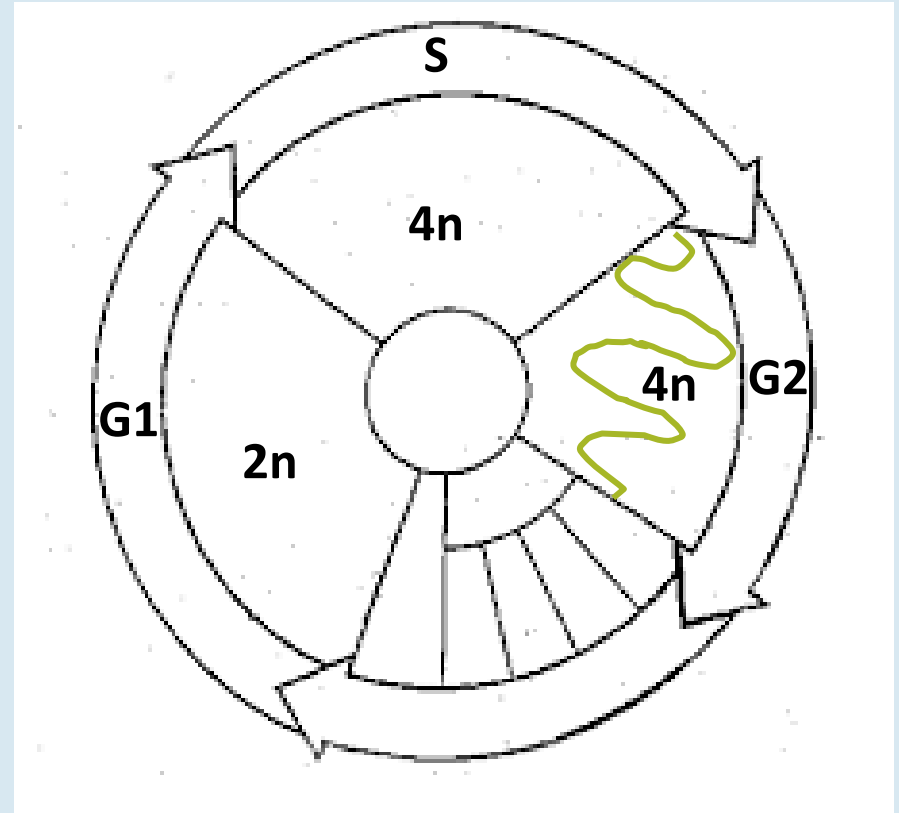
- All 46 chromosomes are replicated.
- $2n \rightarrow 4n$



Life of a cell

Phase = Growth 2 (G2)

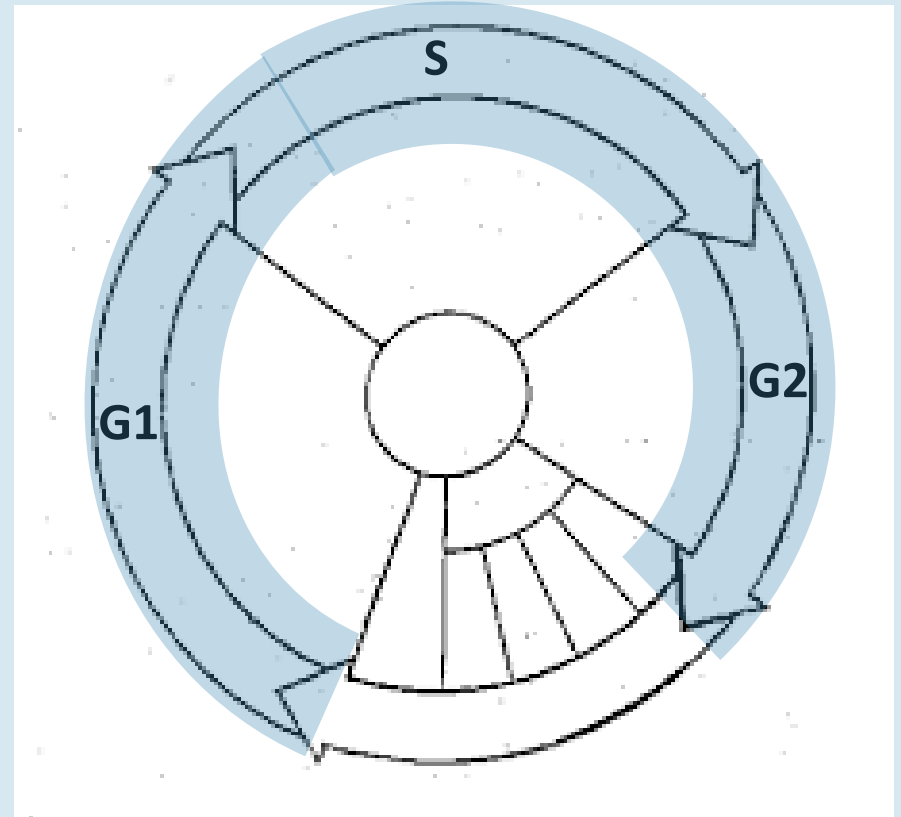
- Cell “double checks” chromosomes for errors after replication.



Life of a cell

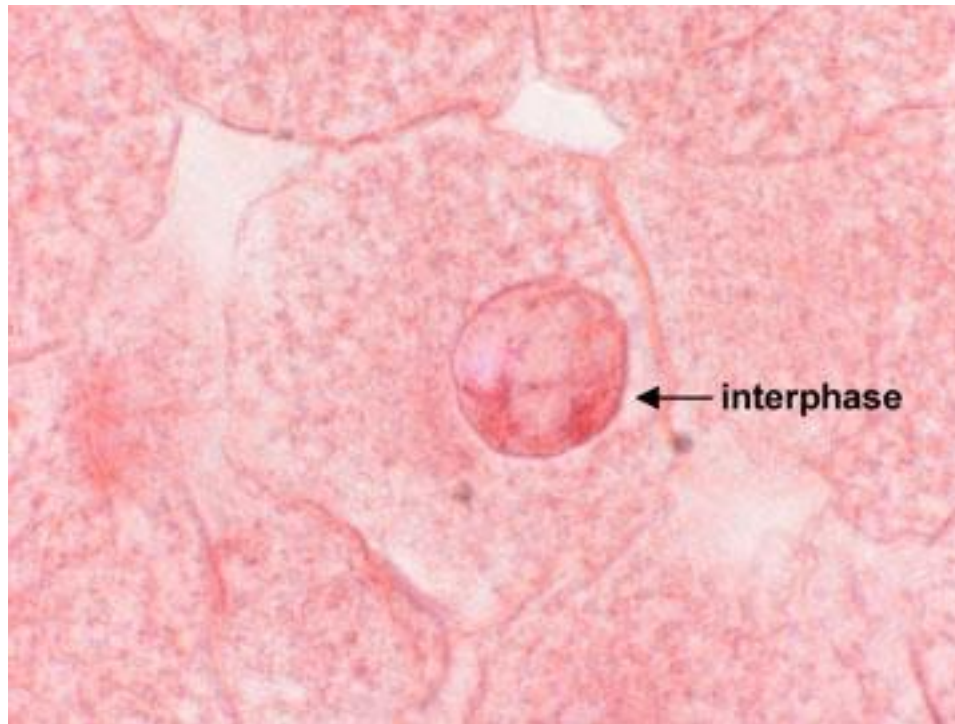
These three phases are known collectively as **interphase**.

Purpose = to prepare for cell division!



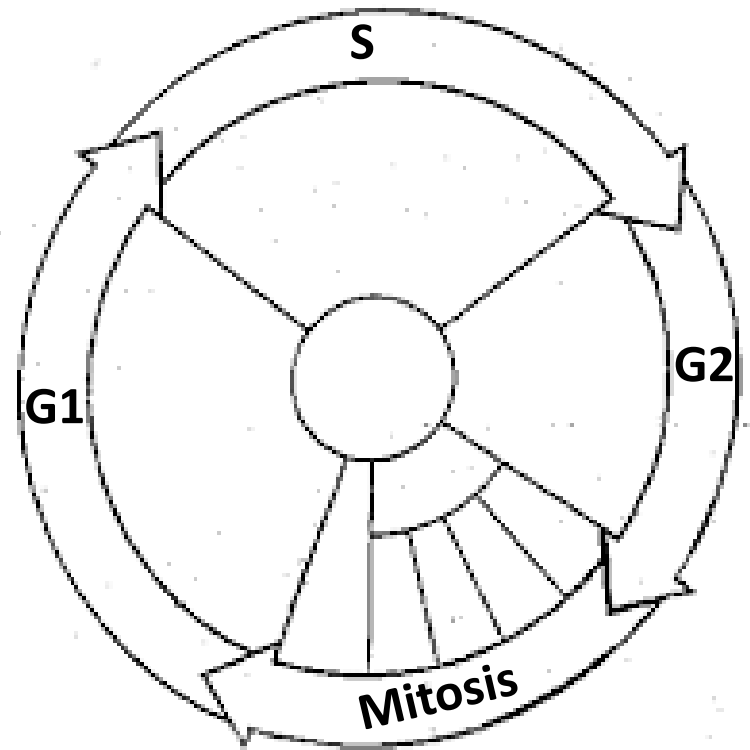
Life of a cell

DNA is in chromatin form during interphase.

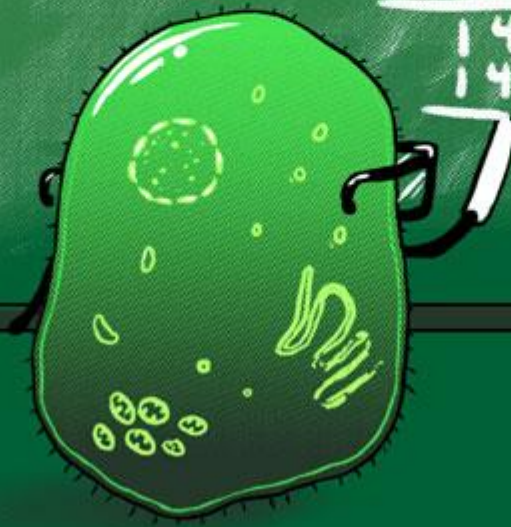


Life of a cell

Last phase is where the cell divides = **mitosis**.



$$\begin{array}{r} 42 \\ 7 \overline{) 294} \\ \underline{28} \\ 14 \\ \underline{14} \\ 0 \end{array}$$



Vocabulary Association Activity

Cell

Nucleus

Chromatin

Chromosomes

$2n$

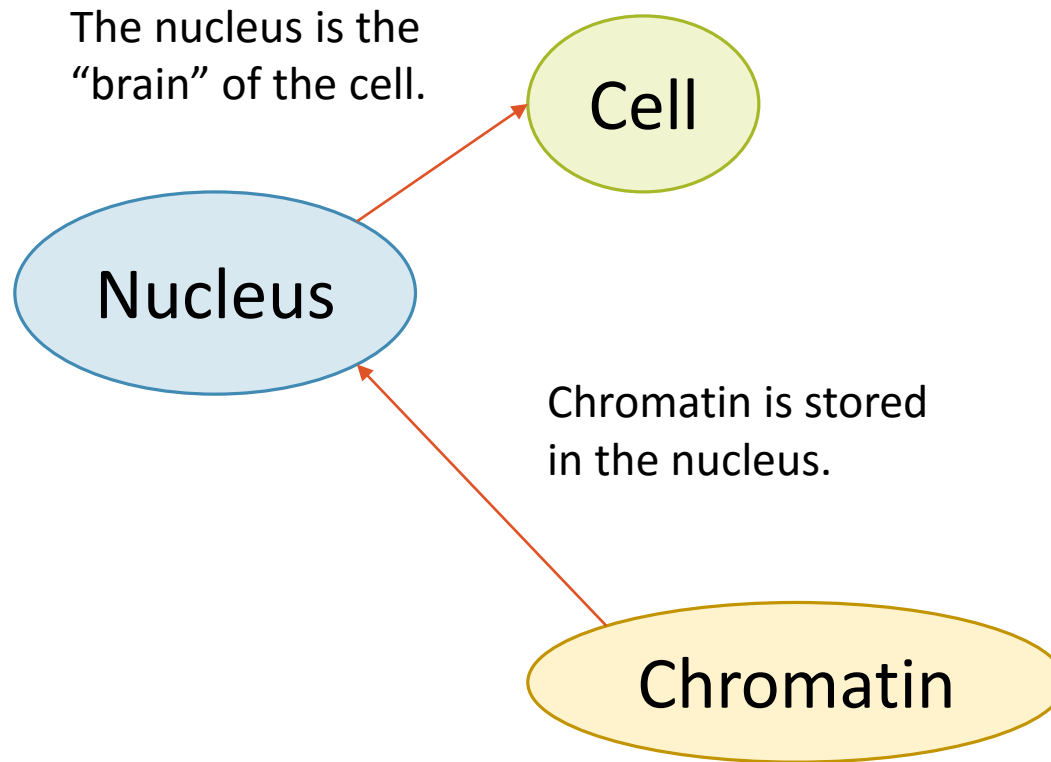
Diploid

Centrioles

Interphase

Mitosis

Example



EXIT TASK

How does interphase prepare a cell to divide?

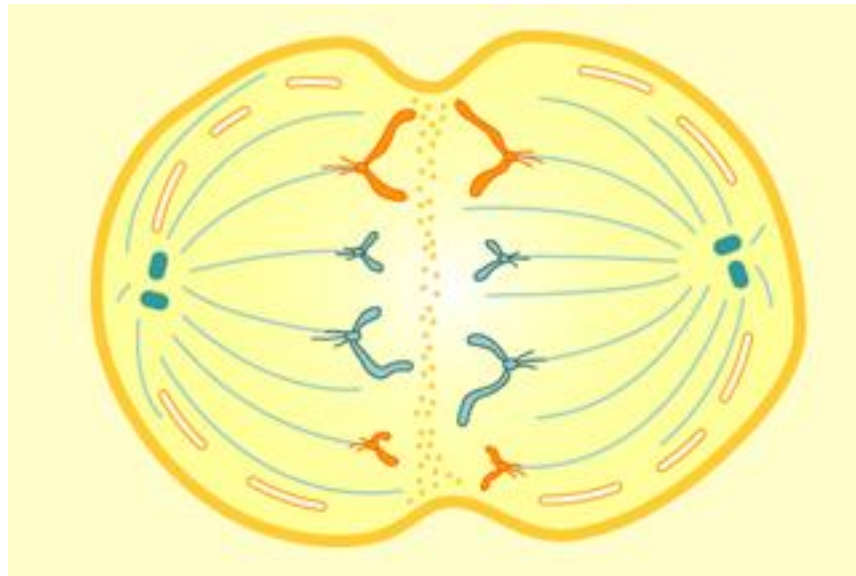
Bell Ringer

Kahoot! Review

Mitosis

The goal: to make copies of **somatic cells** by dividing

↑
(body cells)



Step 1: Prophase

Chromatin begins to condense into chromosomes.

Centrioles move to opposite sides of the cell.

Centrioles produce spindle fibers that cross the cell.

The nuclear membrane begins to dissolve.

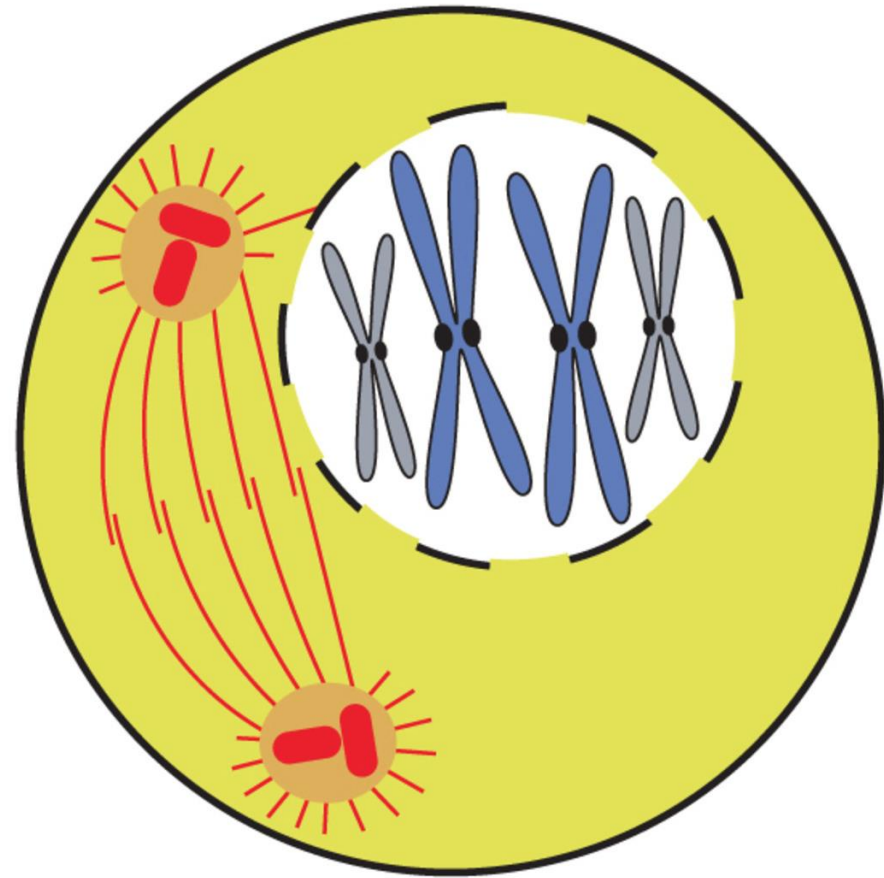
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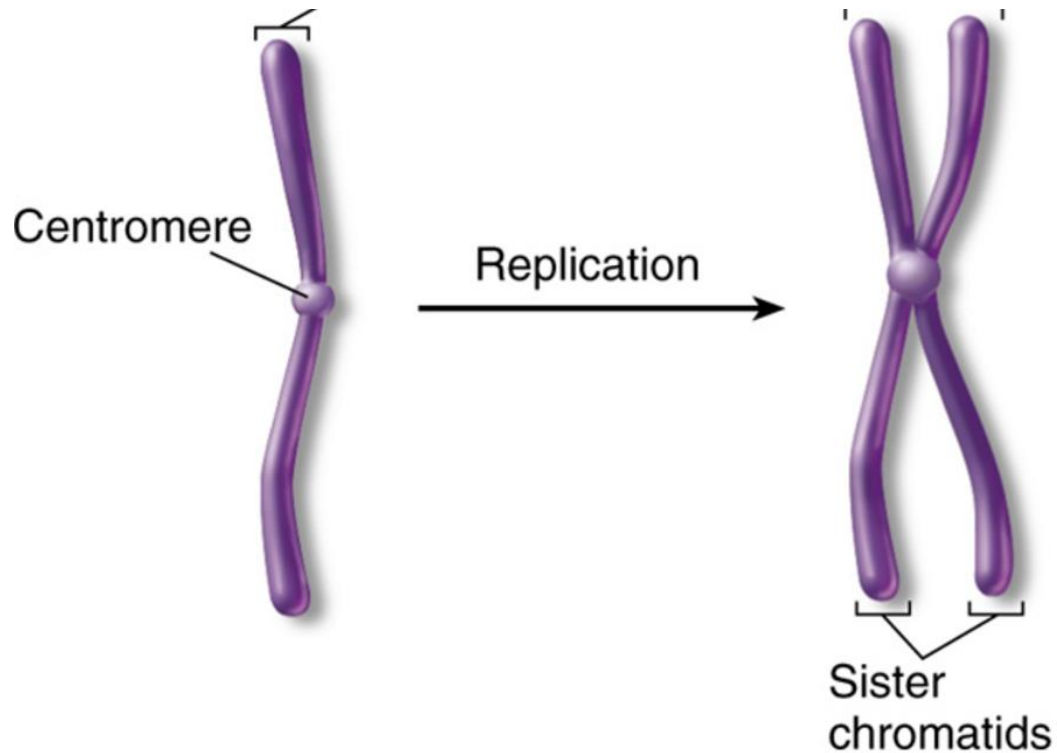
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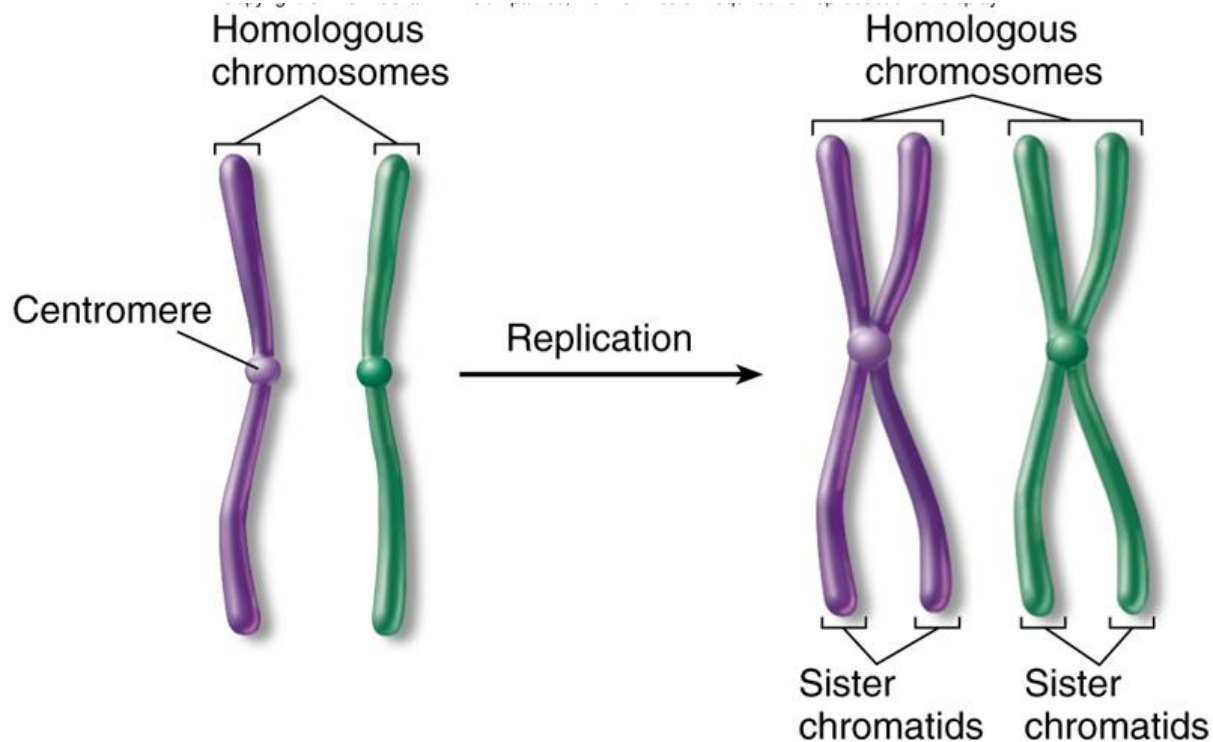
Sister chromatids

Duplicated chromosomes connected at the centromere.



Sister chromatids

Duplicated chromosomes connected at the centromere.



Step 2: Metaphase

The nuclear membrane is dissolved.

Spindle fibers bind to centromeres.

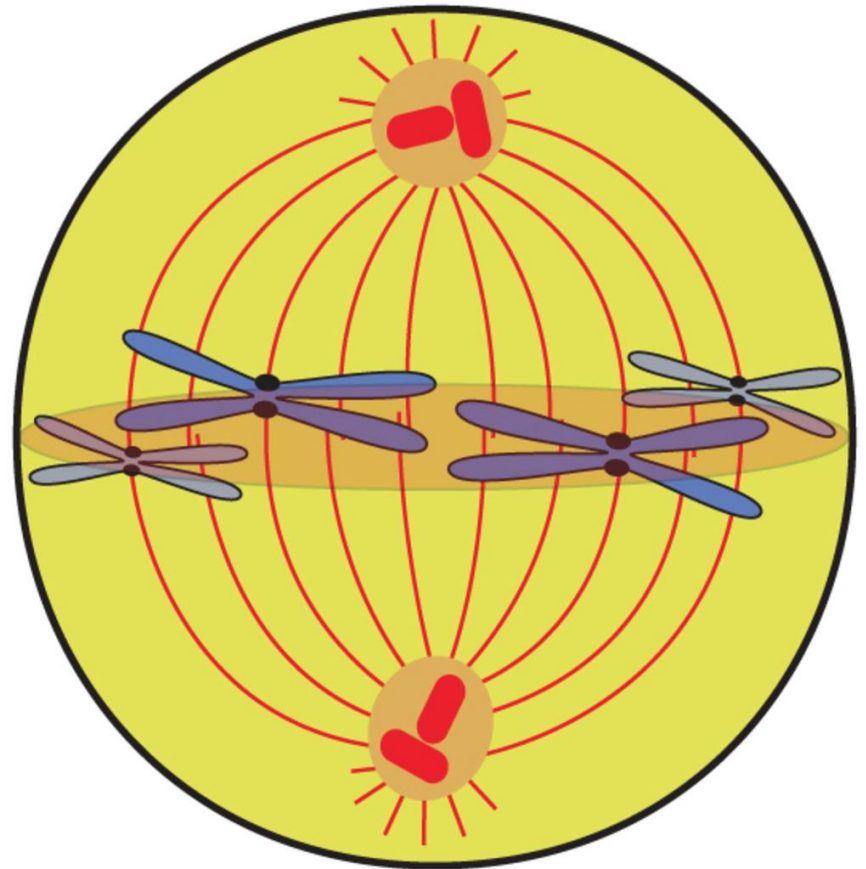
Chromosomes are aligned along the **metaphase plate** (“center line” of the cell)

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Step 3: Anaphase

Sister chromatids are separated at the centromere.

Separated chromatids move toward the centrioles.

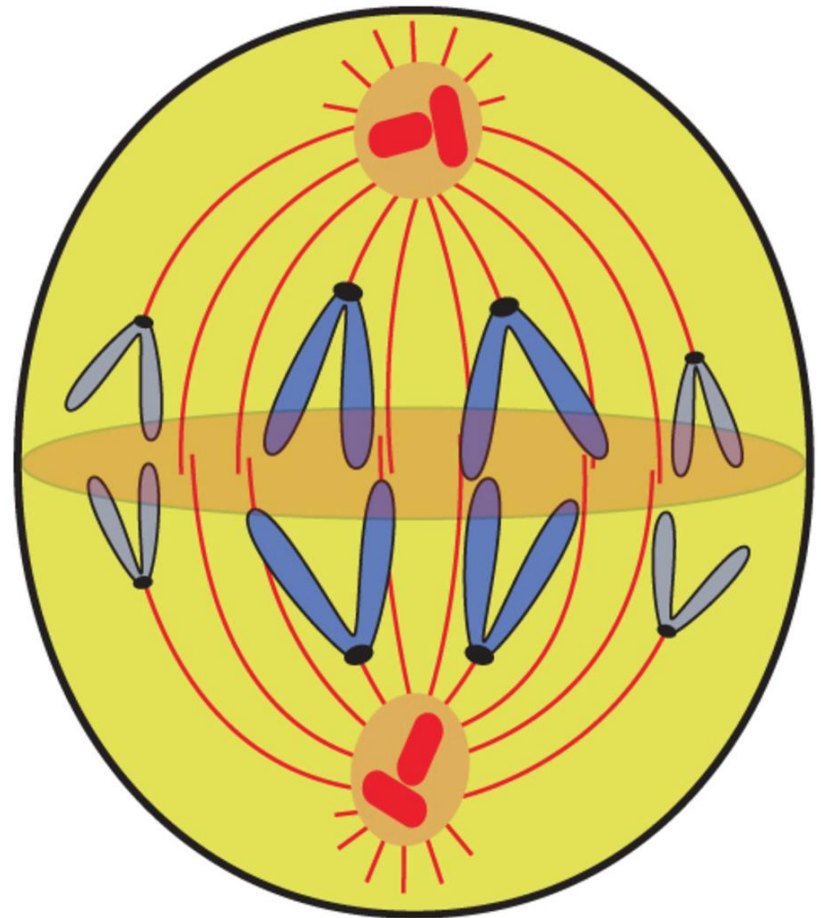
Chromatids “drag” in a characteristic V-shape

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Step 4: Telophase

Chromatids arrive at opposite ends of the cell.

Daughter nuclei membranes reform.

Chromosomes begin to disperse back to chromatin.

Cell may begin to show “pinching”.

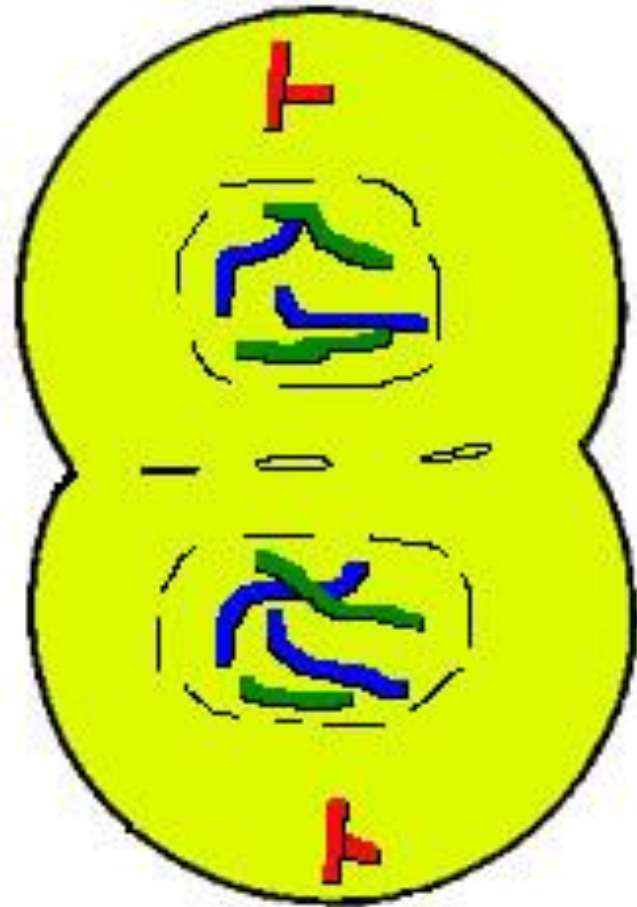
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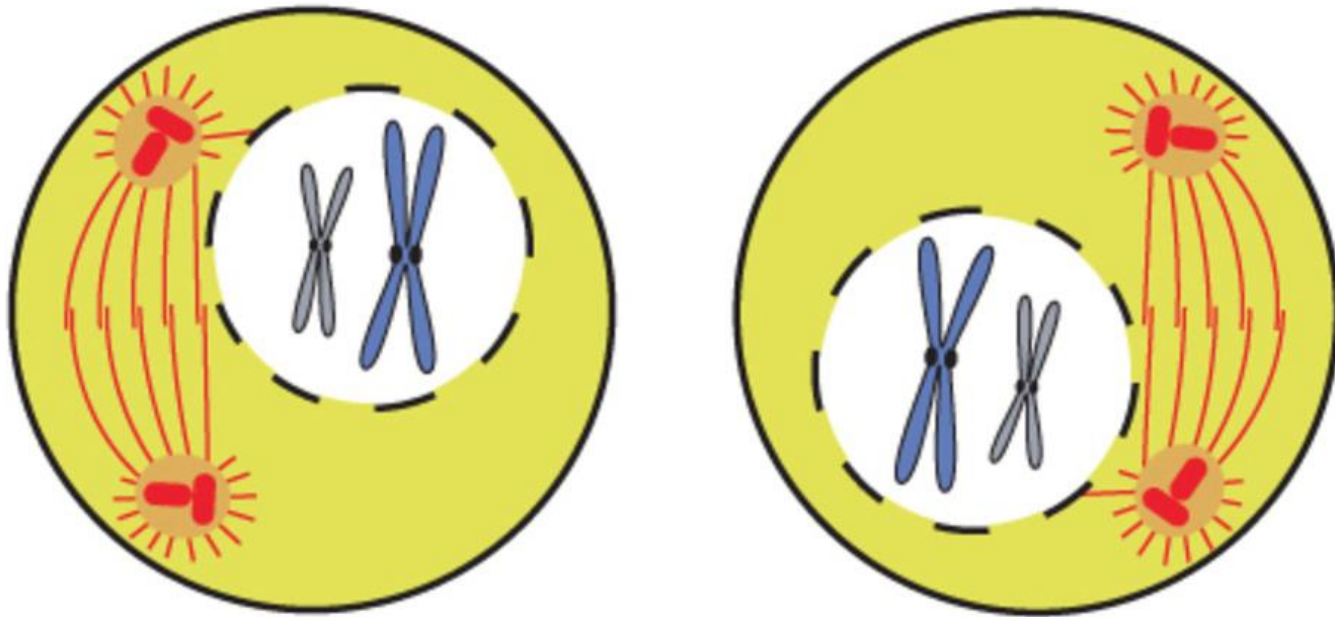
Chromosomes begin to disperse back to chromatin.

Cell may begin to show a furrow.



Cytokinesis

The cell membrane is cleaved in two leaving two identical daughter cells ($2n$).



EXIT TASK

Why is it important that the cell double its chromosome number before dividing?