



CELL CYCLE

How Cells Divide

Catalyst:

Describe what happened **after** the last time you scraped or cut yourself?

How did your wound **heal itself**?

Reflection:

26L

Mitosis Notes

Name: _____
Date: _____ Period: _____

1. What happens to the cells in our bodies when they get old?

Our bodies make _____ all the time.
These new cells _____ cells that have _____ and help us to _____

2. What is the cell cycle?

Cells have a _____ cycle called the _____.

Cells undergo a cell cycle for two reasons:

1. To _____ old and damaged cells
2. For _____ and development.

3. The Cell Cycle

There are _____ main stages of the cell cycle:

1. _____
2. _____
3. _____

4. Review – The Nucleus

It is the _____ inside the nucleus that tells the cell what to do.
The DNA has the _____ that tells the cell what to do.

5. Review – Chromosomes

The DNA inside the cell is organized into _____.

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Red blood cells are being produced in your bones at a rate of 2 to 3 million per second to replace the ones that wear out.

Cell division occurs at least 10 million times every second in an adult human body.

About 1 trillion
mitoses occur in
an adult human
every 24 hours.

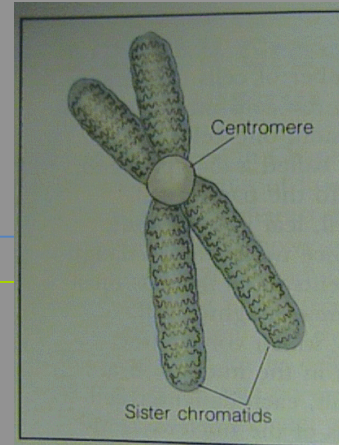
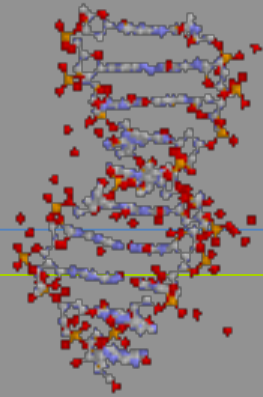
Cell cycle

The life cycle of a cell

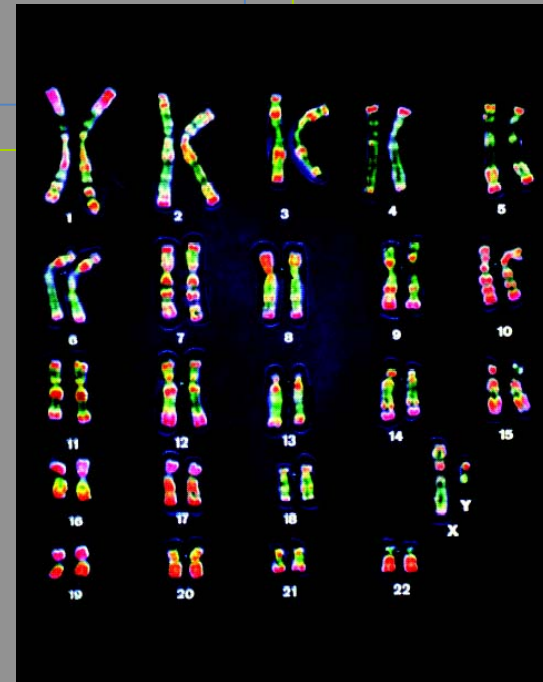
Begins when the cell is formed

**Ends when the cell divides and
forms
new cells**

A cell's DNA is organized into chromosomes



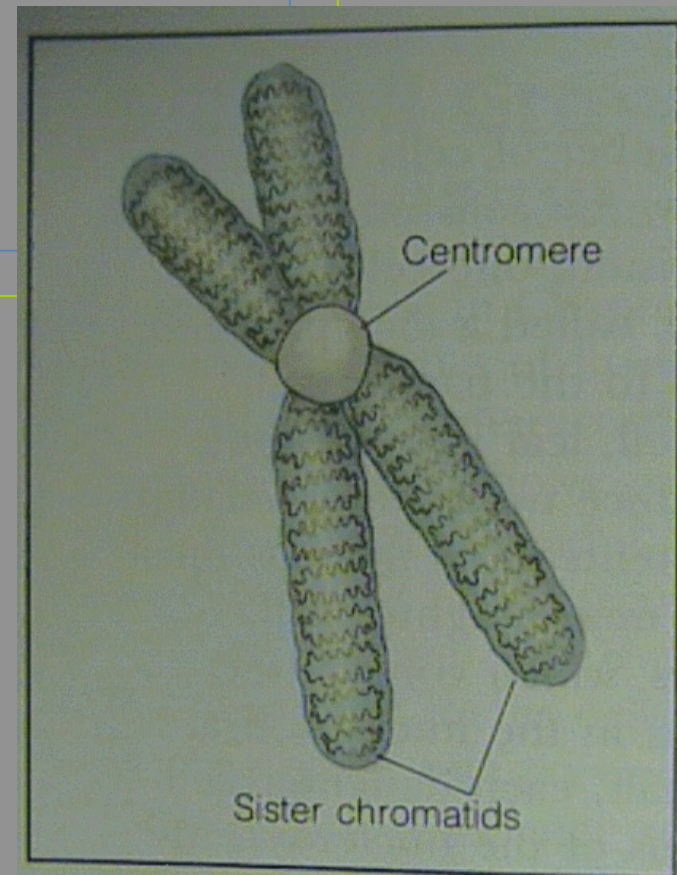
- Human cells have 46 chromosomes, organized into 23 pairs of “homologous chromosomes”
 - Homologous chromosomes = chromosomes with matching information



During the cell cycle, the chromosomes get copied

Once a chromosome has an identical copy of itself, the two copies are called chromatids

- The 'sister chromatids' are held together at the centromere:



How do cells make more cells?

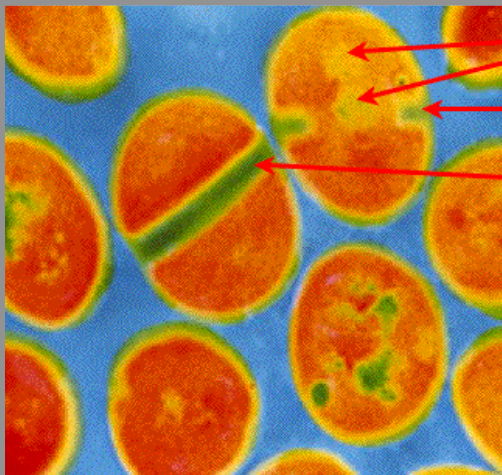
Prokaryotic cells (bacteria)

Binary fission

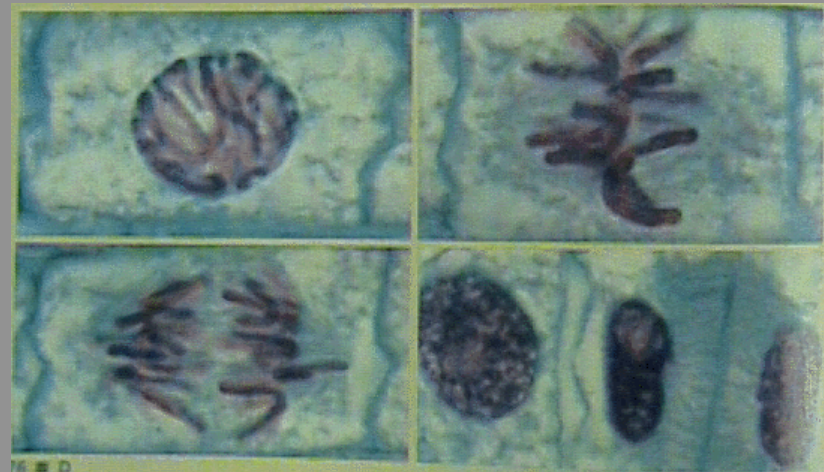
'splitting into 2 parts'

Eukaryotic cells

- Mitosis
 - Process of chromosome separation



<http://www.nature.com/news/2002/020722/full/020722-11.html>

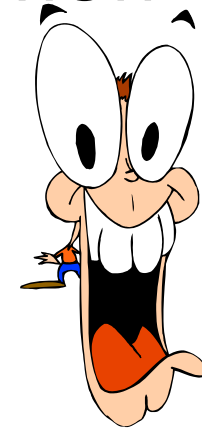


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when they get old?

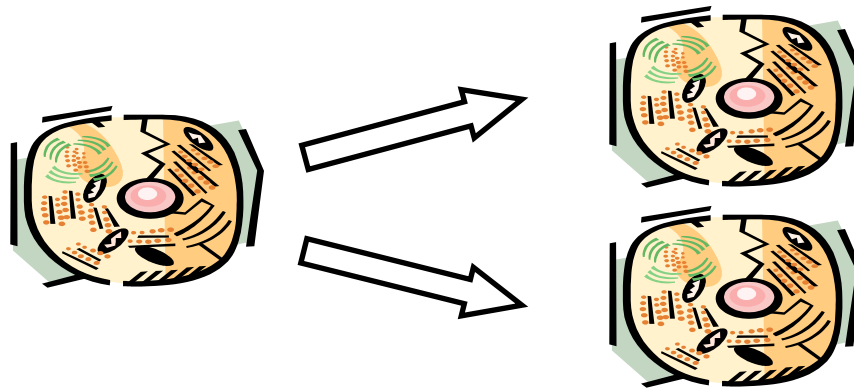
- Our bodies make new cells all the time.
- These new cells replace cells that have died and help us to grow.

In these few seconds, your body probably just made millions of new cells!



What is the cell cycle?

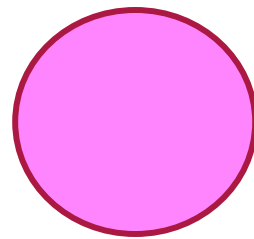
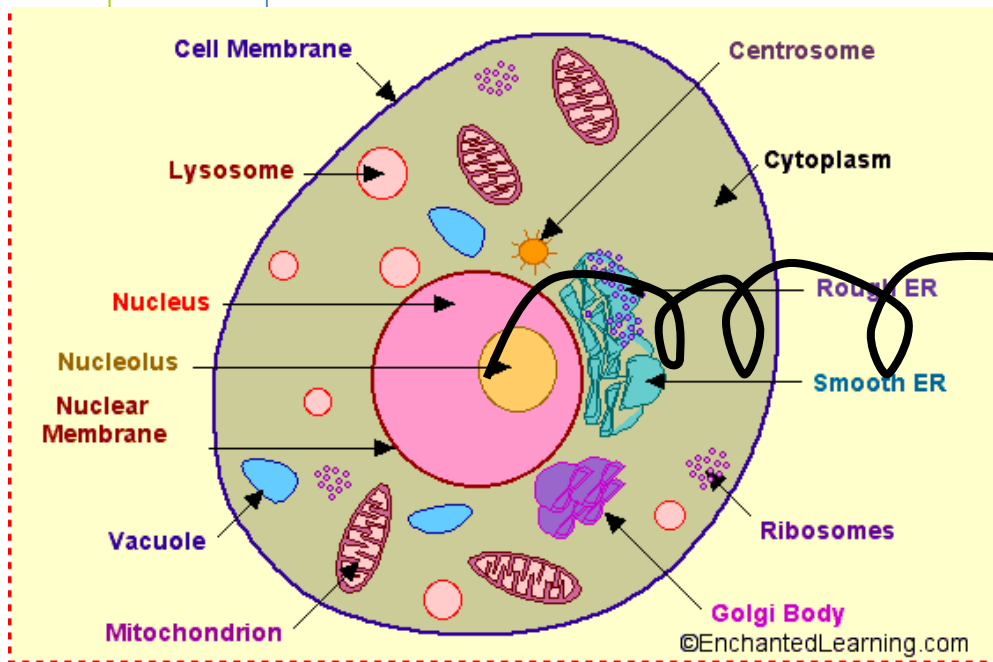
- Cells have a life cycle called the cell cycle.
- Cells undergo a cell cycle for two reasons:
 1. To replace old and damaged cells.
 2. For growth and development.



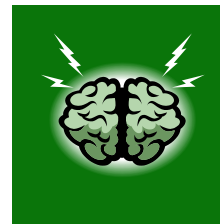
The Cell Cycle

- There are three main stages of the cell cycle:
 1. Interphase
 2. Mitosis (PMAT)
 3. Cytokinesis

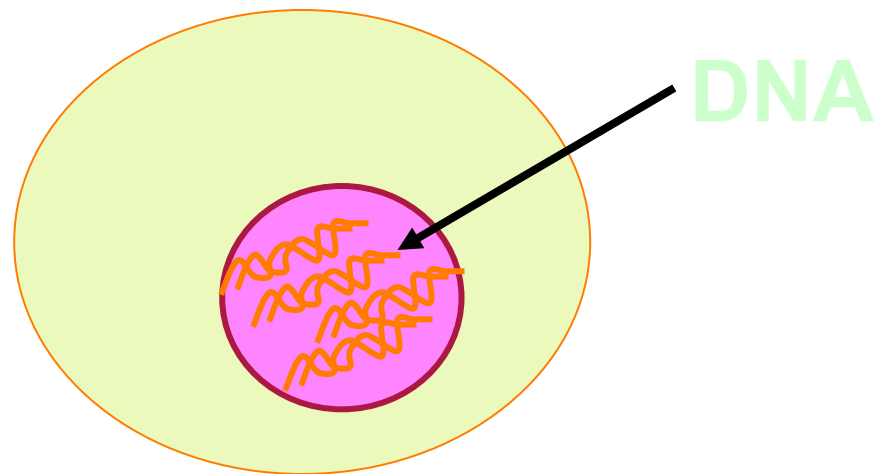
Which part is the nucleus?



What does it do again?

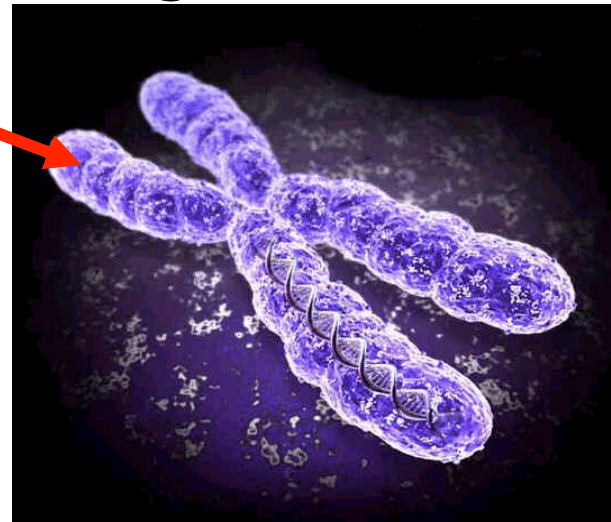


- It is the **DNA** inside the nucleus that tells the cell what to do.
- The DNA inside the nucleus has the **information** that tells the cell what to do.

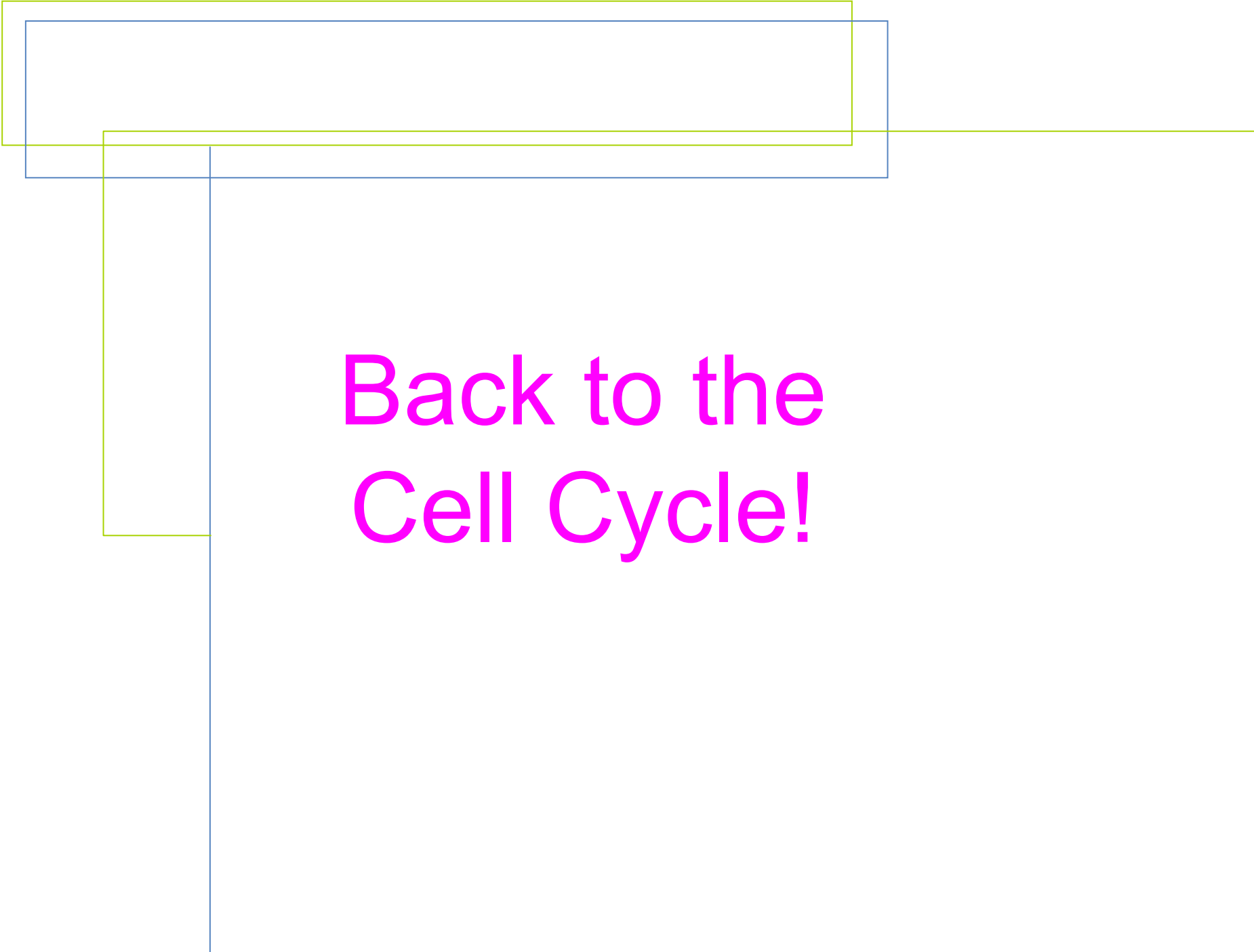


Chromosomes

- The DNA inside the cell is organized into chromosomes.

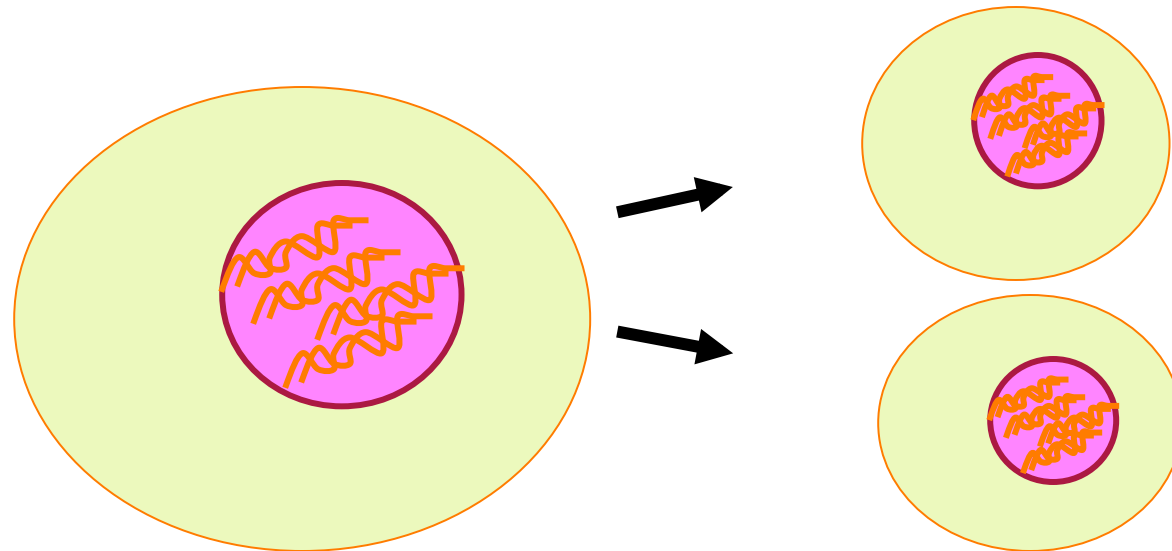


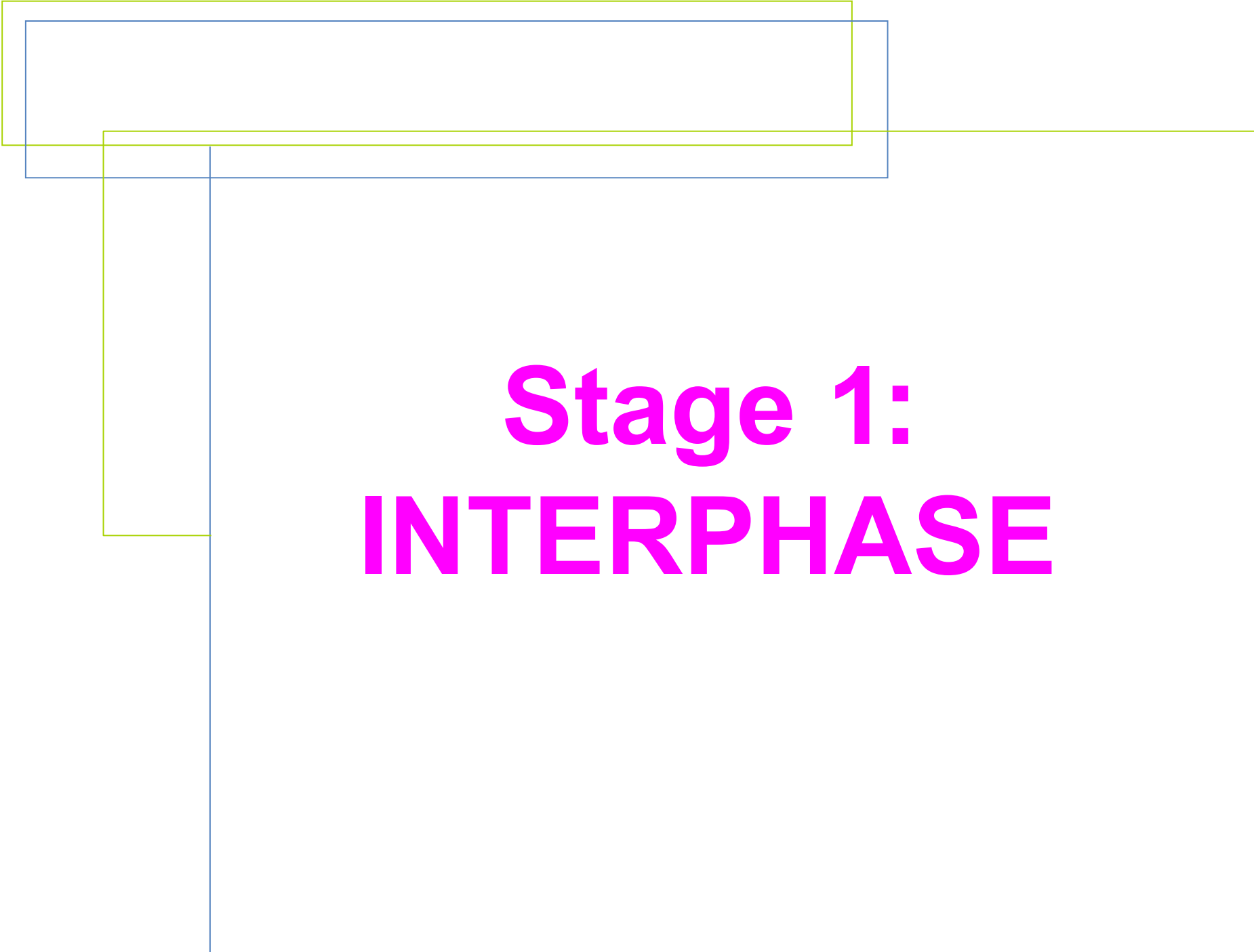
- Since the DNA contains all the important information, it is very important that the cell makes copies of the DNA every time new cells are made!



**Back to the
Cell Cycle!**

- **Mitosis** is the process by which cells divide and each new cell receives a copy of the chromosomes.
- In Mitosis, two new daughter cells are made that are identical to the original cell.

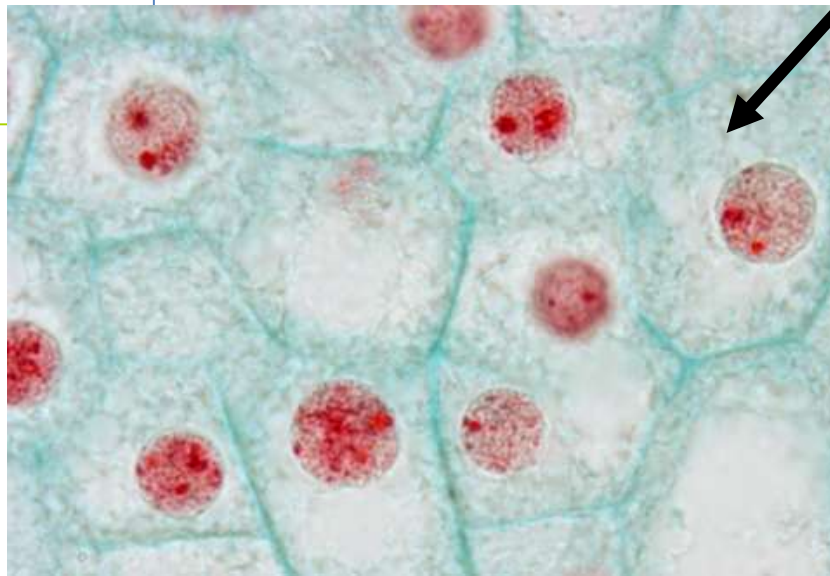




Stage 1: **INTERPHASE**

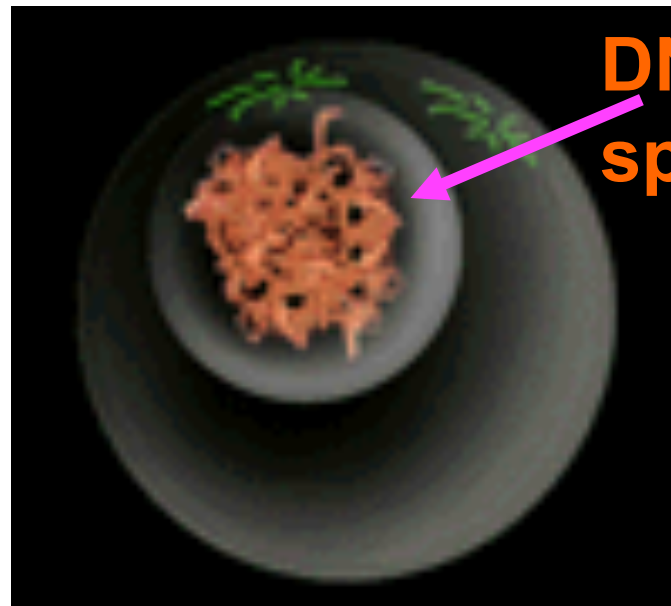
1. Interphase

- The phase of a cell cycle when a cell is preparing to reproduce is called interphase.



During interphase:

- The cell grows
- The chromosomes (DNA) are copied
- Other cell materials (organelles) are copied



**DNA looks like
spaghetti noodles**

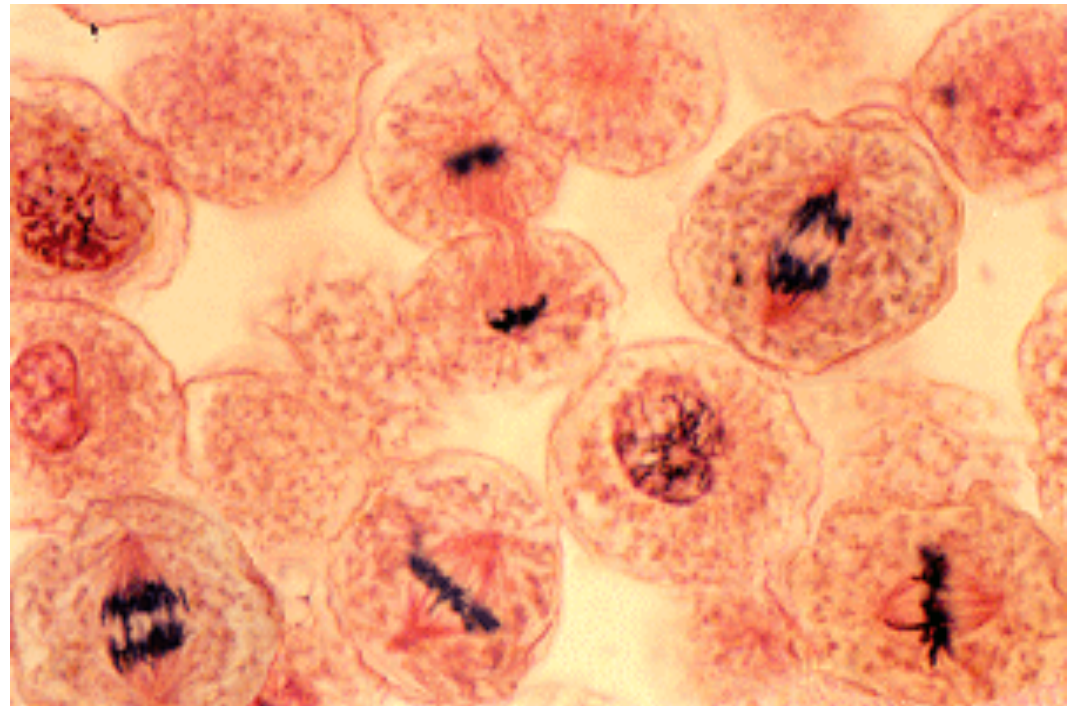


Stage 2: Mitosis

The Phases

There are 4 stages of Mitosis:

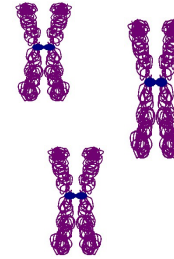
1. Prophase
2. Metaphase
3. Anaphase
4. Telophase





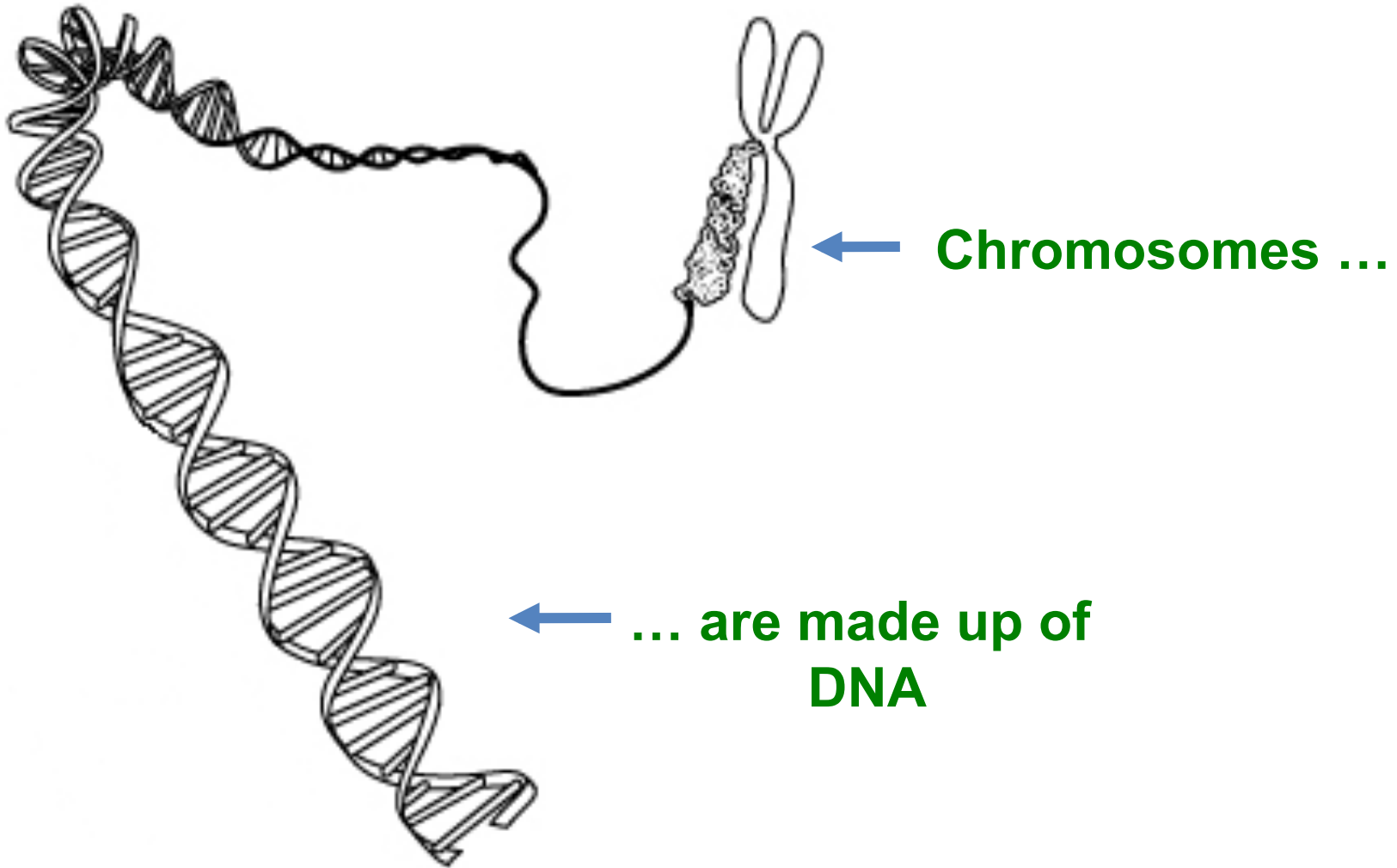
Phase 1 of Mitosis: **PROPHASE**

A. Prophase



During prophase, the DNA becomes tightly coiled into chromosomes and the nuclear membrane around it breaks apart.

Don't Forget!

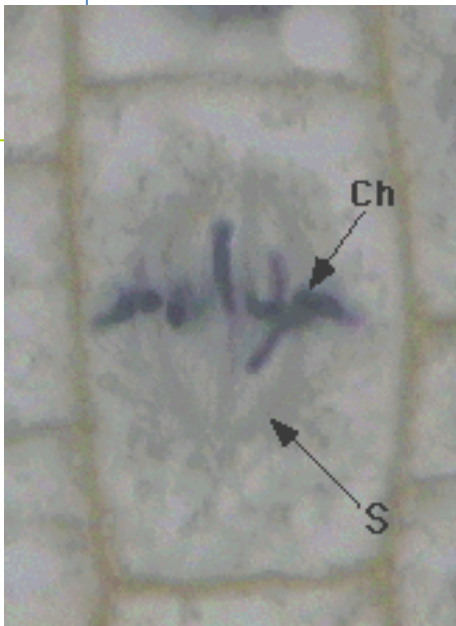




Phase 2 of Mitosis: **MetaPHASE**

B. Metaphase

- The chromosomes line up at the center (equator) of the cell.

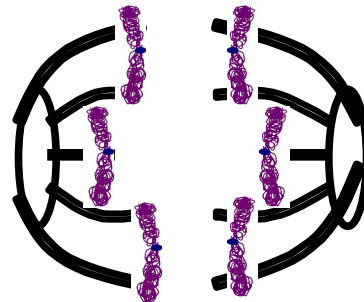




Phase 3 of Mitosis: **AnaPHASE**

C. Anaphase

- In the **third** phase of mitosis the chromosomes begin to separate.





Phase 4 of Mitosis: **TeLoPHASE**

D. Telophase

At this point,
mitosis is over!!

1. A new nuclear membrane forms around the 2 new sets of chromosomes.
2. The cell membrane starts to pinch.



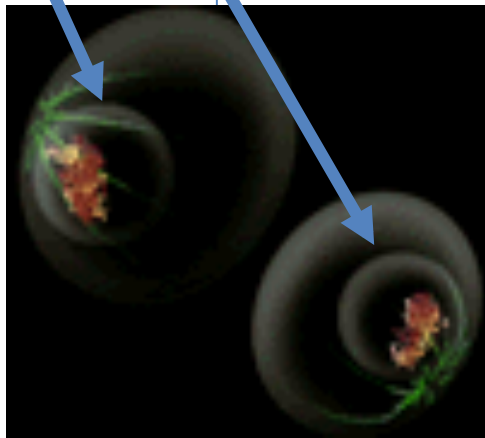


Stage 3: Cytokinesis

Cytokinesis

- The final phase of mitosis is when the cell membrane pinches all the way and the cytoplasm divides to form two identical daughter cells.

2 new daughter cells!



Cell Cycle Notes 9/29/14

Catalyst:

Describe what happened **after** the last time you scraped or cut yourself?

How did your wound **heal itself**?

Reflection:

How do cells make more cells? Explain the process in your own words.

Mitosis Notes

Name: _____
Date: _____ Period: _____

1. What happens to the cells in our bodies when they get old?

Our bodies make _____ all the time.
These new cells _____ cells that have _____ and help us to _____

2. What is the cell cycle?

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3. The Cell Cycle

There are _____ main stages of the cell cycle:

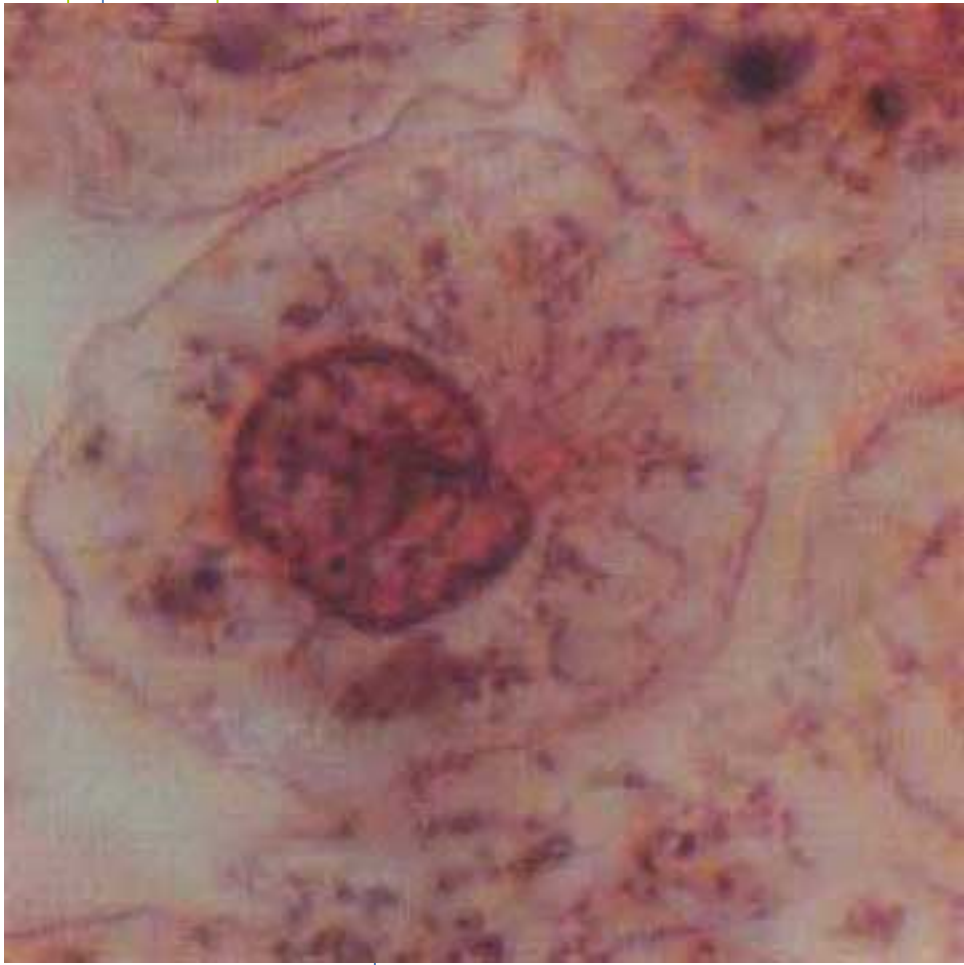
1. _____
2. _____
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4. Review – The Nucleus

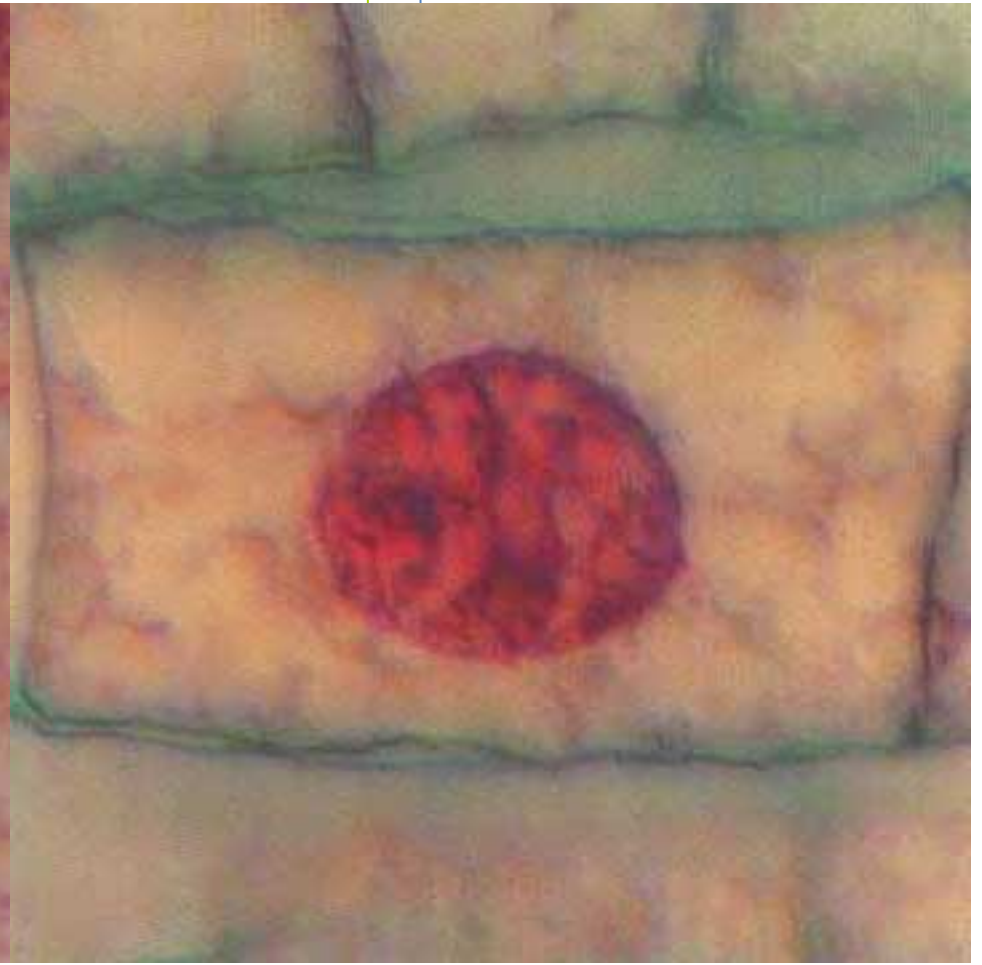
It is the _____ inside the nucleus that tells the cell what to do.
The DNA has the _____ that tells the cell what to do.

5. Review – Chromosomes

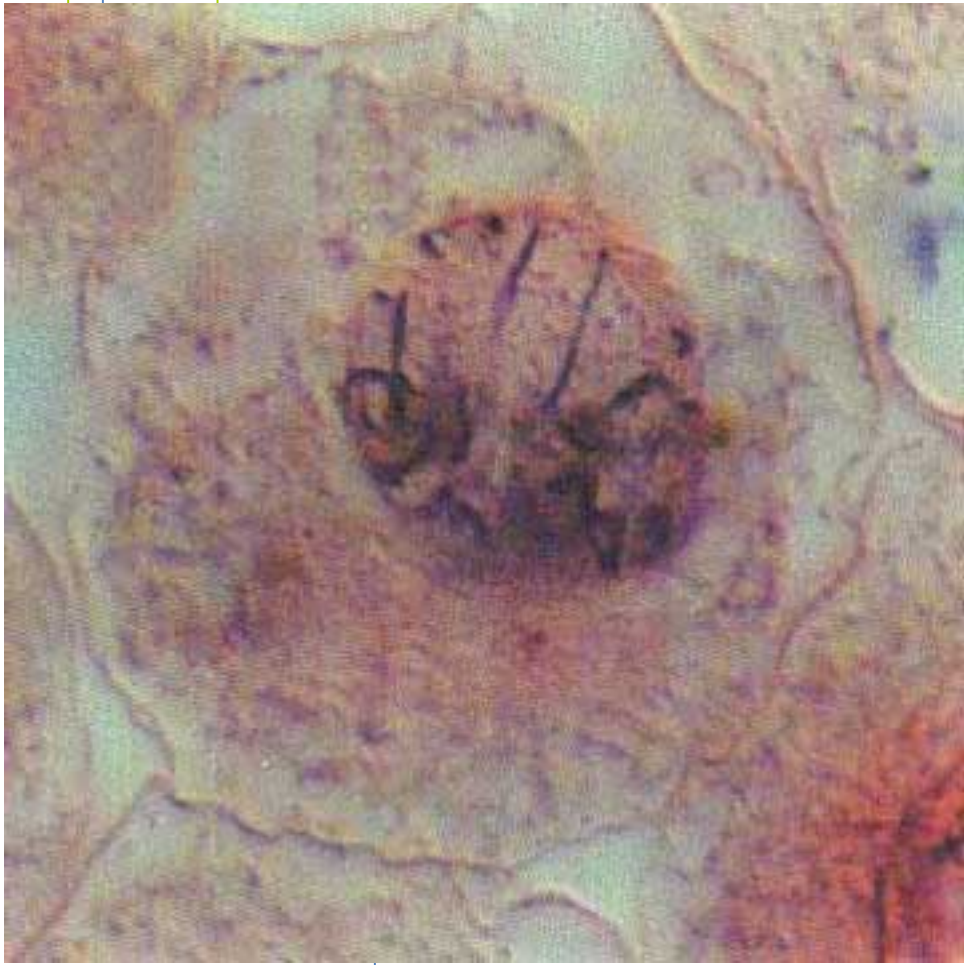
The DNA inside the cell is organized into _____.



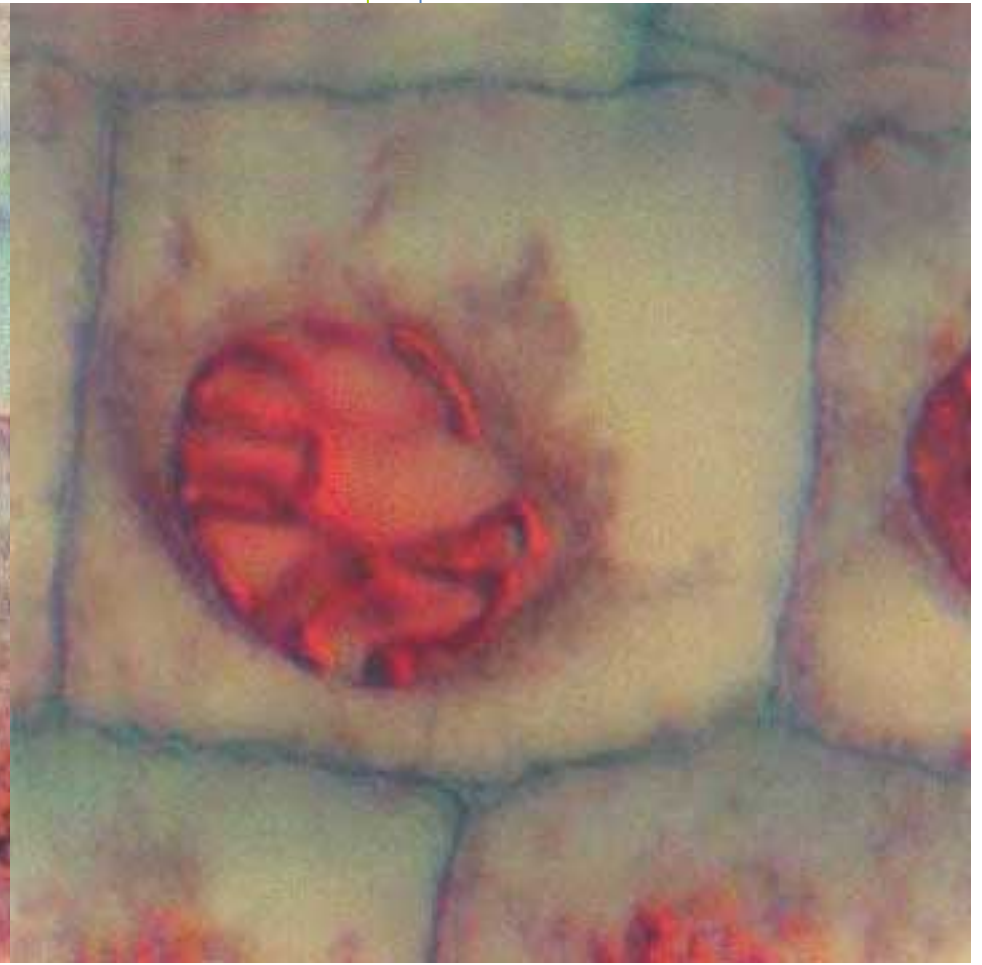
Animal



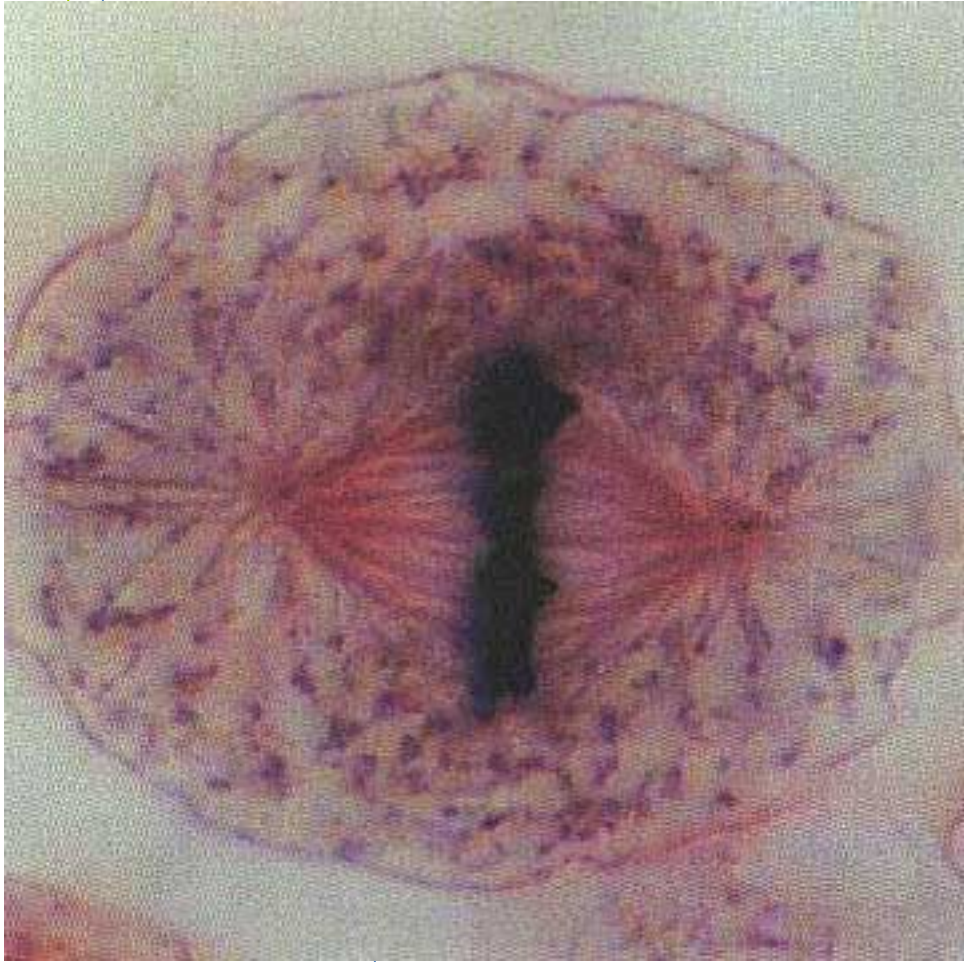
Plant



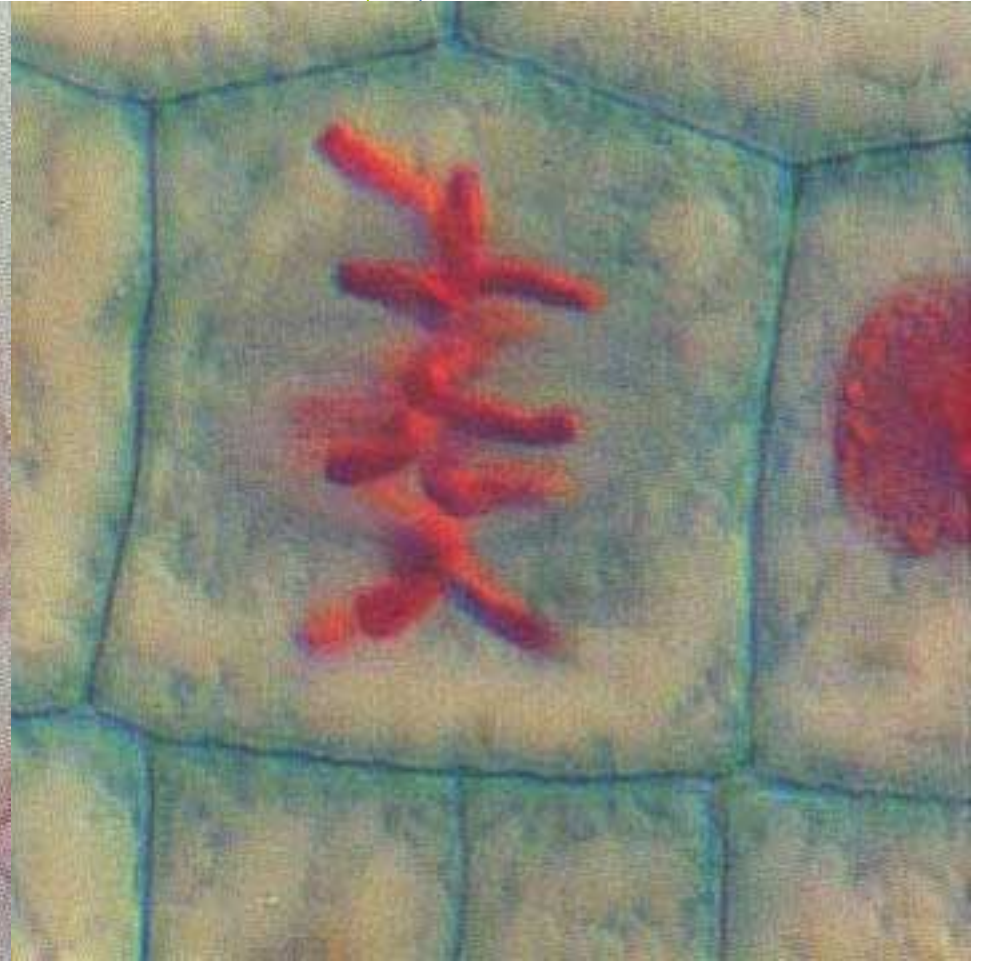
Animal



Plant



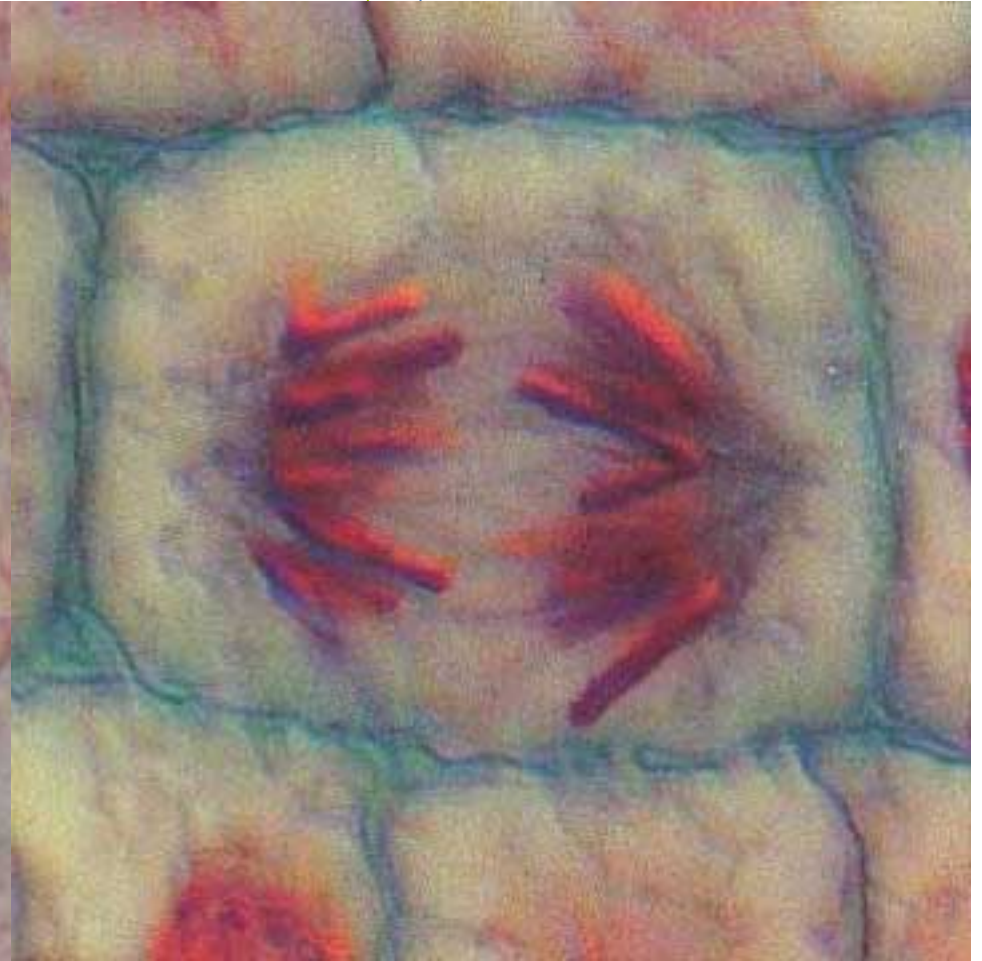
Animal



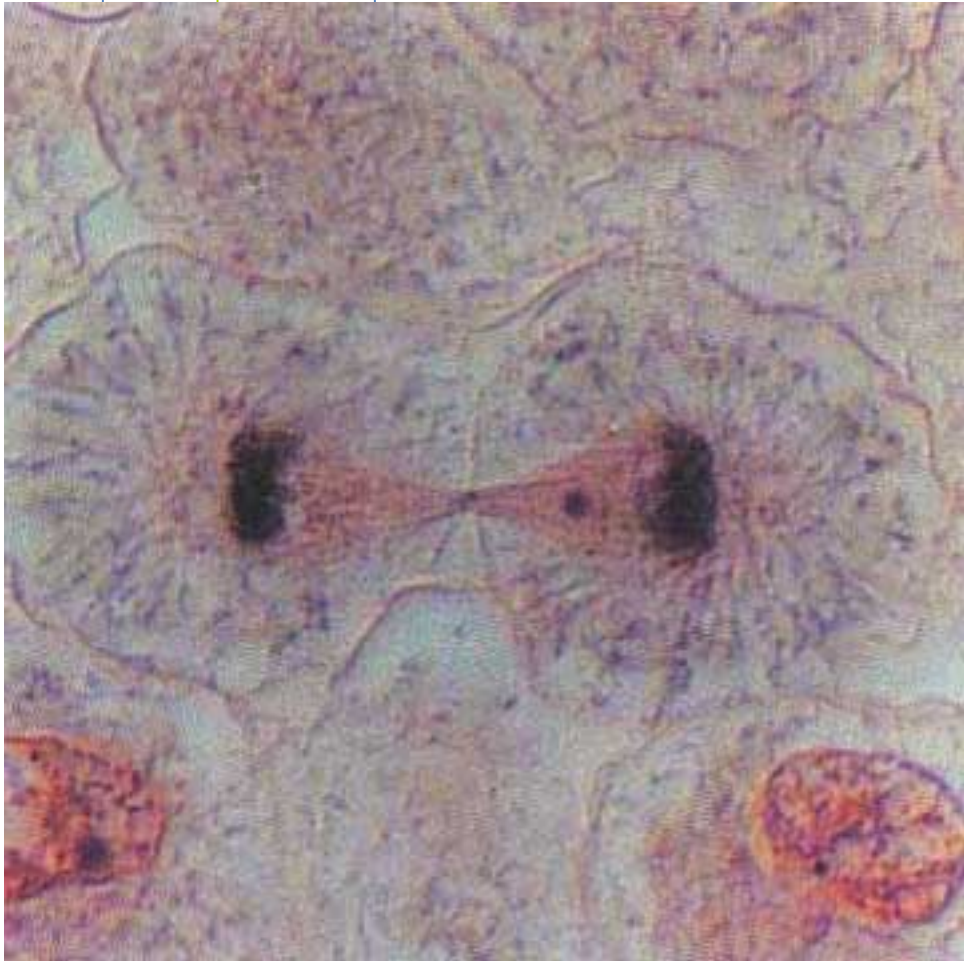
Plant



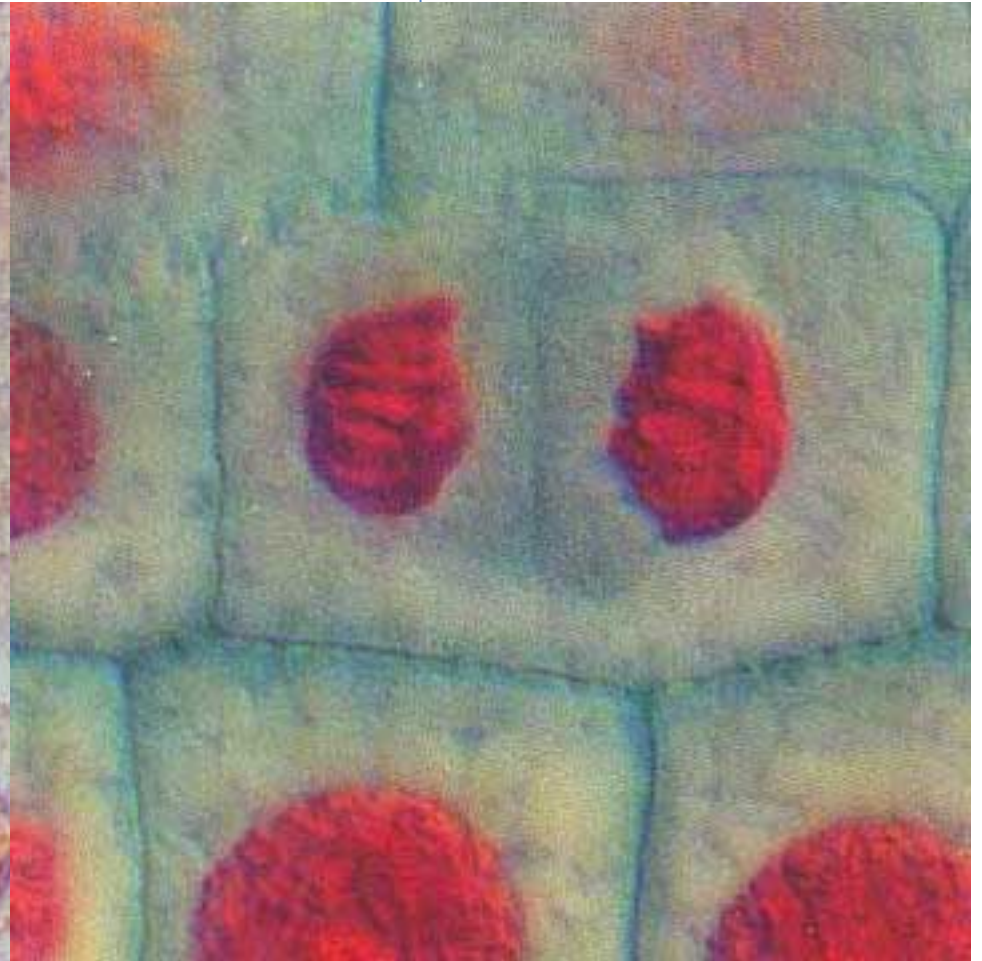
Animal



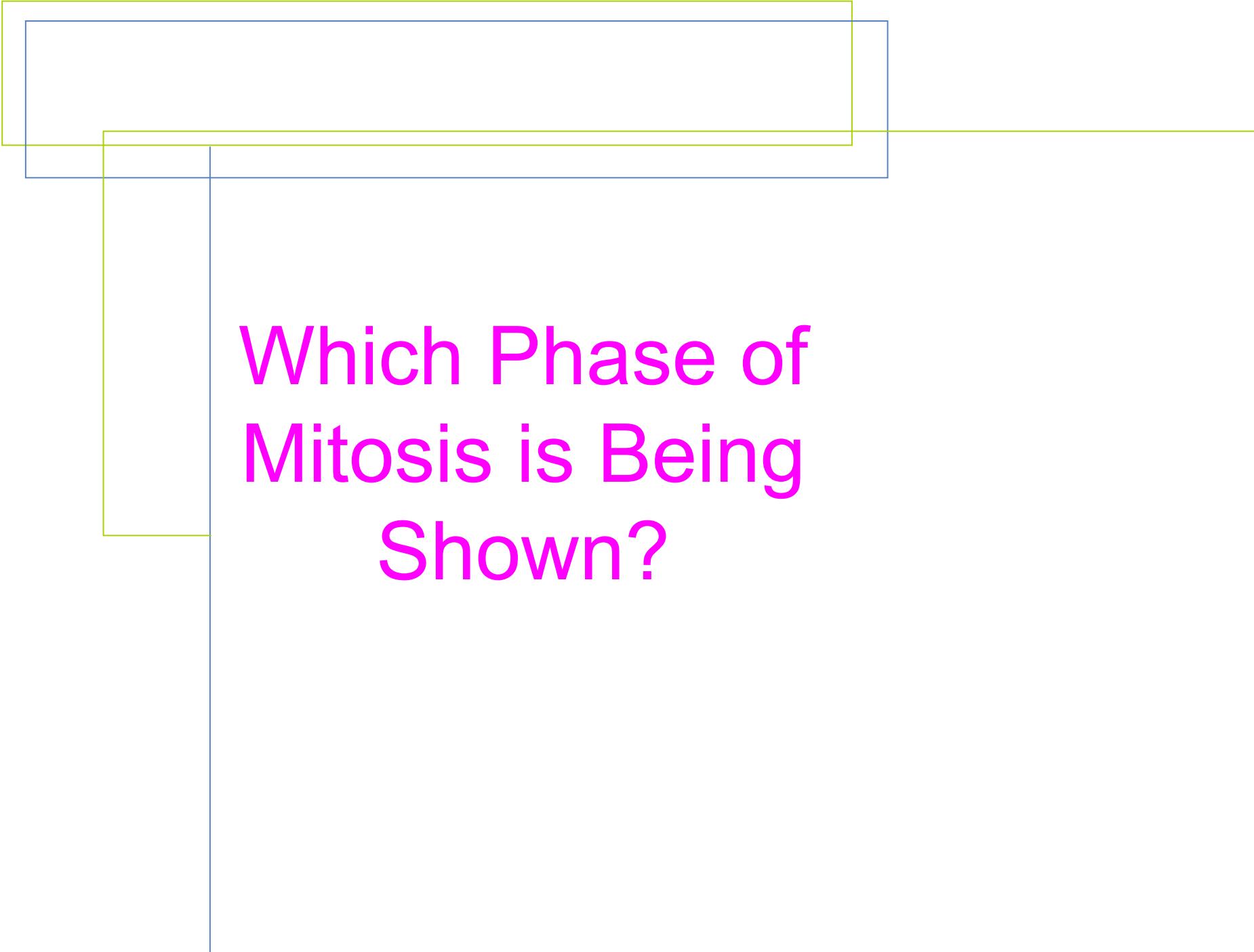
Plant



Animal

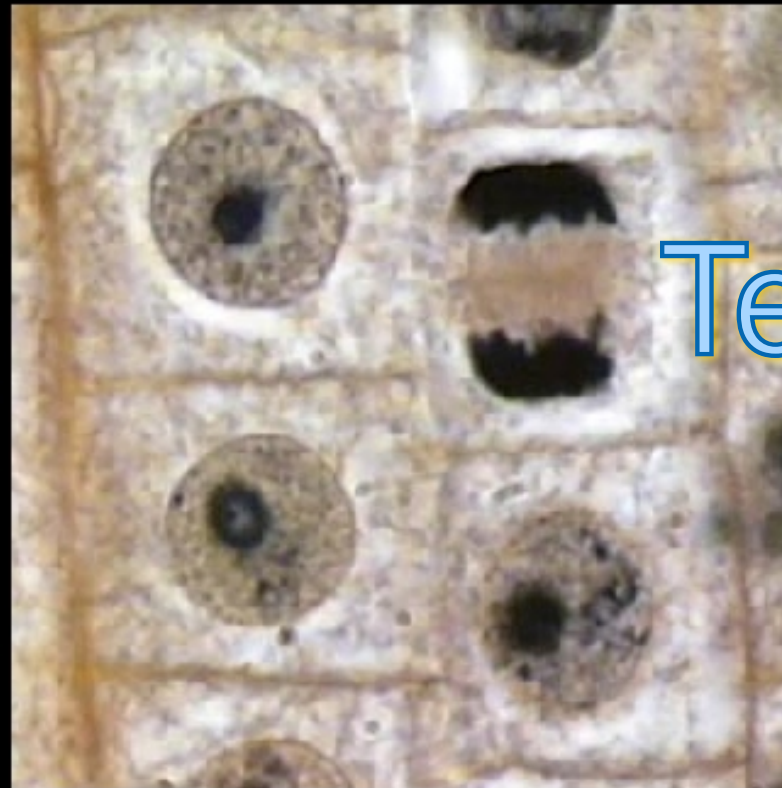


Plant



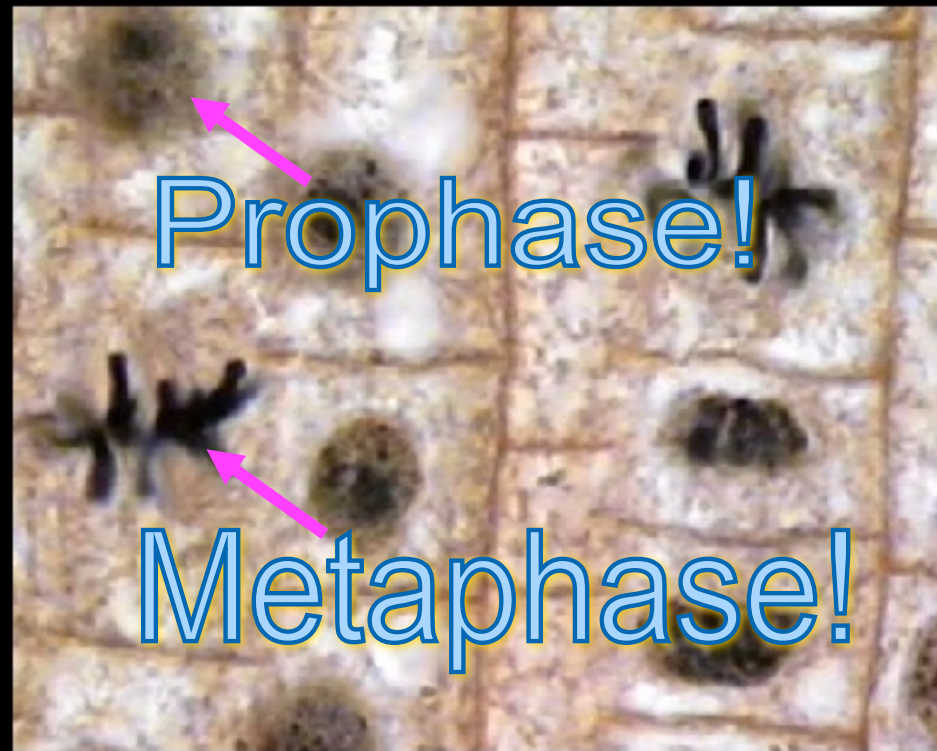
Which Phase of
Mitosis is Being
Shown?

Mitosis. I. Describe the phases of mitosis shown here.



Telophase!

Mitosis II. Describe the phases of mitosis shown here.

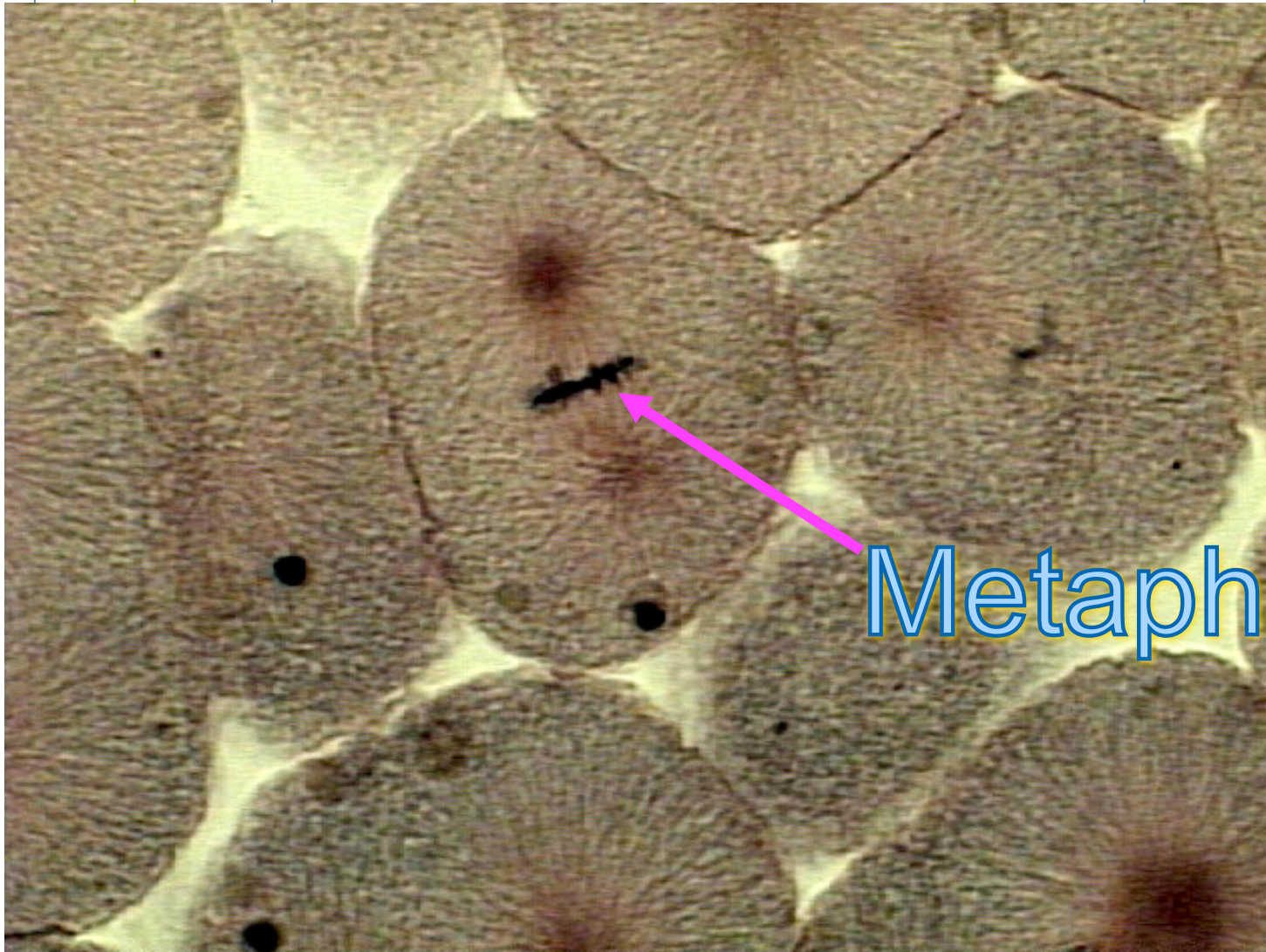


Which Stage of Mitosis is Shown Below?



Cytokinesis!

Which Stage of Mitosis is Shown Below?



Metaphase!

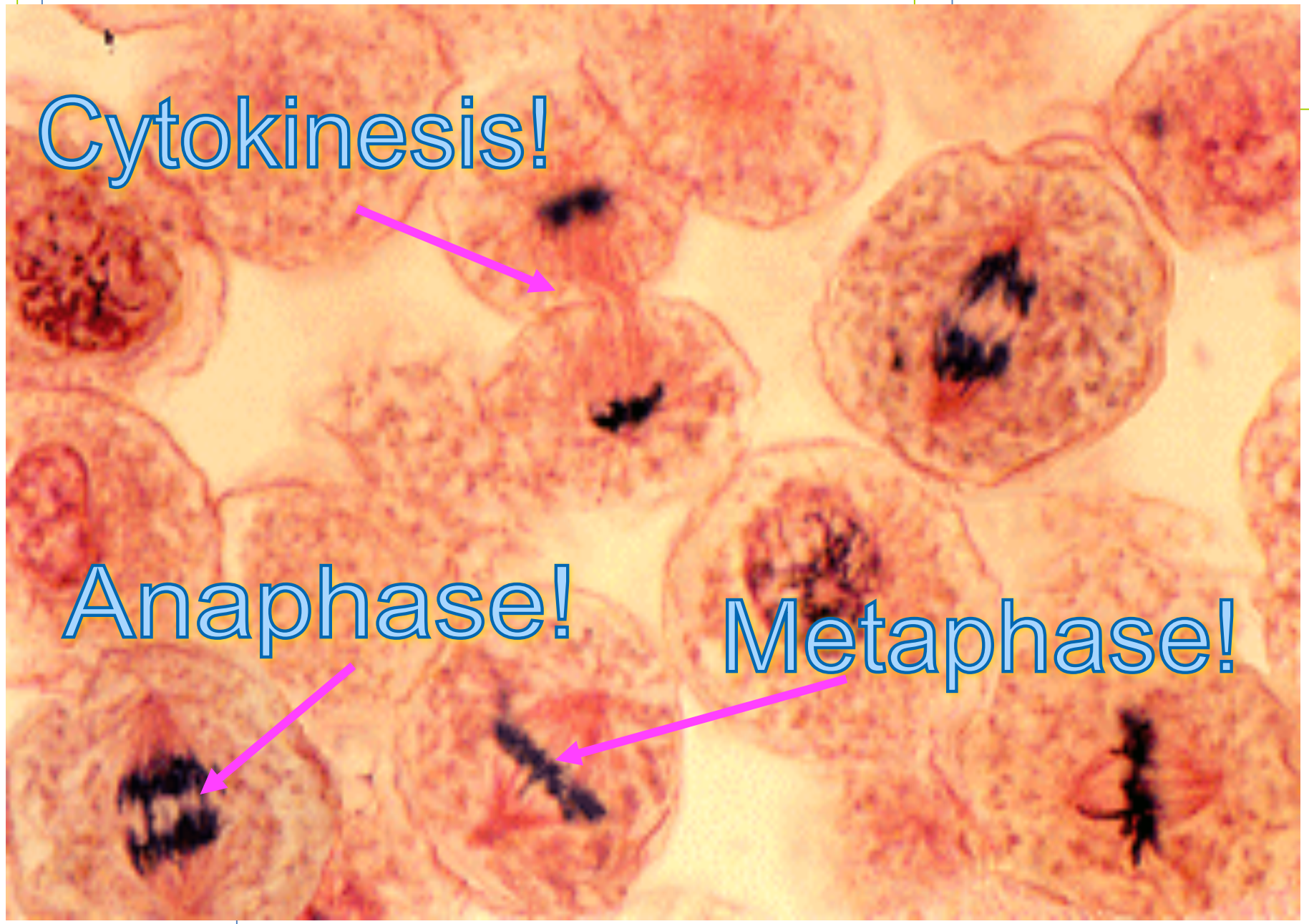
Cytokinesis!



Anaphase!



Metaphase!





Review Questions



1. What are the four phases of mitosis?

Prophase

Metaphase

Anaphase

Telophase

1. Interphase is the phase before mitosis when the cell prepares for cell division.

3. Mitosis makes 2 new cells that are (circle one: same or different) from the original cell.
4. These 2 cells have the same *information* as the original cell because they have copies of the same DNA.



5. Put these words in the correct order:

mitosis, cytokinesis, interphase

Interphase, mitosis, cytokinesis

6. Every cell in your body has the (circle one: same / different) DNA.

7. Why is DNA copied during interphase?

During interphase the cell is getting ready for mitosis. The DNA has to be doubled before the cell can split apart.