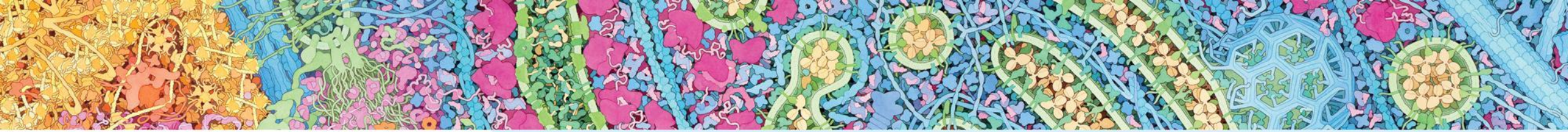


3d molecular designs
Transforming Science Learning

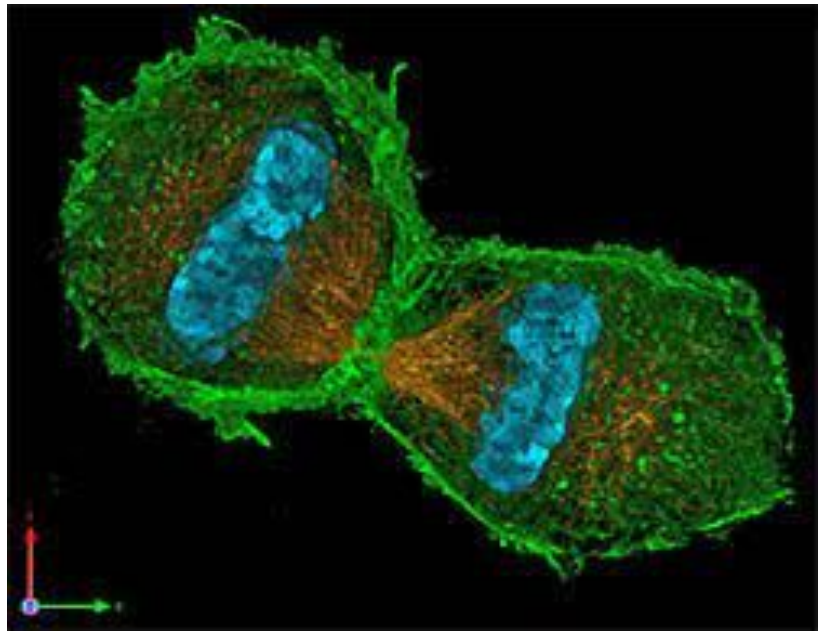
Mitosis and Meiosis
What's the difference?

And why does it matter?

Why do we teach cell division?

Why do cells divide?

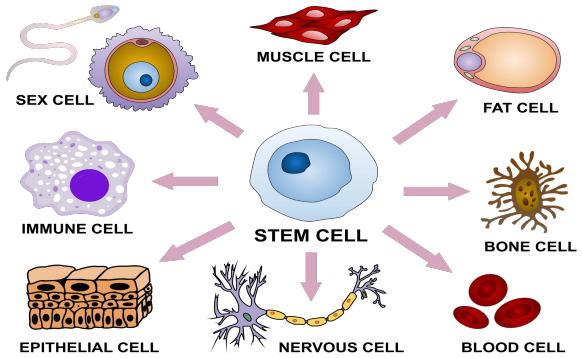
What are the types of cell division?



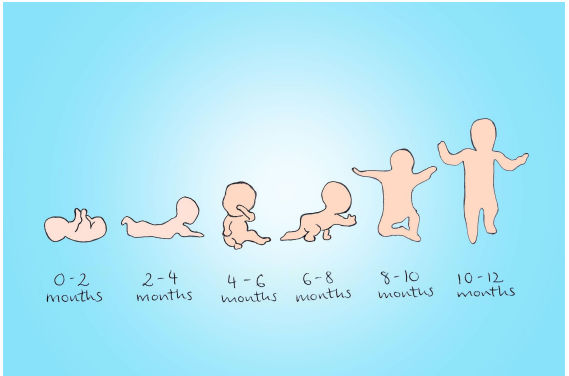
Why do cells divide?

Cellular repair

Differentiation



Growth



Misconception Alert!

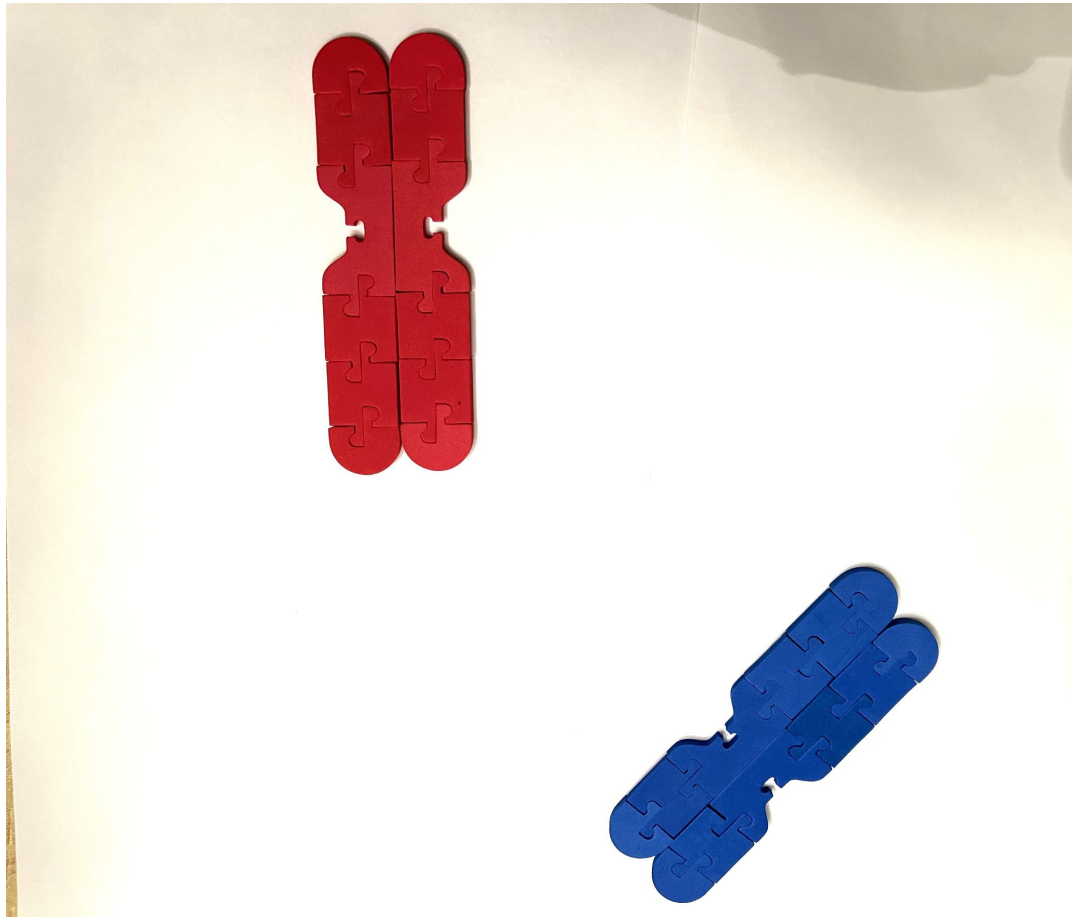
Mitosis is NOT cell division.

It is nuclear division

Let's Model Mitosis

Prophase

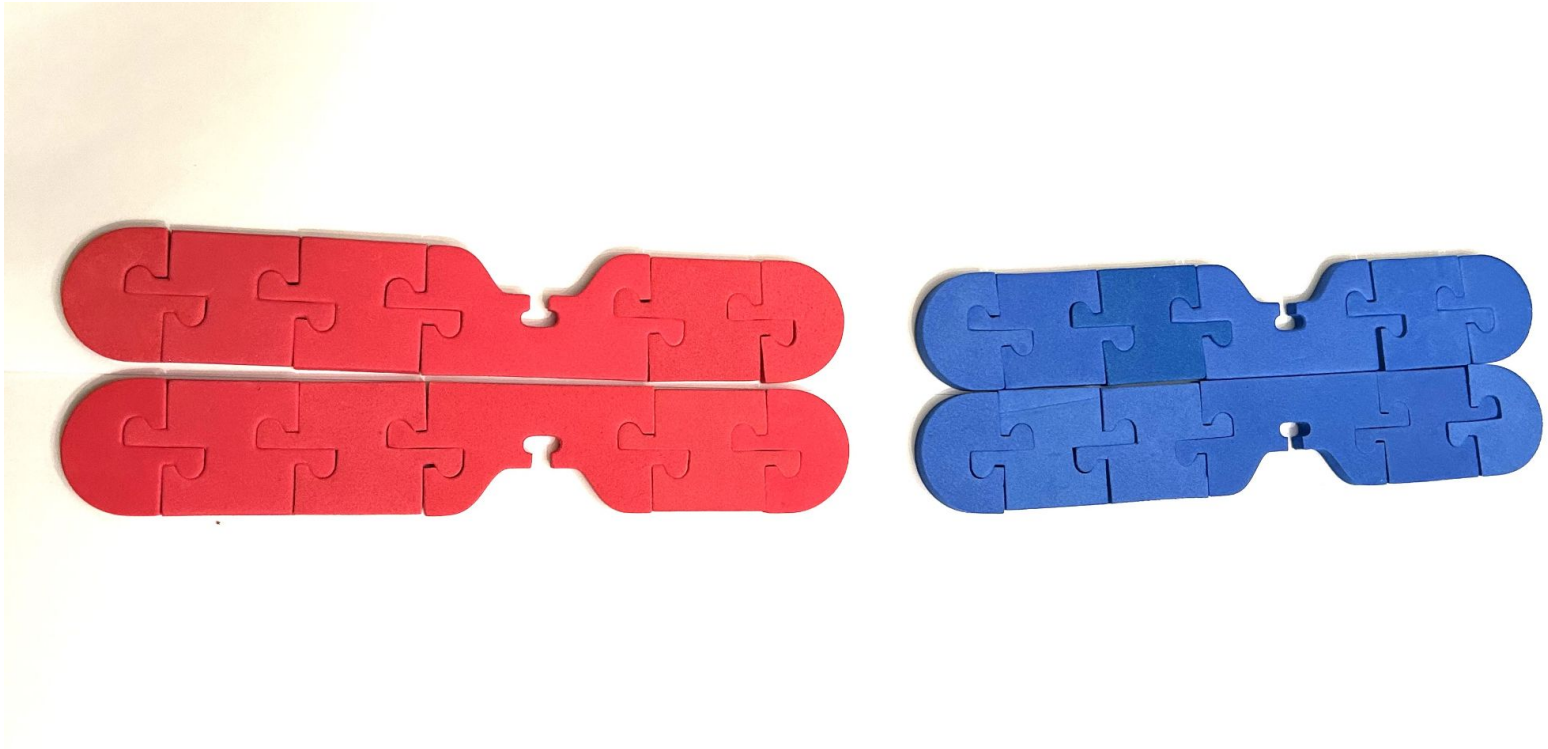
- **Chromosomes condense**
- **The nuclear membrane breaks down**
- **The mitotic spindle forms**



Let's Model Mitosis

Metaphase

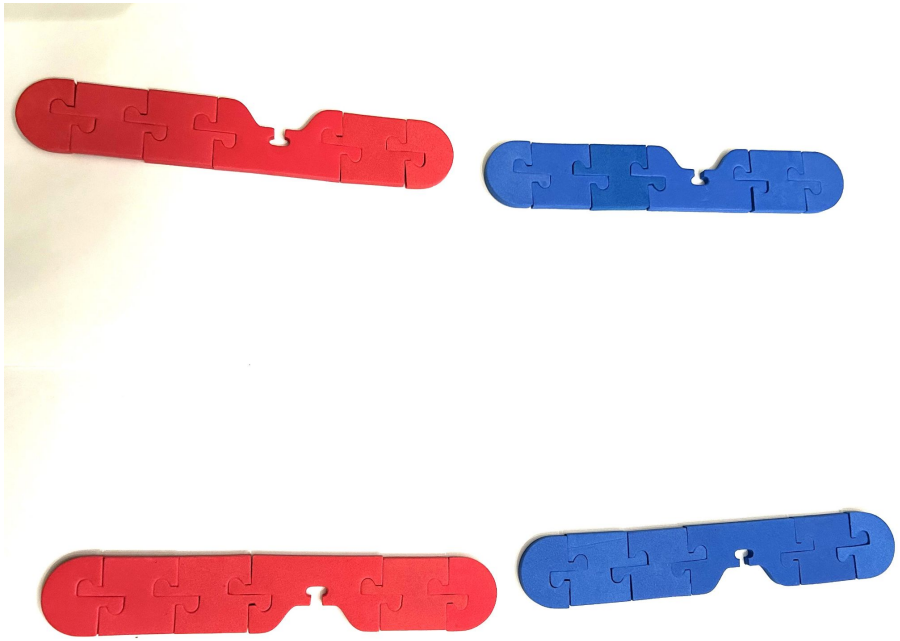
- Chromosomes attach to the spindle fibers down the middle of the cell.



Let's Model Mitosis

Anaphase

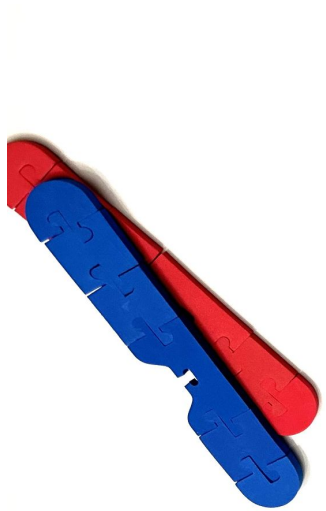
- Sister chromatids break apart and migrate towards opposite poles of the cell.



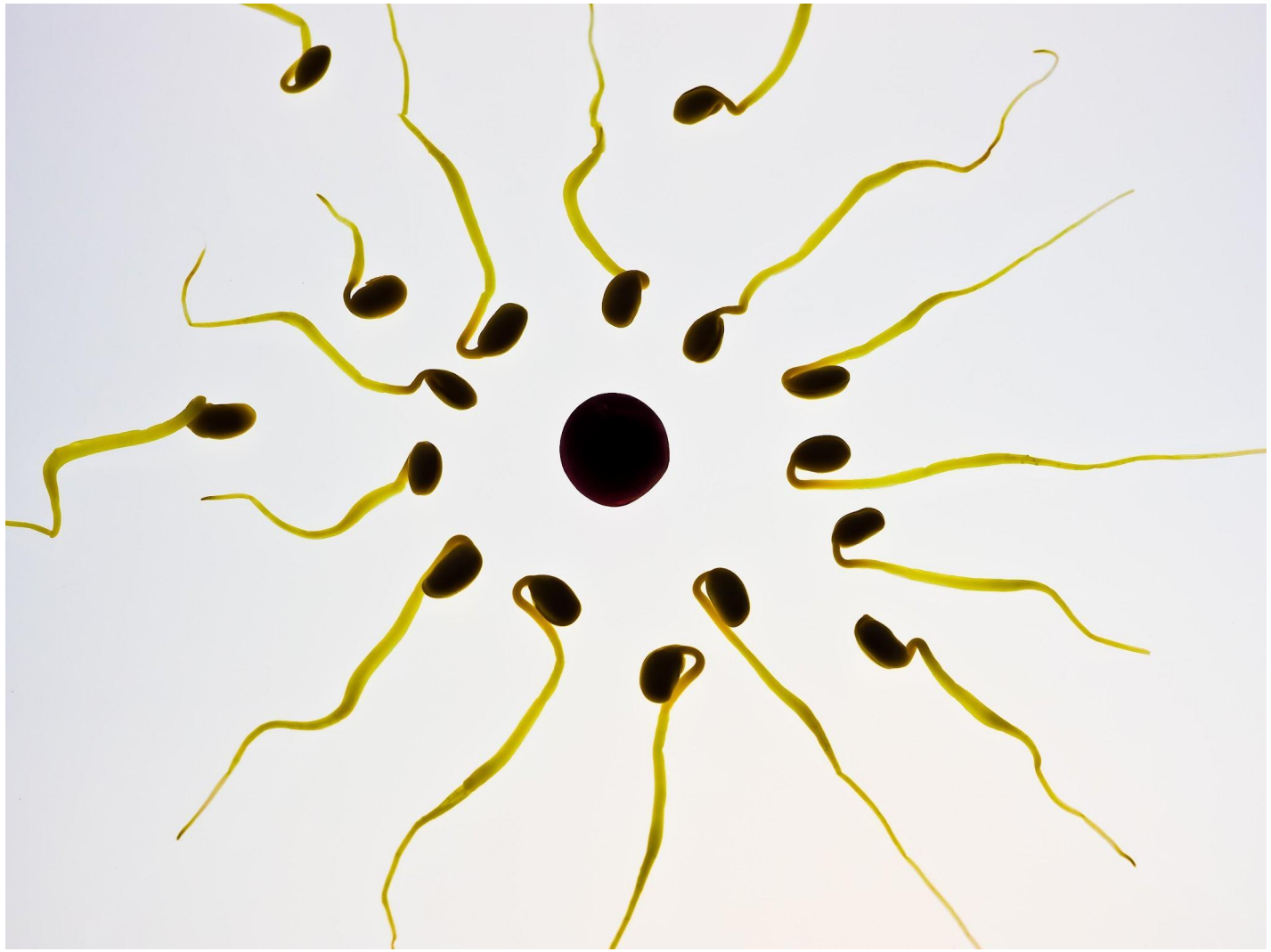
Let's Model Mitosis

Telophase and cytokinesis

- **Nuclear membranes form around chromosomes at each pole.**
- **Chromosomes relax.**
- **Cell division occurs between the two new nuclei.**



If we have mitosis, then, why do we have meiosis?



Misconception Alert!

Meiosis not just mitosis twice.

It is a reduction division.

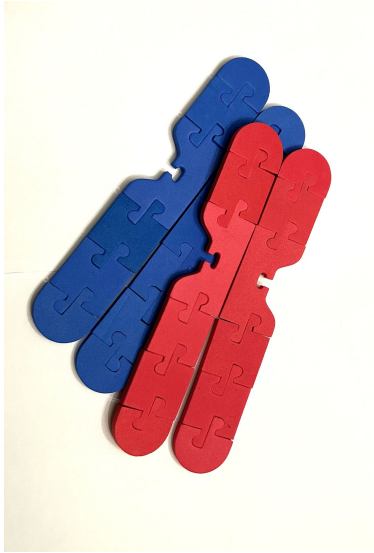
Meiosis 1 - all of the big events happen here.

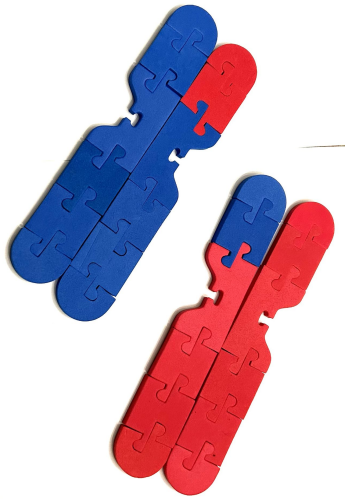
- Homologous replication
- Diploid to haploid

Meiosis 1 -

Prophase 1:

- Chromosomes condense
- Homologous chromosomes form tetrads
- Homologous recombination occurs producing genetically distinct chromosomes.
- Spindle fibers form

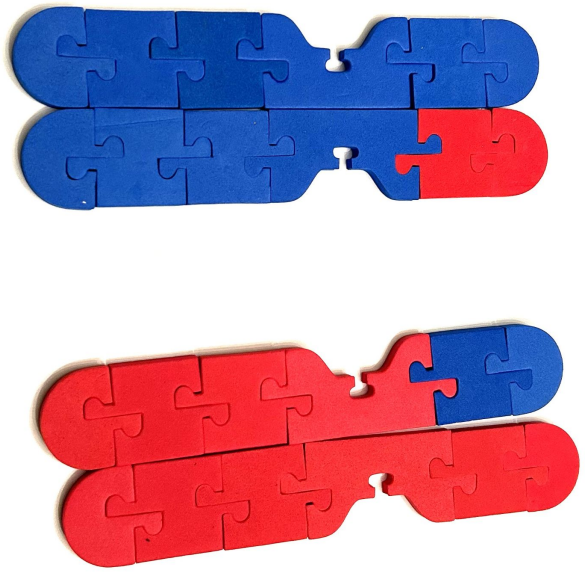




Meiosis 1 -

Metaphase 1:

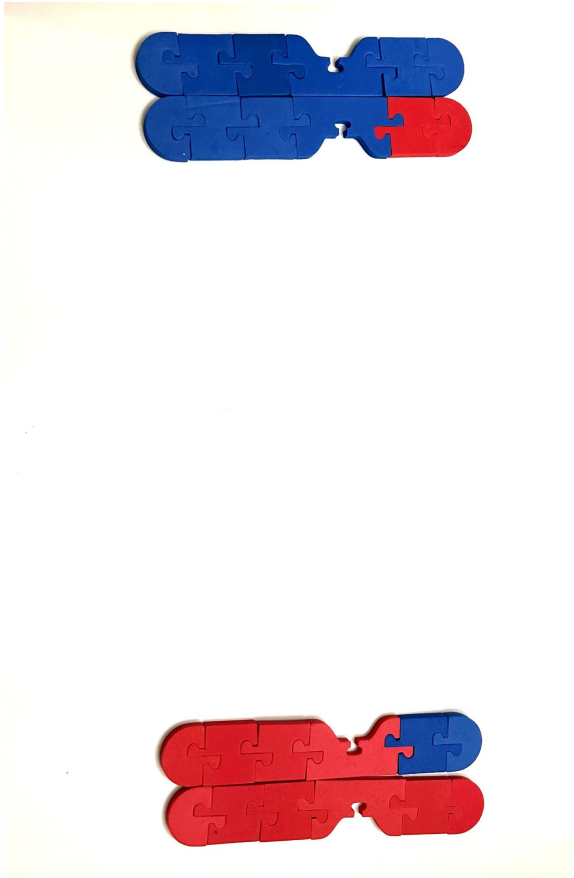
- Chromosomes attach in pairs in the middle of the cell.



Meiosis 1 -

Anaphase 1:

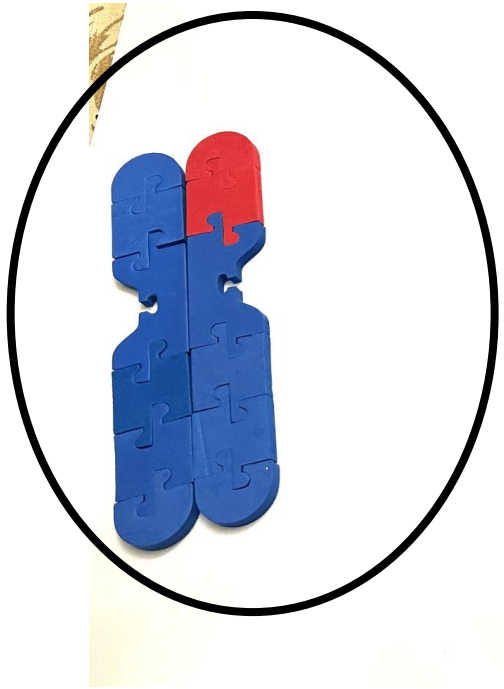
- Chromosomes separate and migrate towards opposite poles.

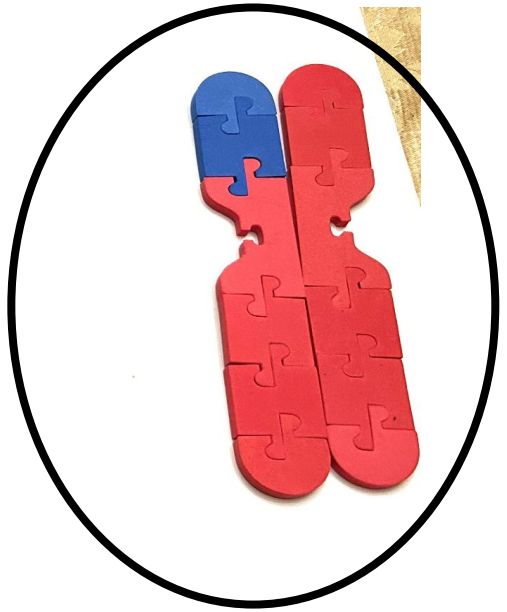


Meiosis 1 -

Telophase 1 and Cytokinesis:

- **Nuclear membranes form around the nuclei at opposite poles. Each nuclei will be haploid.**
- **The cell will divide in the center.**

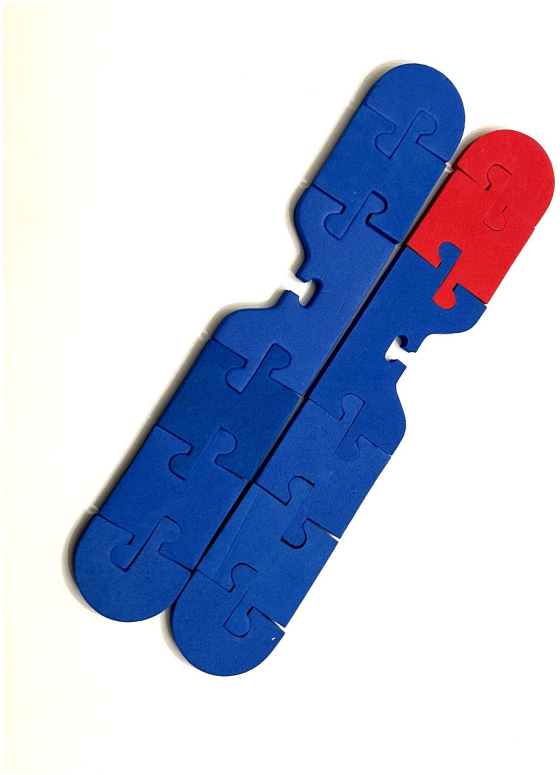


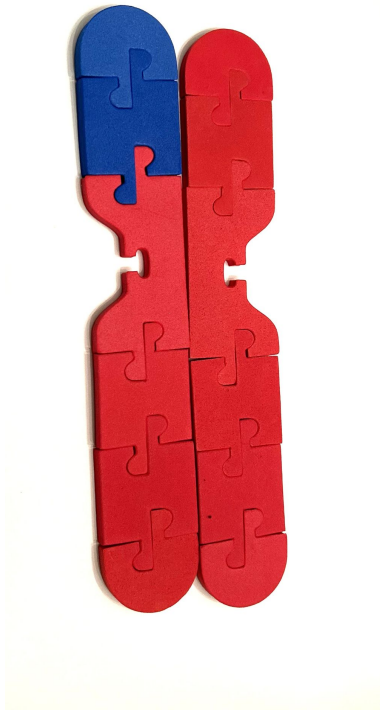


Meiosis 2 -

Prophase 2:

- If chromosomes have relaxed, they will condense again.
- The nuclear membrane dissolves.
- Spindle fibers form.

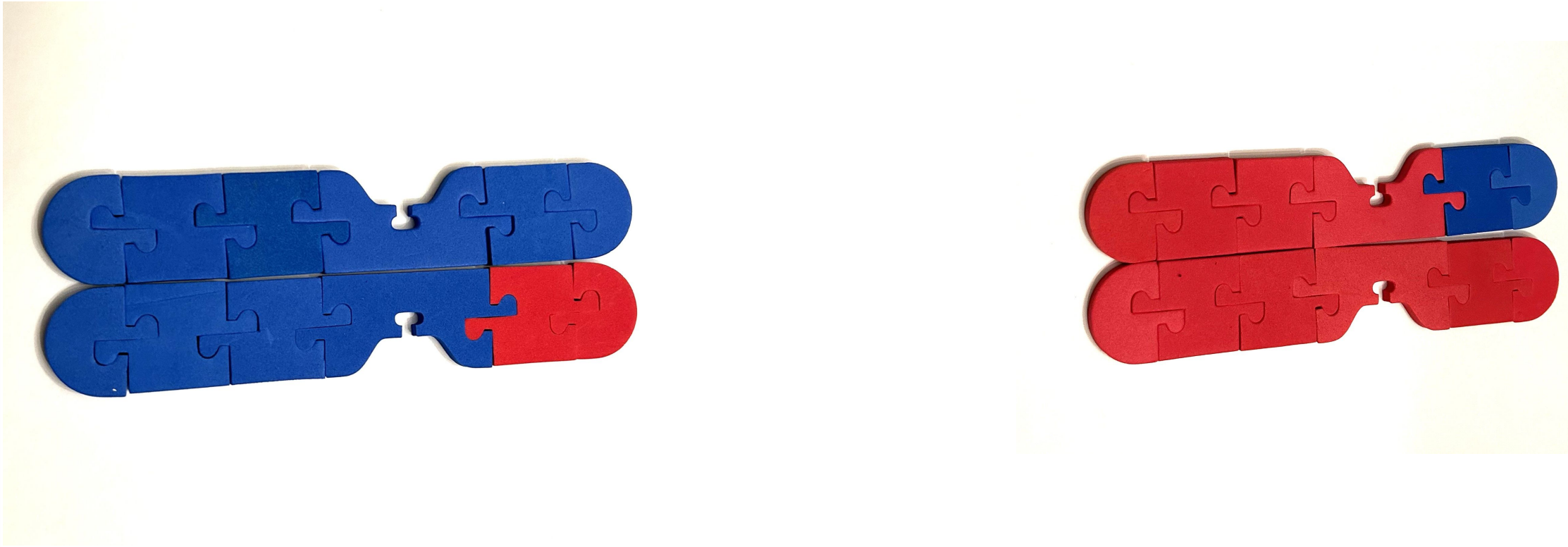




Meiosis 2 - much more like mitosis!

Metaphase 2:

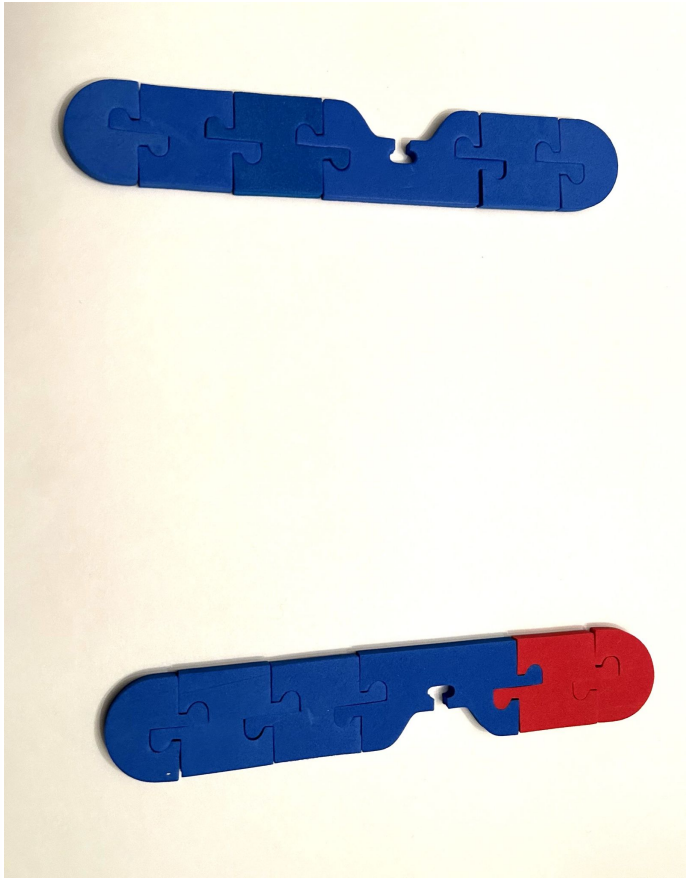
- Chromosomes attach to the spindle fibers in the middle of the cell.

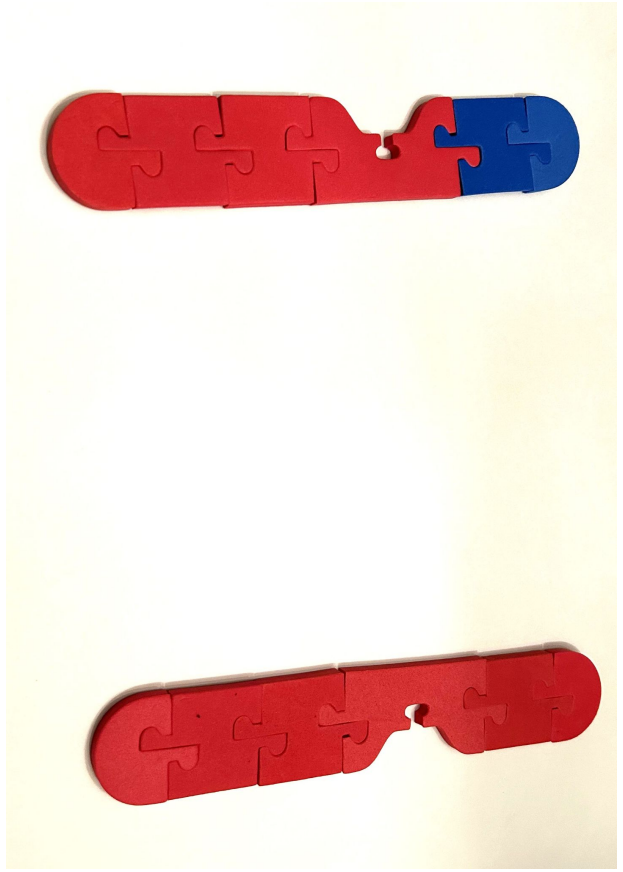


Meiosis 2 - much more like mitosis!

Anaphase 2:

- Sister chromatids are pulled towards opposite poles.

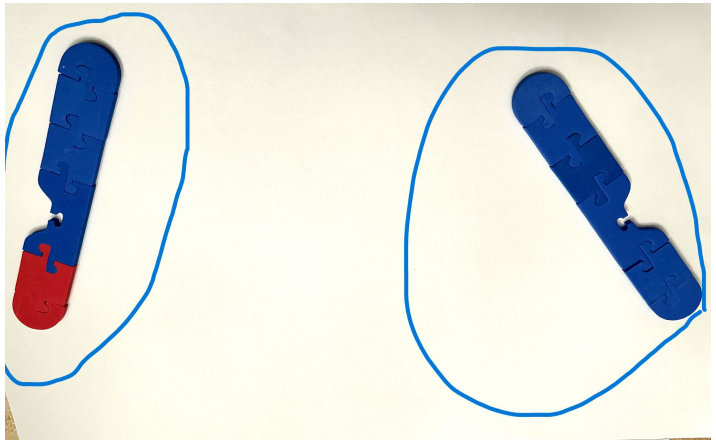


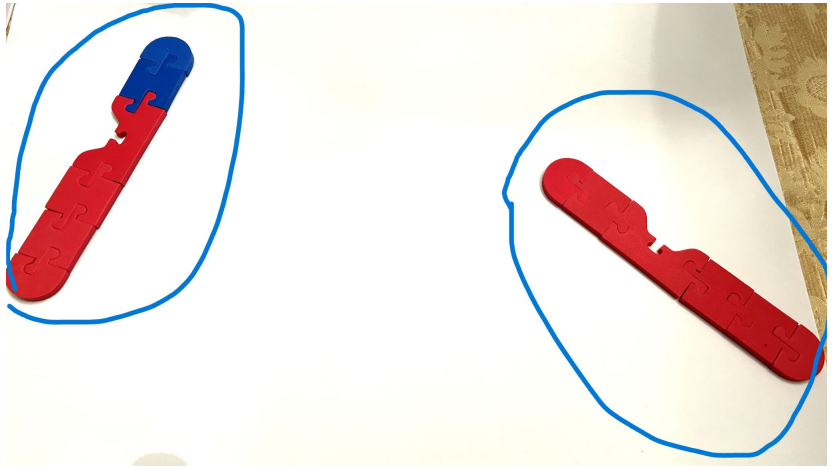


Meiosis 2 - much more like mitosis!

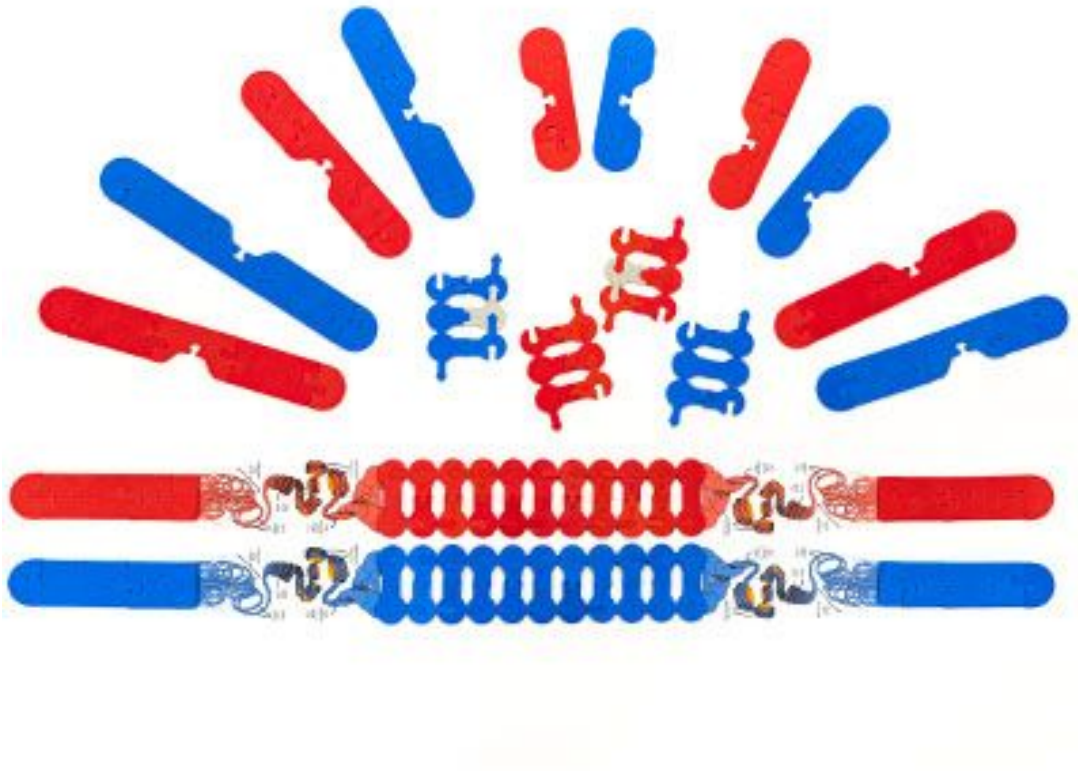
Telophase and Cytokinesis 2:

- New nuclear membranes form.
- Chromosomes relax.
- Cells divide down the middle.
- 4 haploid cells now exist from the original cell.





3D Molecular Designs Chromosome Connections



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