

MEIOSIS

Grade 10

Learning points

By the end of this lesson, students will be able to:

- Describe meiosis as the process that creates reproductive cells (egg and sperm)
- Understand that meiosis leads to variation in offspring
- Model the steps of meiosis in a simplified way
- Explain why offspring receive half of their genetic information from each parent

Look at these pictures...



1. Why do children look like their parents but not exactly the same?



2. Where do our traits come from?

Trait Shuffle Game

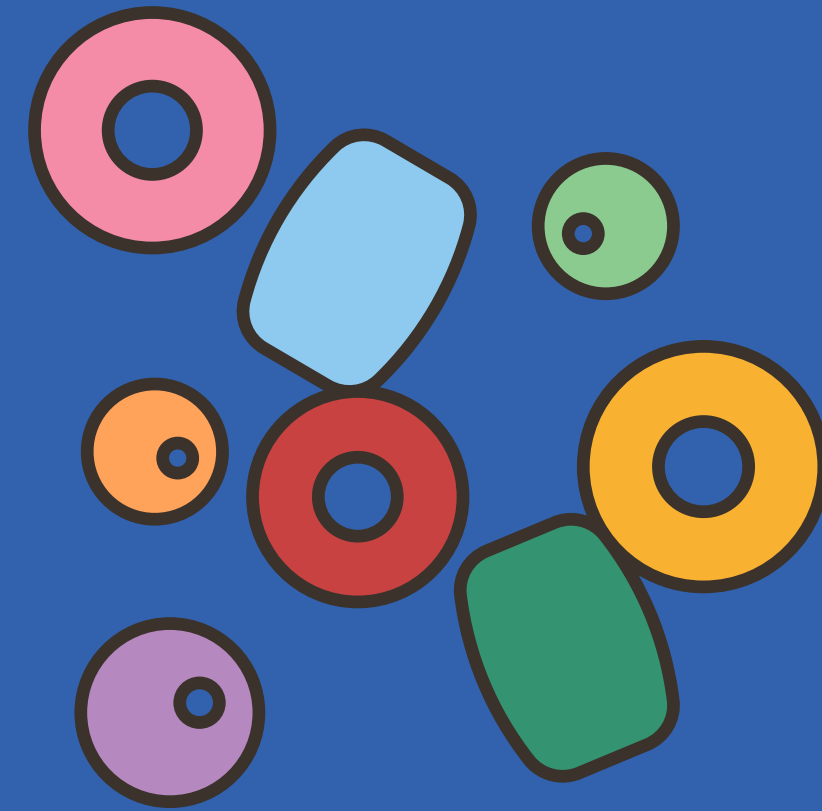


Use beads or colored slips from "Mom" and "Dad" cups
Combine to form a child's genetic traits

Trait Shuffle Game

Guiding Questions:

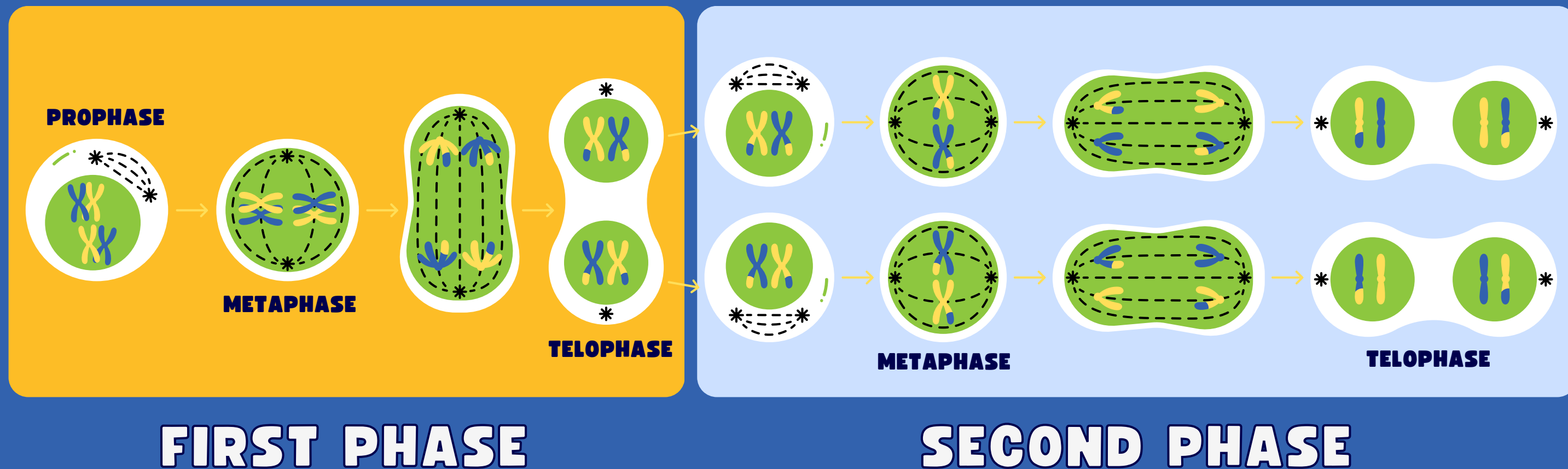
- Did any groups get the same baby twice?
- How do the babies look similar but not exactly the same?
- What do you think causes this variety?



Meiosis

Amoeba Sisters Video:

<https://www.youtube.com/watch?v=VzDMG7ke69g&t=294s>

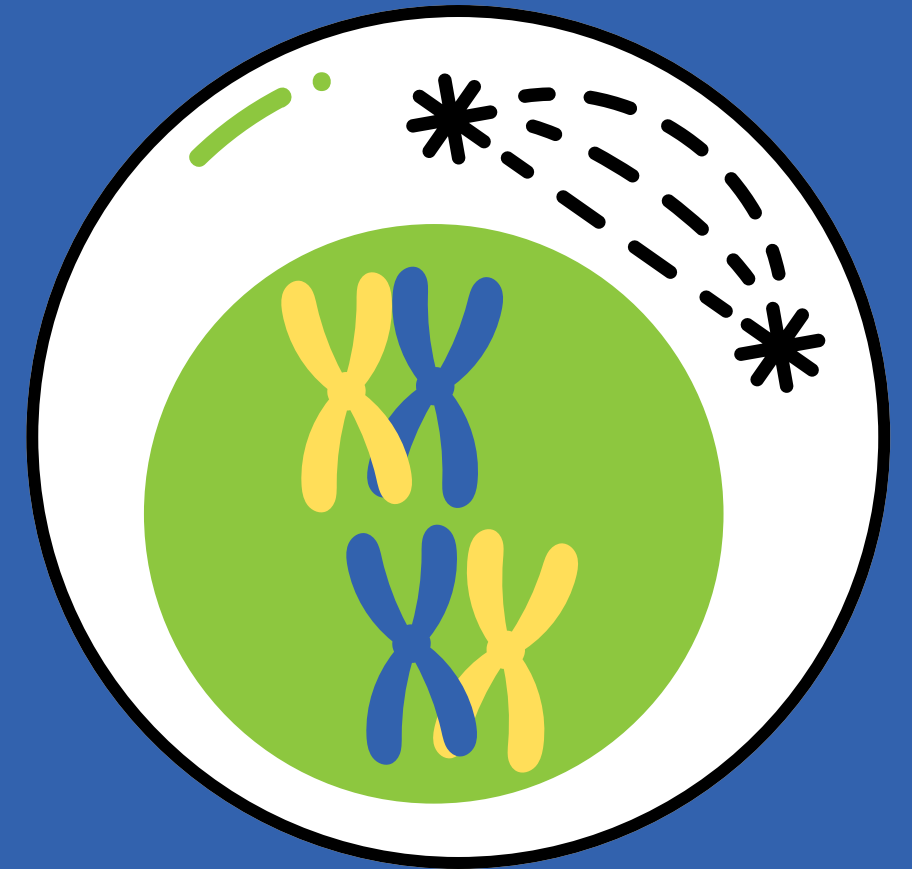


**LET'S LOOK AT
THE STAGES
OF MEIOSIS**

PROPHASE 1

The chromosomes condense and the nucleolus breaks down.

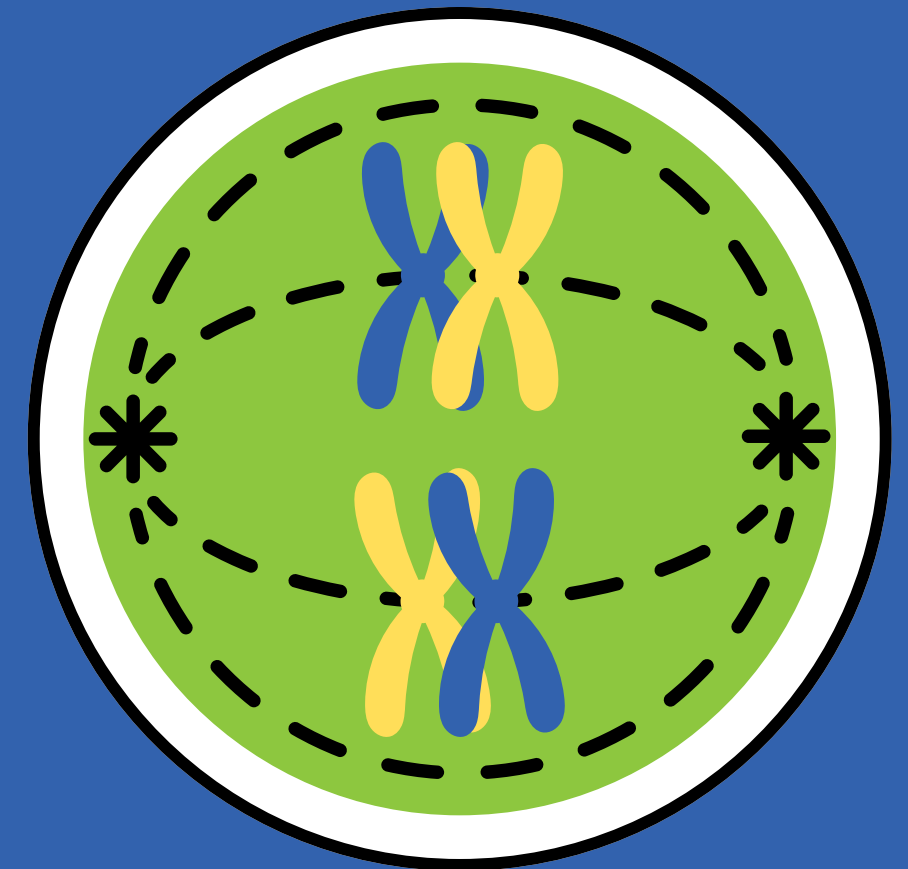
As chromosomes move around, crossing over happens - this means genetic material can be exchanged.



METAPHASE 1

The chromosomes align in pairs in the centre of the cell.

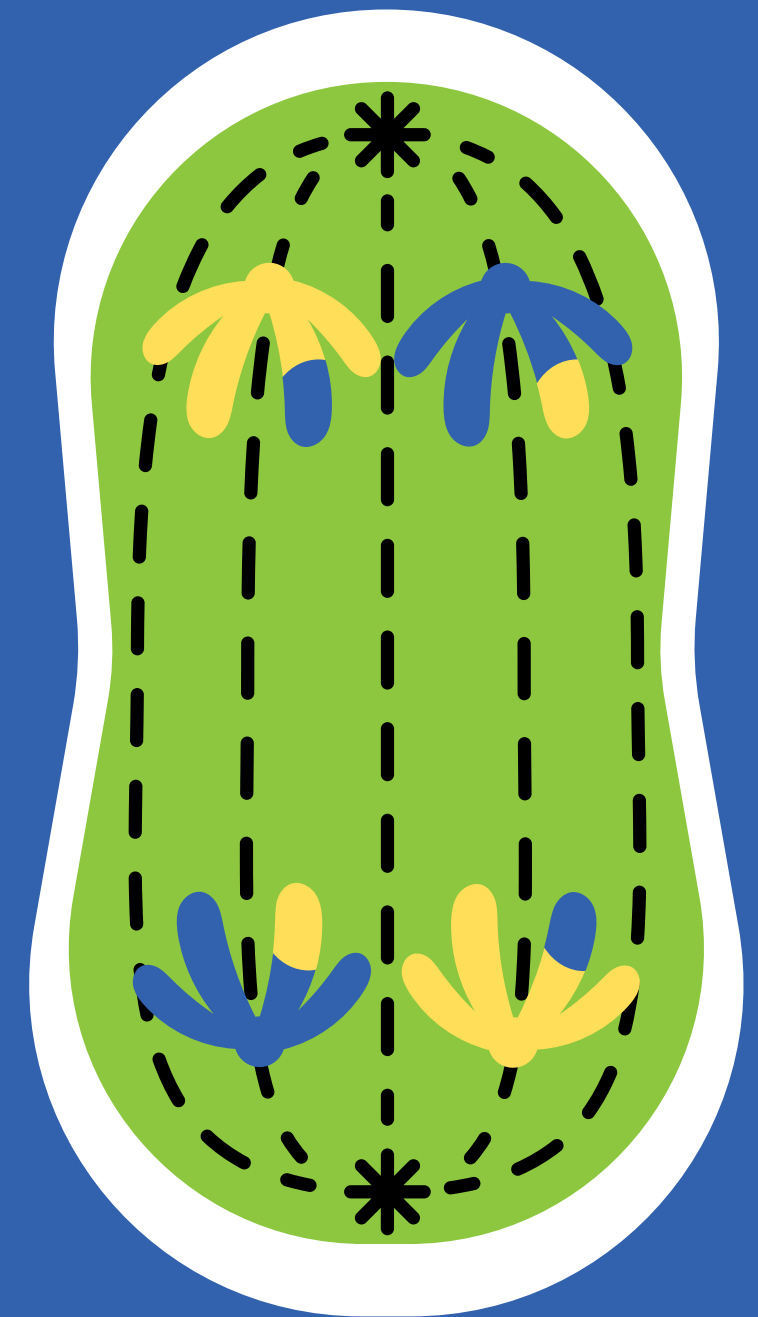
Random assortment occurs - this means that chromosome pairs line up randomly.



ANAPHASE 1

Chromosome pairs separate and move to opposite ends of the cell.

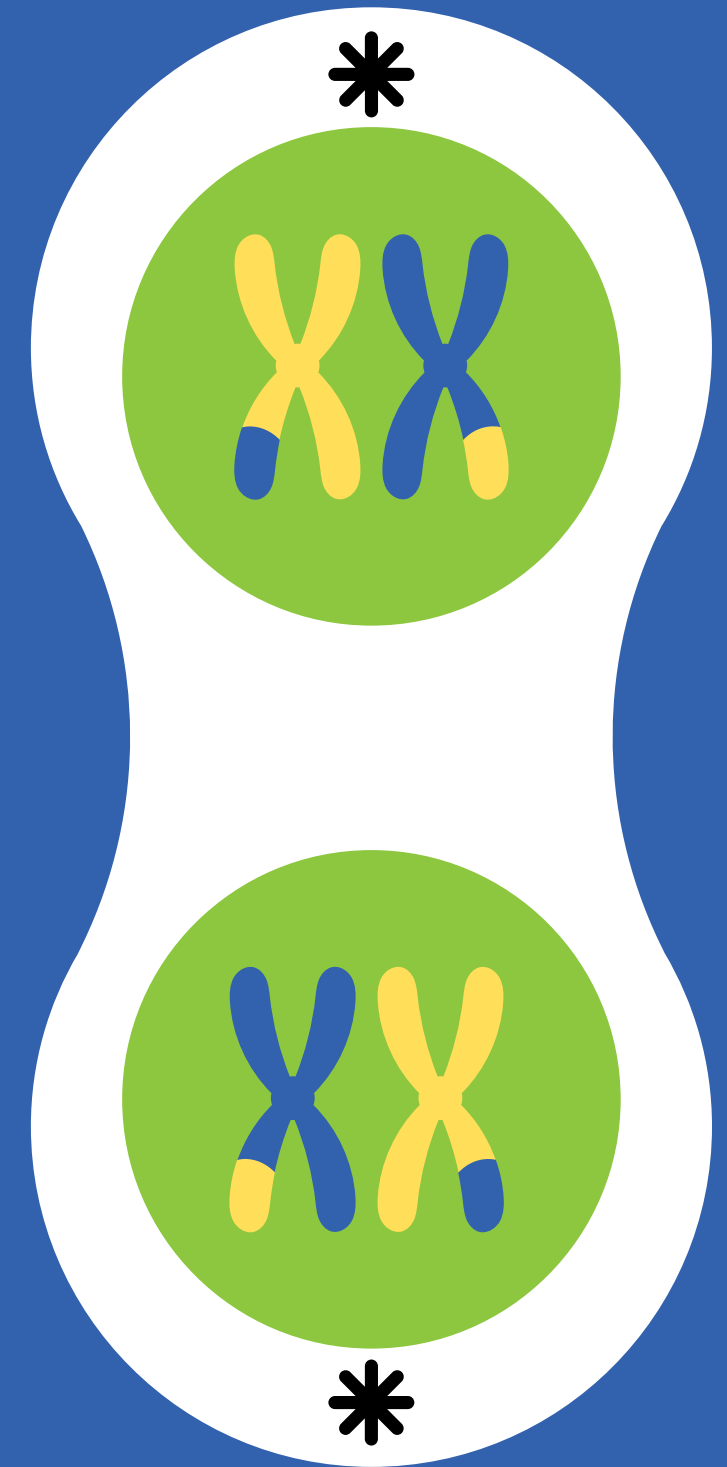
This ensures each cell contains half the number of chromosomes (haploid).



TELOPHASE 1

Two new nuclei form around each set of chromosomes.

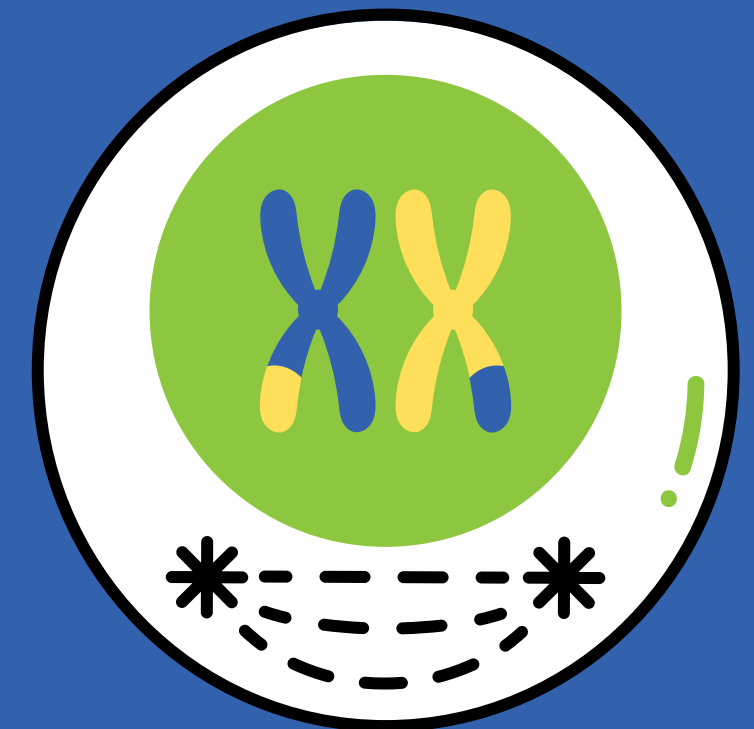
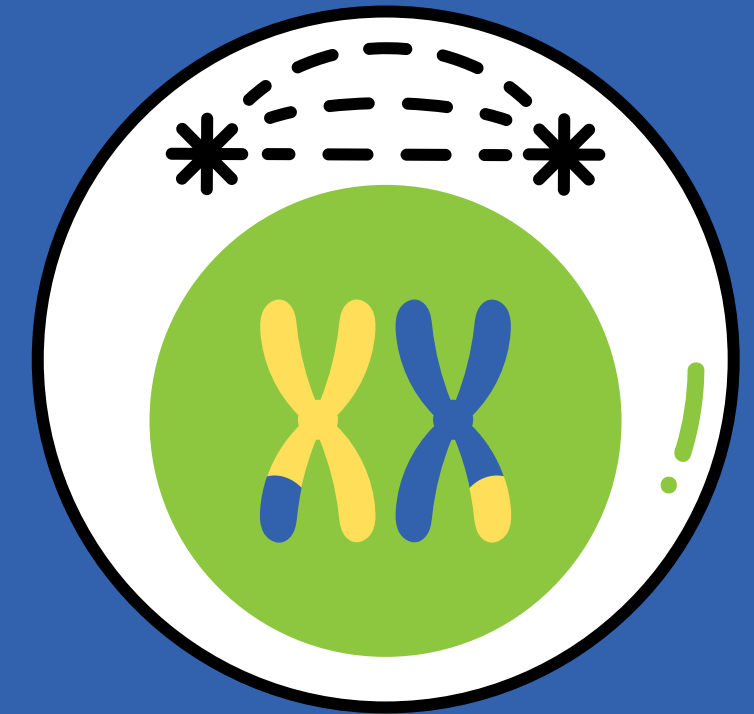
The cytoplasm splits and two (haploid) daughter cells are formed.



PROPHASE 2

Phase 2 happens to allow 4 haploid sex cells (sperm and egg cells) to be created.

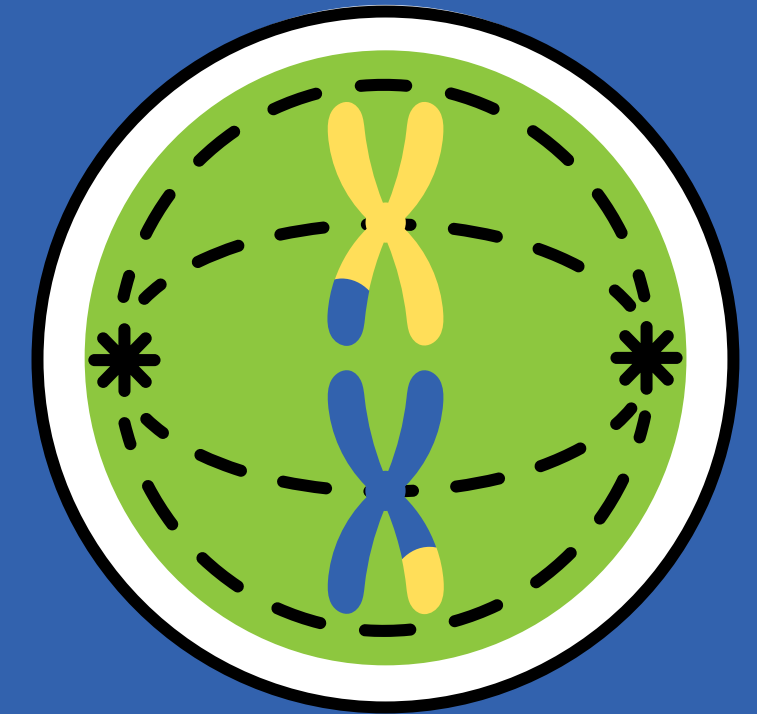
The chromosomes condense and the nucleolus breaks in both cells.



METAPHASE 2

The chromosomes align single file in the centre of the cell.

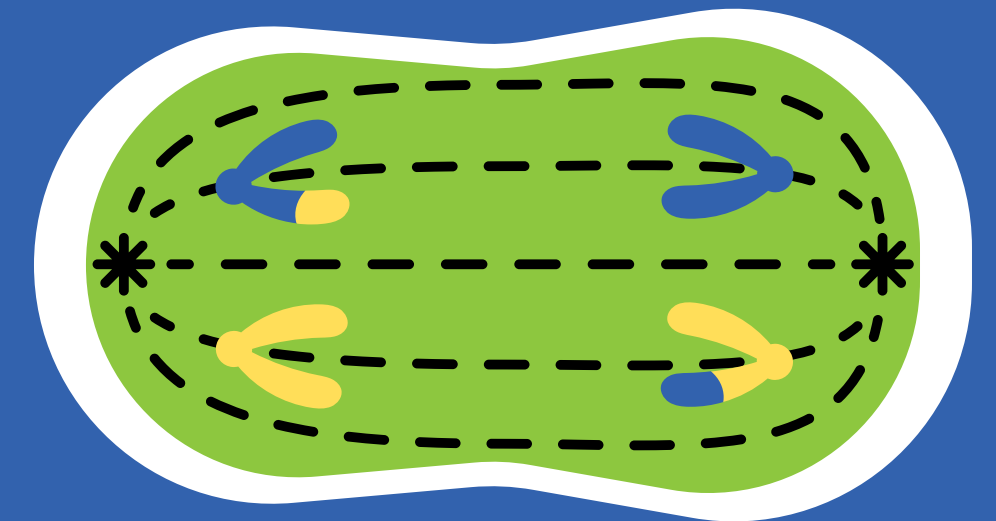
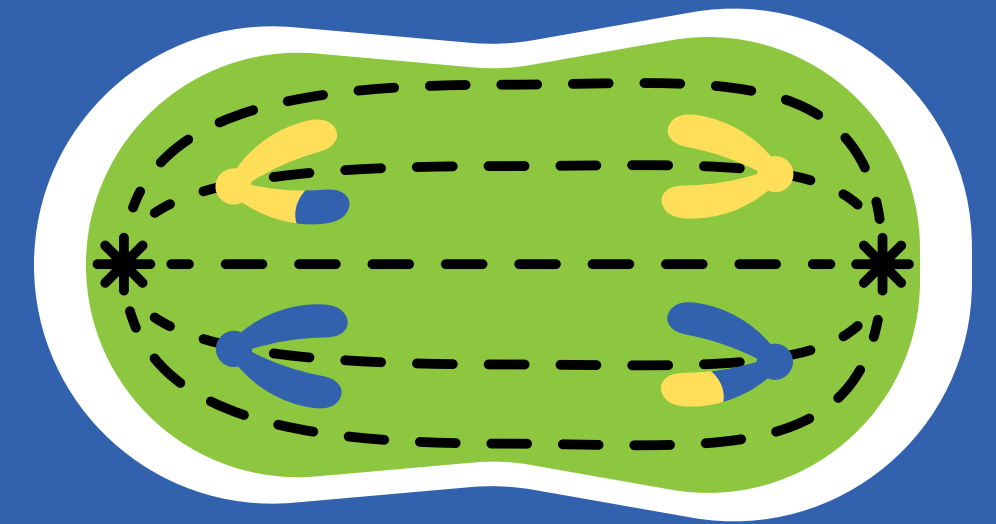
This occurs to ensure sister chromatids separate in the next stage.



ANAPHASE 2

Sister chromatids separate and move to opposite ends of the cell.

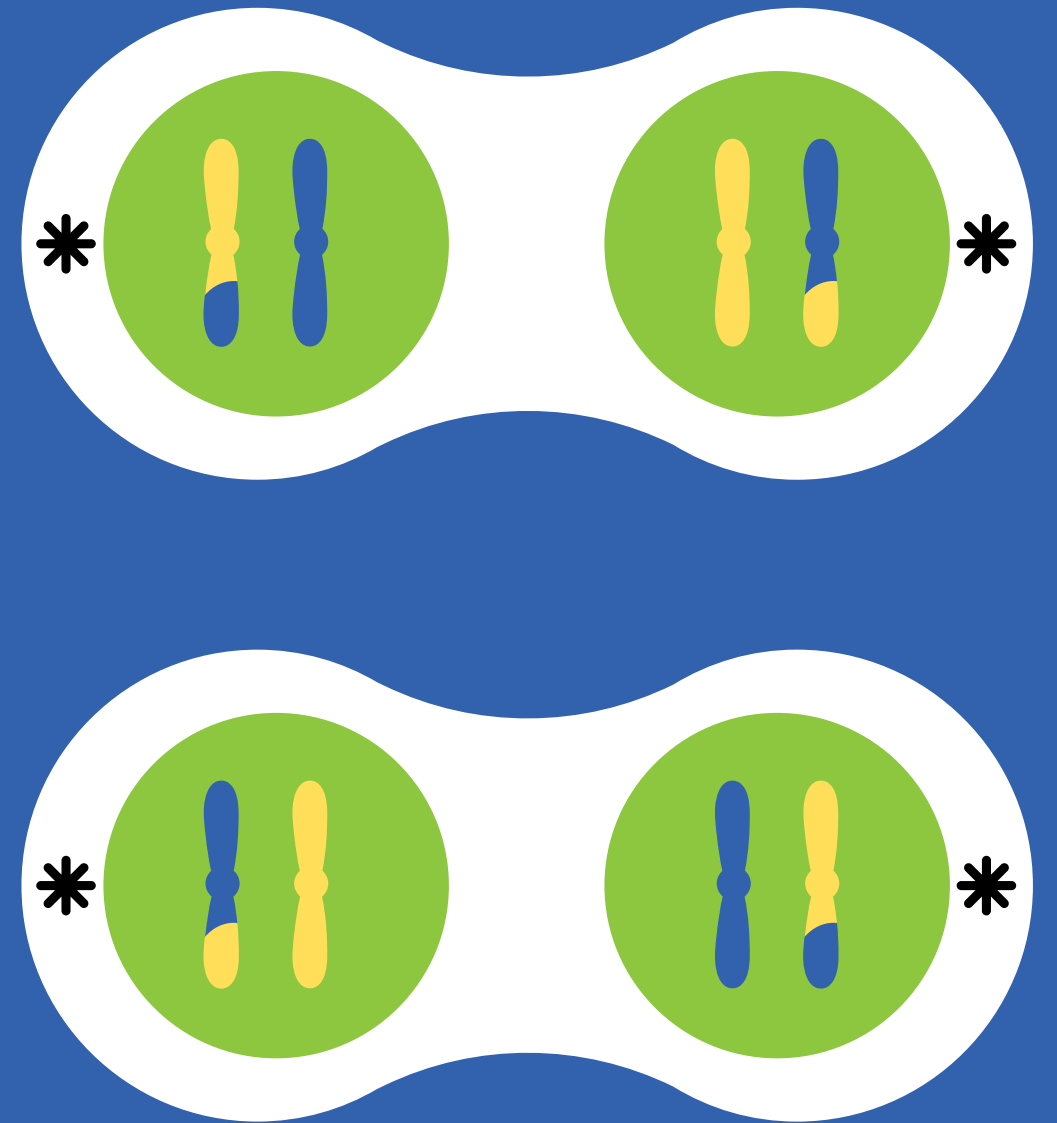
This ensures the daughter cells remain haploid - that means they have half the genetic material of the original parent cell.



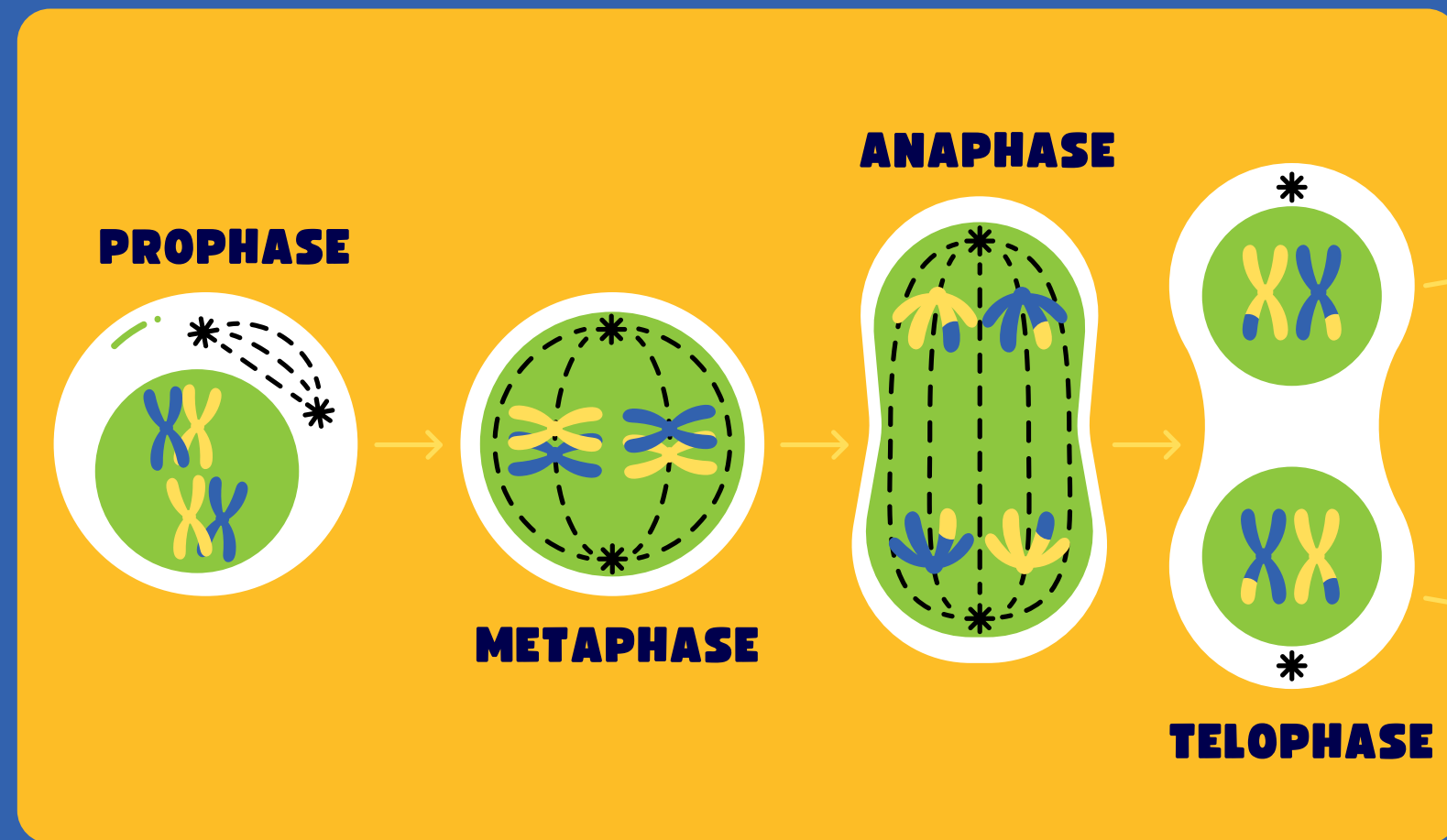
TELOPHASE 2

Four new nuclei form around
each set of chromosomes

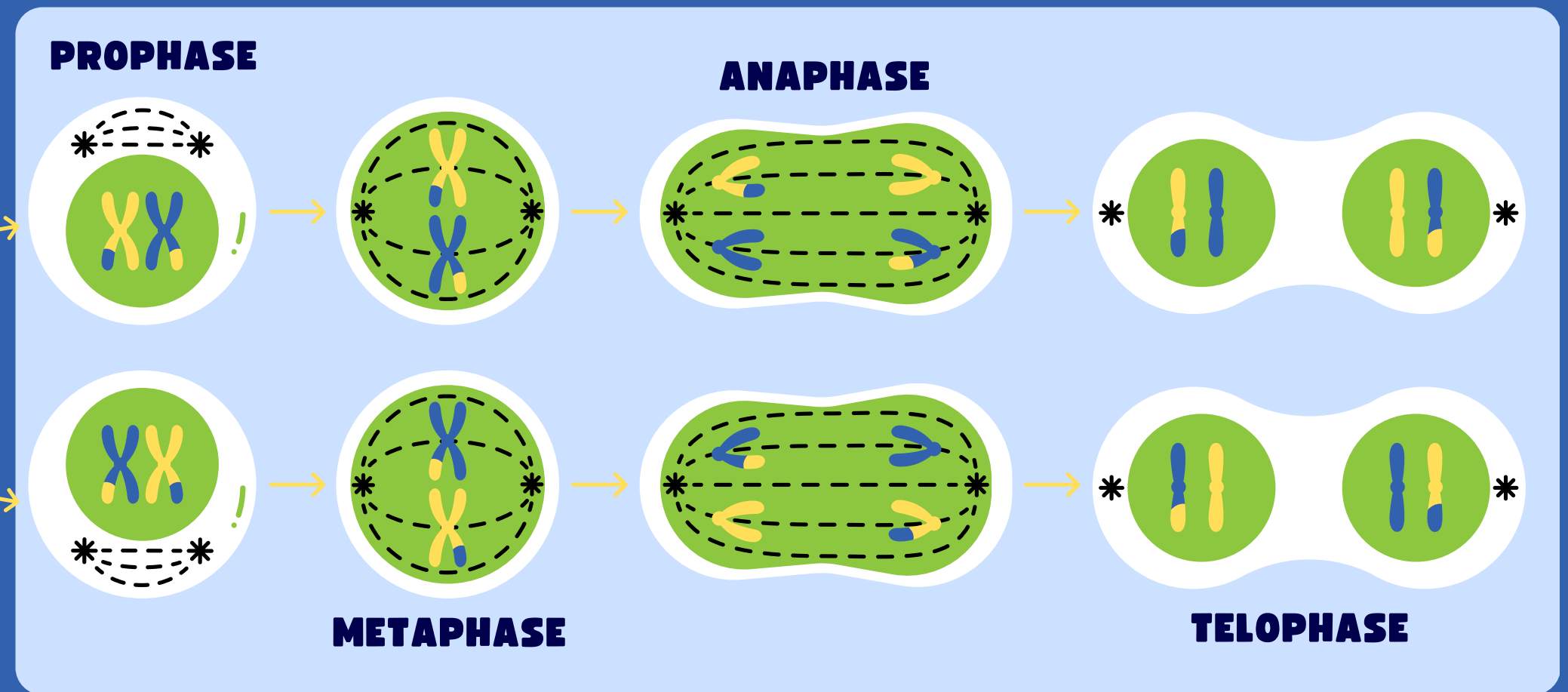
The cytoplasms split and four
(haploid) daughter cells are formed.



THE WHOLE PROCESS



FIRST PHASE

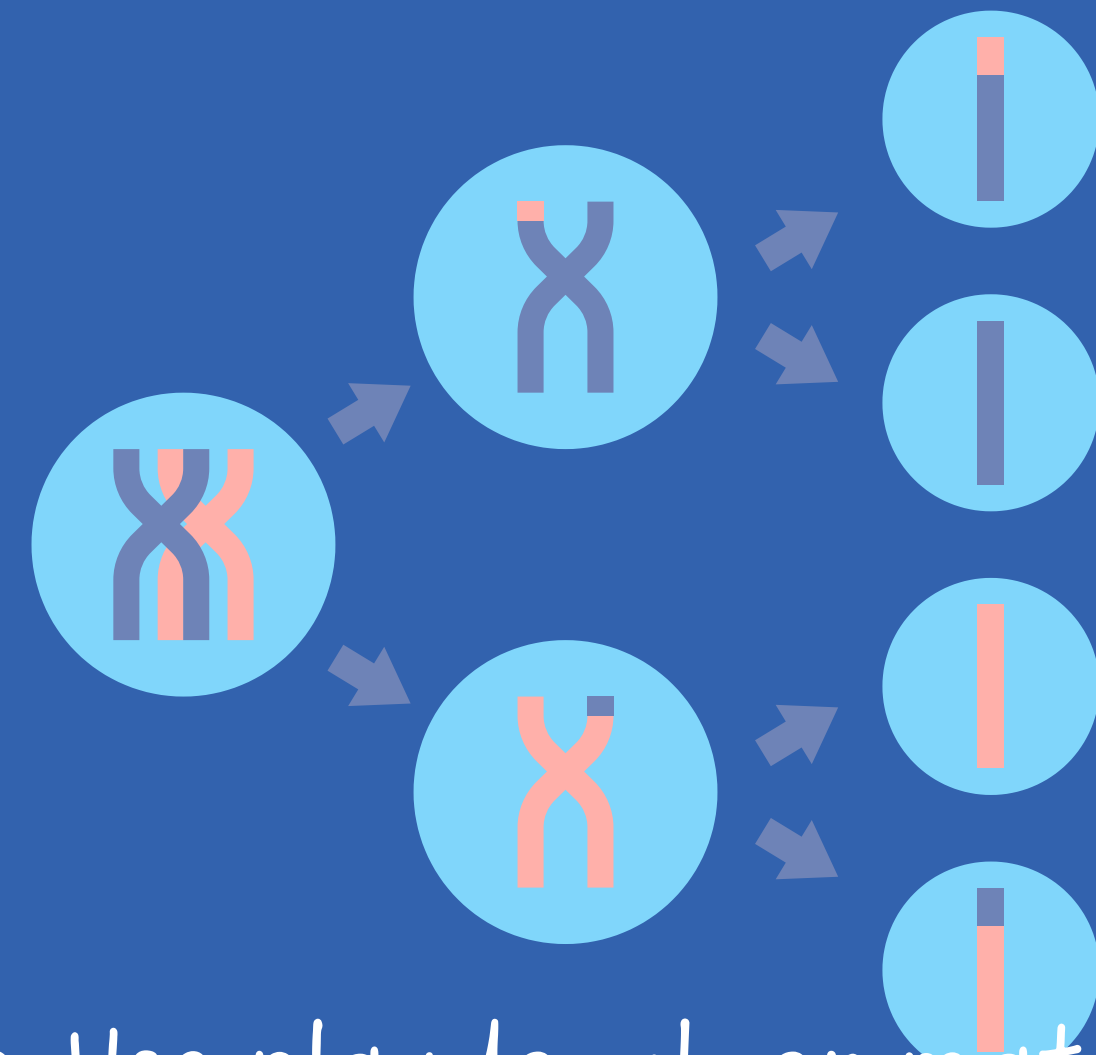


SECOND PHASE

Modeling Meiosis

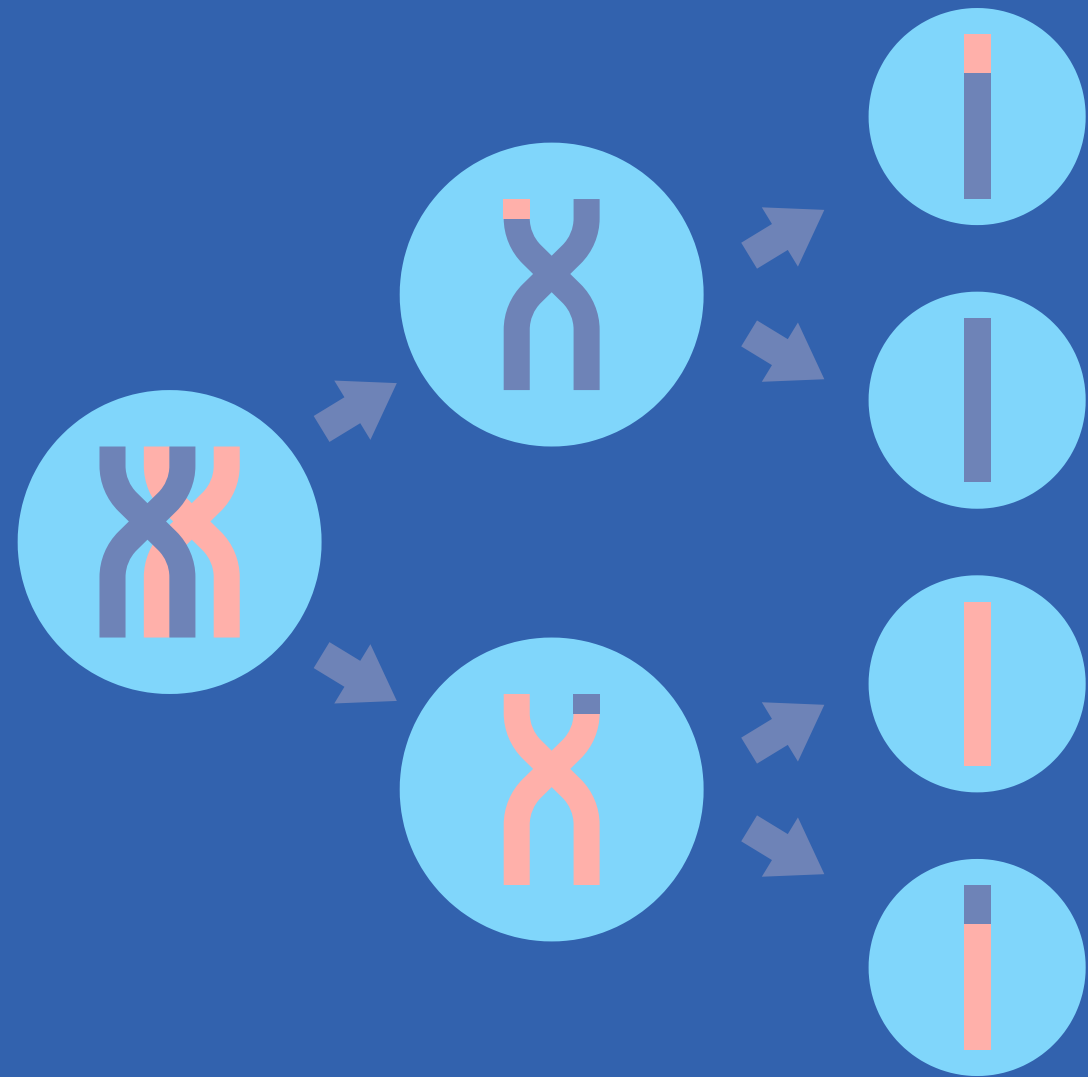


MATERIALS



- Use playdough or materials to model 1 cell \rightarrow 2 \rightarrow 4
- Label stages

Modeling Meiosis



- What's happening to the chromosomes in each phase?
- How is this different from mitosis?

Venn Diagram

- What's happening to the chromosomes in each phase?
- How is this different from mitosis?