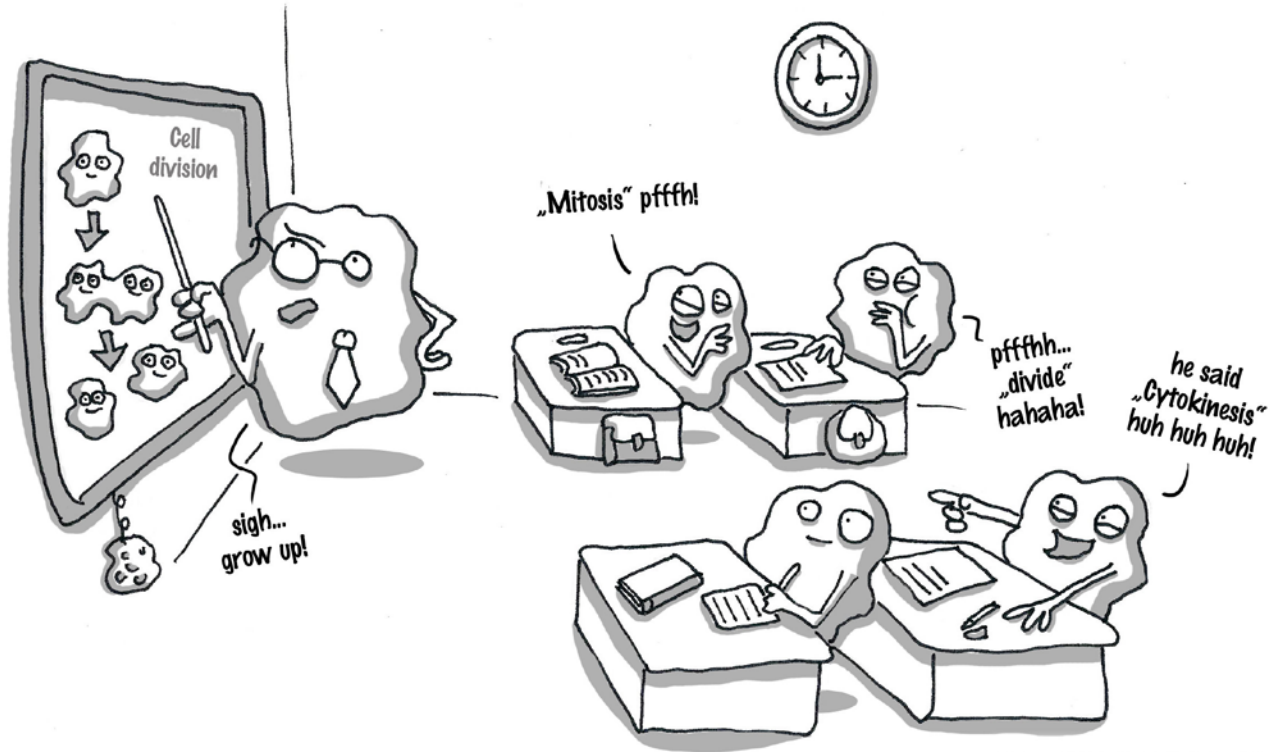


Sexual Reproduction



CELLBLOG
theCELLBLOG.tumblr.com

- S1-1-05 Illustrate and explain the production of male and female gametes by meiosis.
- S1-1-06 Compare and contrast the functions of mitosis to that of meiosis. Include: diploid cells, haploid cells

Sexual Reproduction:

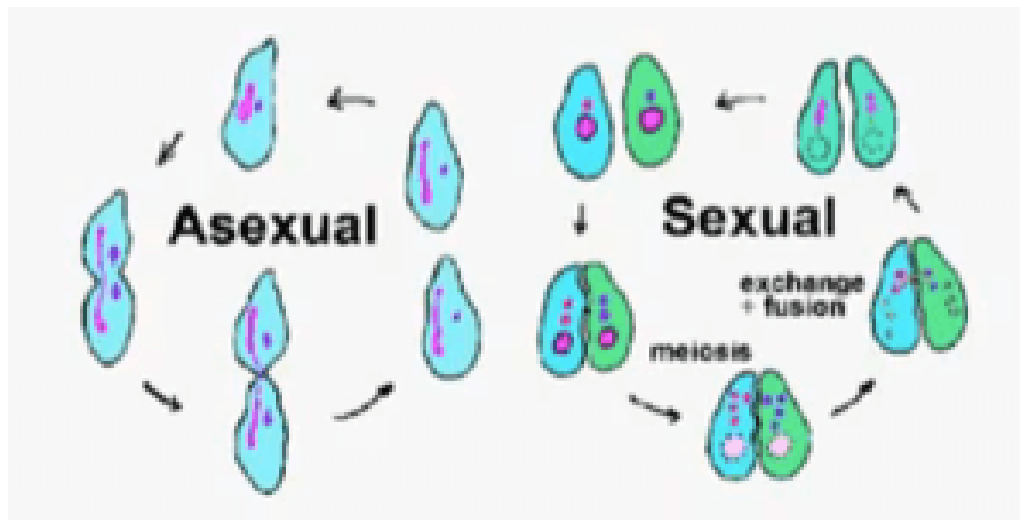
Remember that **ASEXUAL** reproduction is when **ONE** cell/organism produces an **EXACT GENETIC COPY**.

→ usually performed by **CELLS** or **SIMPLE** organisms.

More complex organisms reproduce by **SEXUAL REPRODUCTION**.

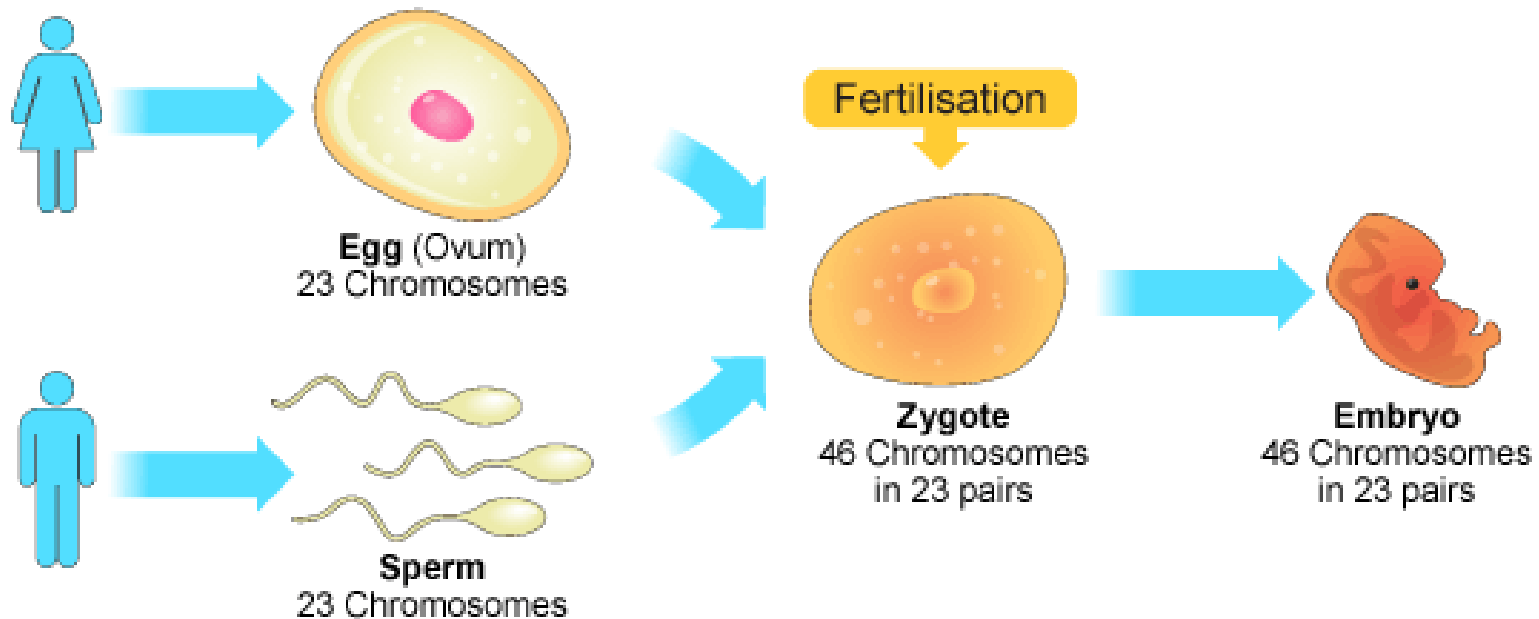
SEXUAL reproduction is when **TWO** organisms provide **GENETIC INFORMATION** to produce an offspring that has a **NEW GENETIC CODE**

→ Note: does not have to involve **INTERCOURSE!**



Sexual Reproduction:

In animals, two specialized **SEX CELLS** (**EGG** and **SPERM**) combine to form a **ZYGOTE**



By combining the genetic material, the offspring may have a better chance of survival in a changing environment. → Due to **VARIATION!**

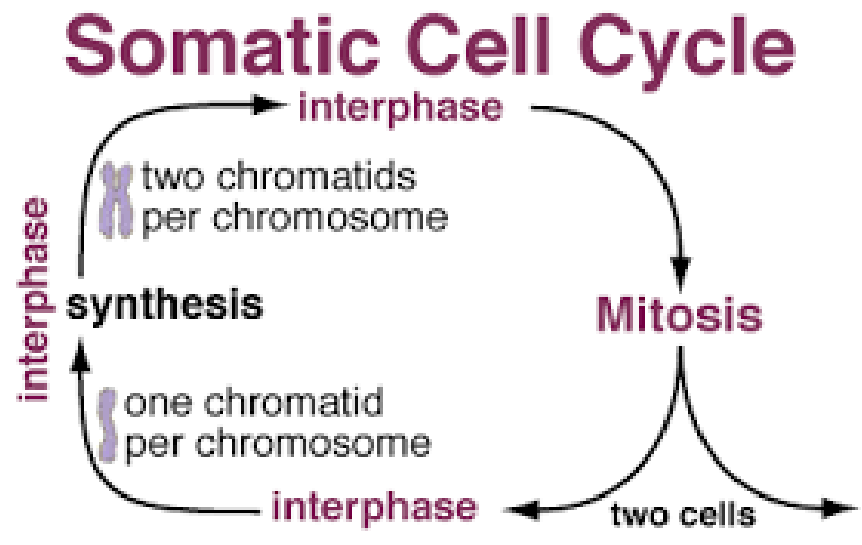
Chromosome Number and the Formation of Sex Cells

A human cell contains **46 CHROMOSOMES**. When the **SPERM** and **EGG** cells combine, the **ZYGOTE** does not get **96 CHROMOSOMES**...Why?

Human cells can be broken down into two types:

1. **SOMATIC (BODY) CELLS**:

- Cells that make up all the **PARTS** of your **BODY**
- Are produced through **MITOSIS**
- Have **46 CHROMOSOMES**



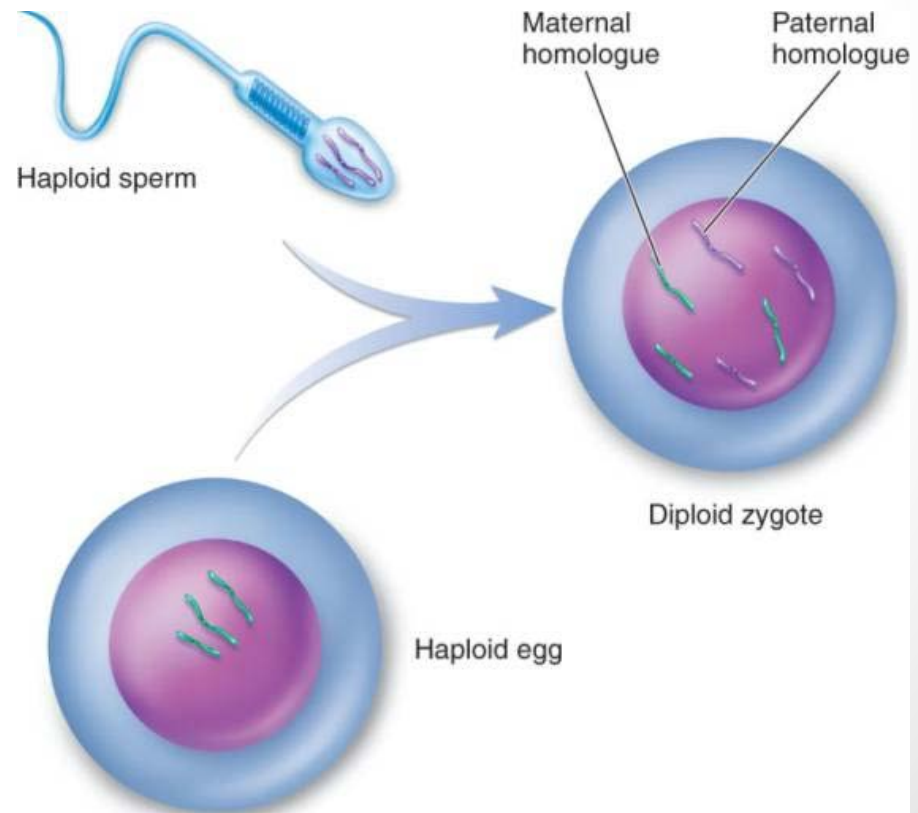
→ Called **DIPLOID (2n)** since they have the **FULL SET** of chromosomes

Chromosome Number and the Formation of Sex Cells

2. SEX CELLS (GAMETES):

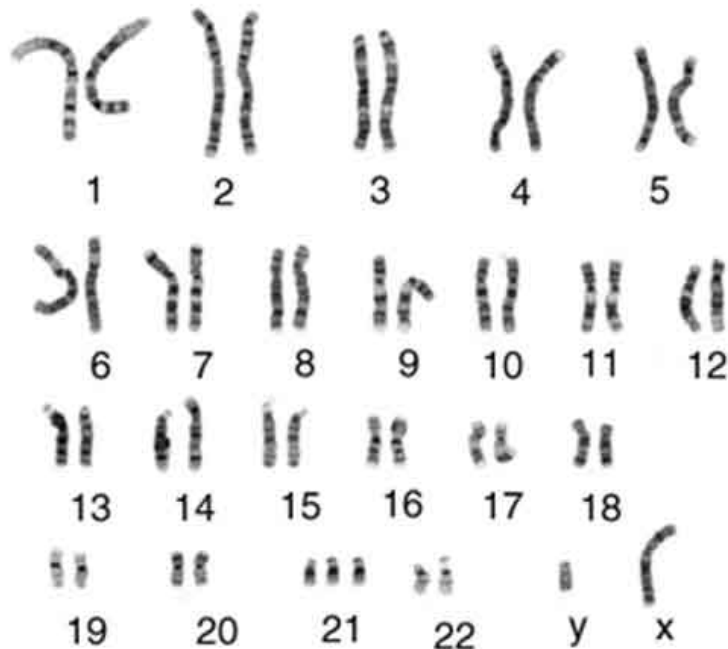
- Either EGG or SPERM
- Are specialized cells that have only 23 CHROMOSOMES.
- Are formed when a SOMATIC cell undergoes a special type of cell division called MEIOSIS

→ Called HAPLOID (n) since they have HALF of the full set of chromosomes



Chromosome Number and the Formation of Sex Cells

When an egg and sperm combine, you get 23 chromosomes from your mom, and 23 chromosomes from your dad.



Each of these 23 chromosomes carry GENES that code for all the TRAITS that you have. The 23RD pair are the X AND Y chromosomes which determine whether you are a BOY or a GIRL.

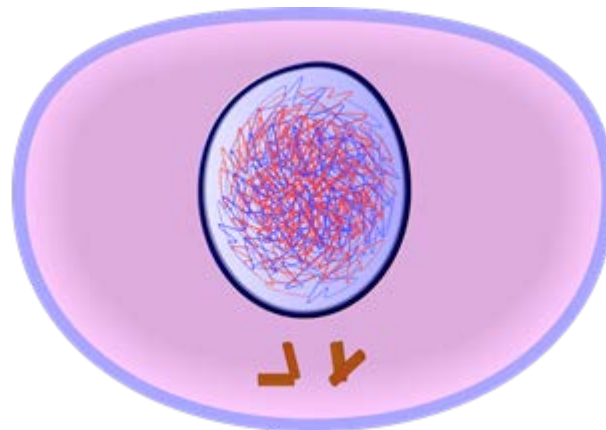
These 23 pairs are called HOMOLOGOUS PAIRS since they code for the same TRAITS

Meiosis

Meiosis starts with one **DIPLOID** cell that undergoes **TWO** cell **DIVISIONS** that produce **FOUR HAPLOID** cells. Just as with mitosis, it all starts with interphase:

INTERPHASE:

- Cell **PREPARES** for **DIVISION** by **DUPLICATING CHROMOSOMES** in the **NUCLEUS**.
- Each of the 46 Chromosomes are now **DOUBLE STRANDED**
- Chromosomes look like long **STRINGS** (**SPAGHETTI**)

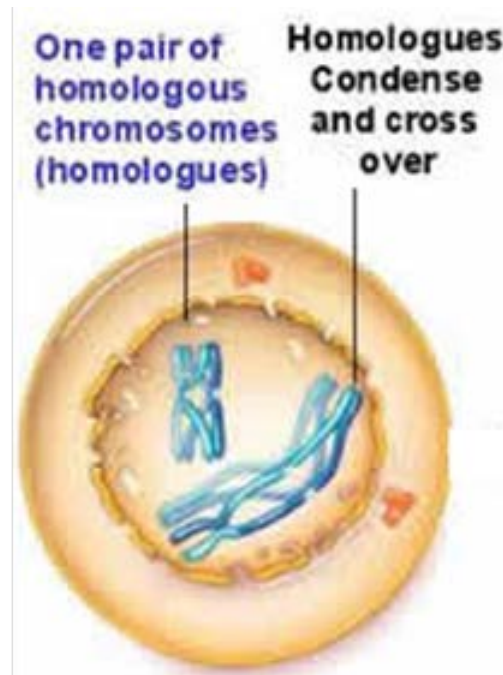


Meiosis 1 – The first division

This is where the cells are reduced from DIPLOID ($2n$) to HAPLOID (n).

PROPHASE 1:

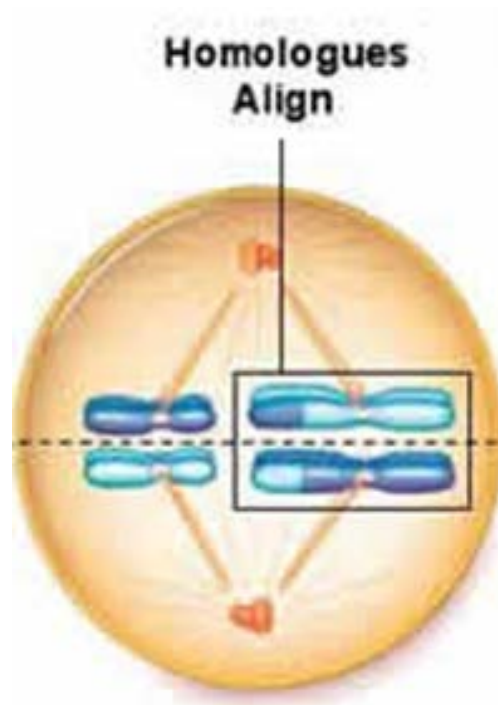
- Chromosomes can now be seen (X SHAPE) (spaghetti to alphaggetti)
- HOMOLOGOUS chromosomes pair up then CROSSING OVER occurs.
- 46 DOUBLE STRANDED chromosomes total. ($2n$)



Meiosis 1 – The first division

METAPHASE 1:

- Chromosomes LINE UP at EQUATOR and INDEPENDENT ASSORTMENT occurs
- NUCLEAR MEMBRANE disappears, SPINDLE and CENTRIOLES appear.
- 46 DOUBLE STRANDED chromosomes total. (2n)



Meiosis 1 – The first division

ANAPHASE 1:

- Chromosomes SPLIT as they are pulled by SPINDLES and CENTRIOLES.
- 23 DOUBLE STRANDED chromosomes going to EACH SIDE. (n)

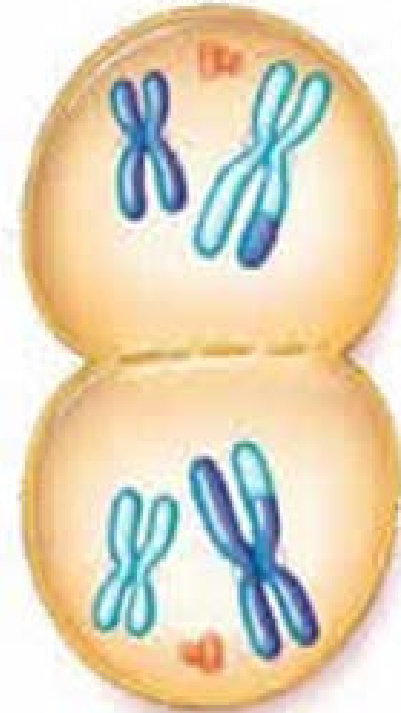


Meiosis 1 – The first division

TELOPHASE 1:

- NUCLEAR MEMBRANE re- forming, and cells are DIVIDING (CYTOKINESIS)

Meiosis I result:
homologues
separated into 2
cells

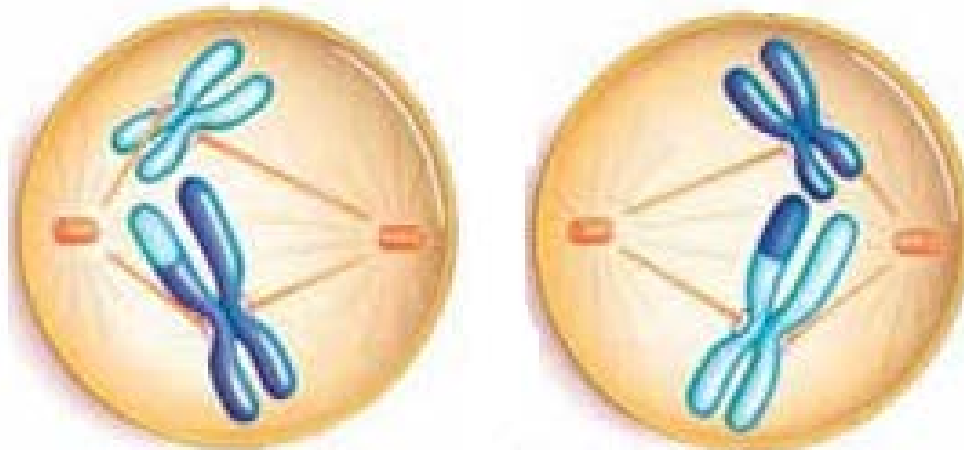


Meiosis II – The second division.

The double-stranded **CHROMOSOMES** are **DIVIDED**.

PROPHASE 2:

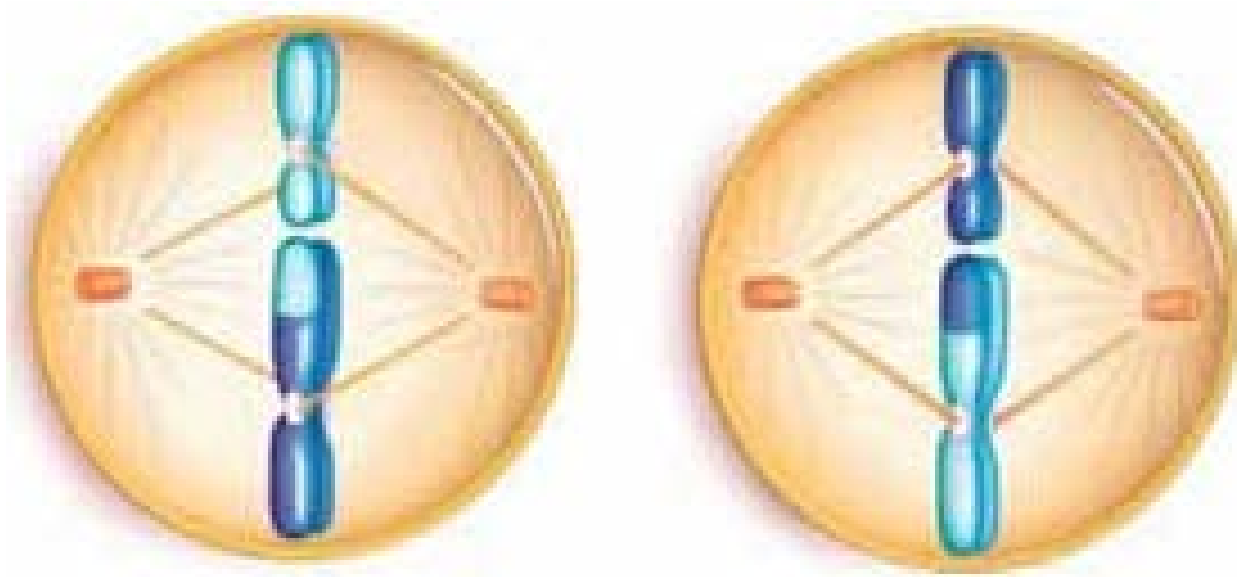
- **23 DOUBLE STRANDED CHROMOSOMES** in each cell



Meiosis II – The second division.

METAPHASE 2:

- chromosomes LINE UP



Meiosis II – The second division.

ANAPHASE 2:

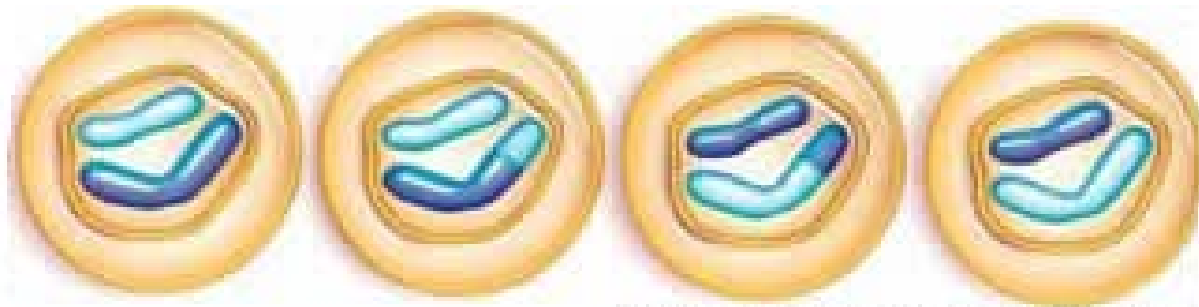
- chromosomes SEPARATE



Meiosis II – The second division.

TELOPHASE 2:

- NUCLEAR MEMBRANE re- forming.
- 23 SINGLE-STRANDED chromosomes in each cell.
- Cytoplasmic Division (CYTOKINESIS)



Notes:

- The final result is 4 CELLS that are HAPLOID (n).
- Each cell has a UNIQUE set of 23 CHROMOSOMES.

Meiosis

