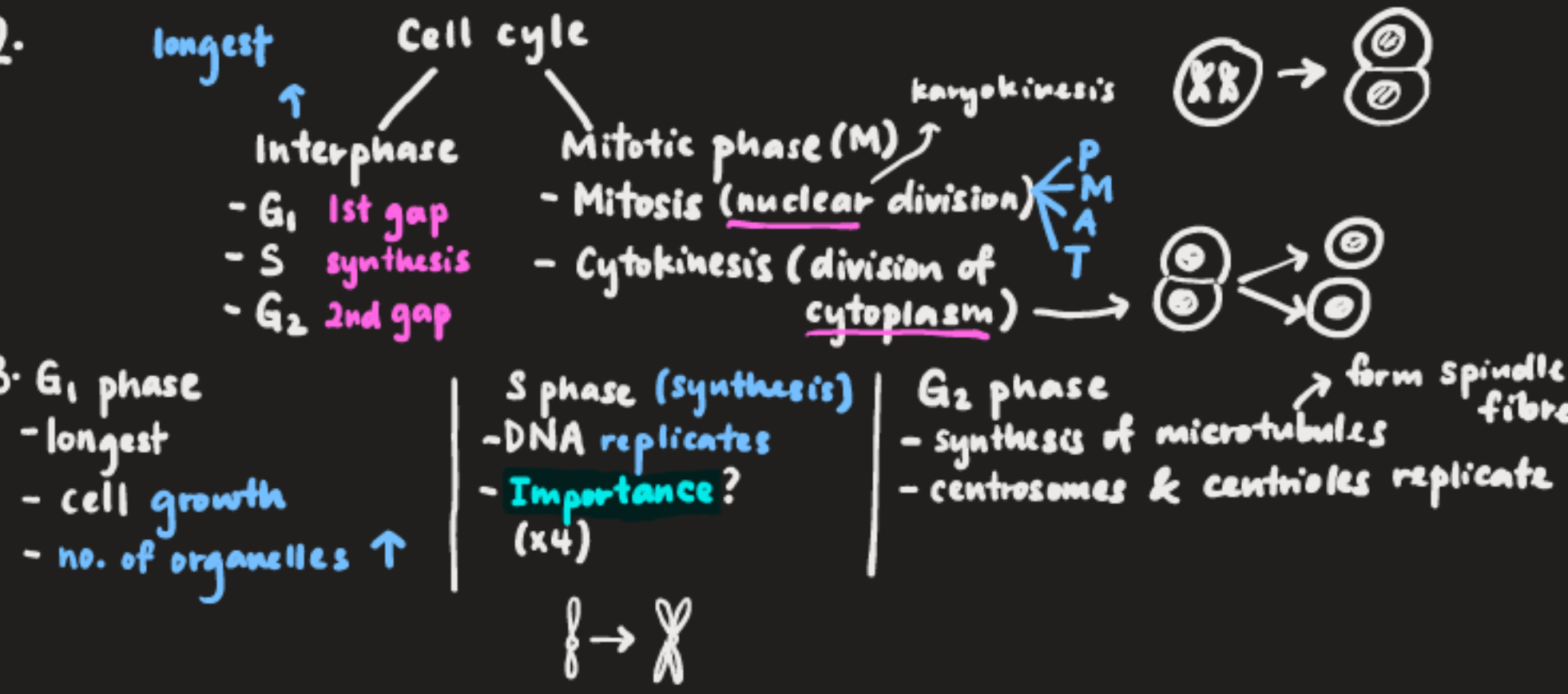


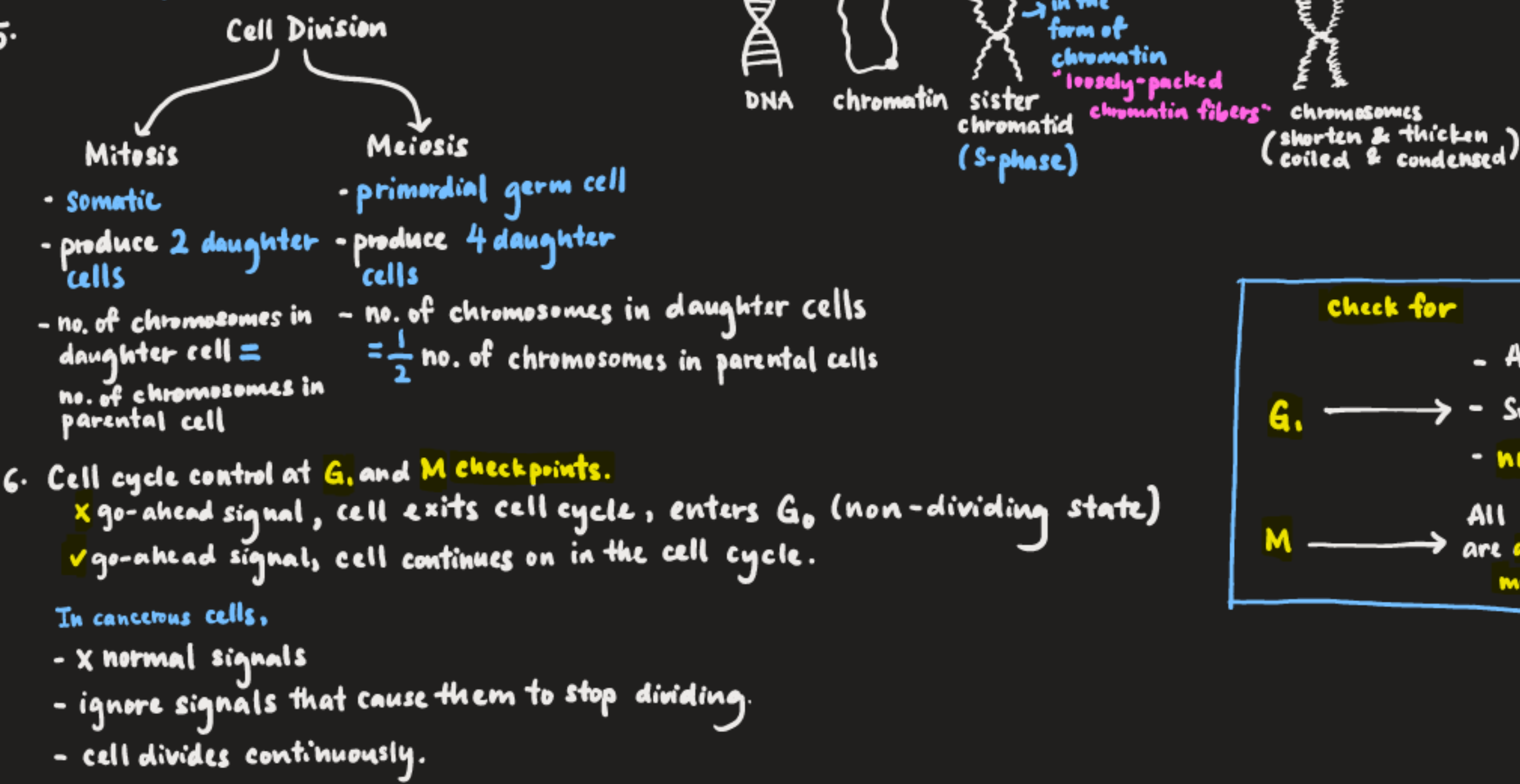
Topic 3: Cell division

16 December 2022 11:09

3.1 1. Cell cycle definition? The complete sequence of events in the life of an individual diploid cell.



4. Human somatic cells → 46 chromosomes  
Human reproductive cells → 23 chromosomes



3.2 1. Definition of mitosis? A division of somatic cell to produce 2 genetically identical daughter cells with each cell having the same number of chromosomes as the parental cell.

2. Prophase
1. Centrosomes move to opposite poles of the cell.
  2. Nuclear envelope and nucleolus disappear.
  3. Chromatin fibers coiled and condensed.
  4. Chromosomes shorten & thicken.
- chromosomal behaviour

Anaphase

1. Two sister chromatids separate & move towards opposite poles.
2. Each chromatid becomes an independent chromosomes.

Telophase

1. A new nuclear envelope forms around each group.
2. Nucleoli reappear in each new nucleus.
3. Chromosomes arrive at opposite poles.
4. Chromosomes uncoil & lengthen, become less condensed, return to chromatin form.

Metaphase

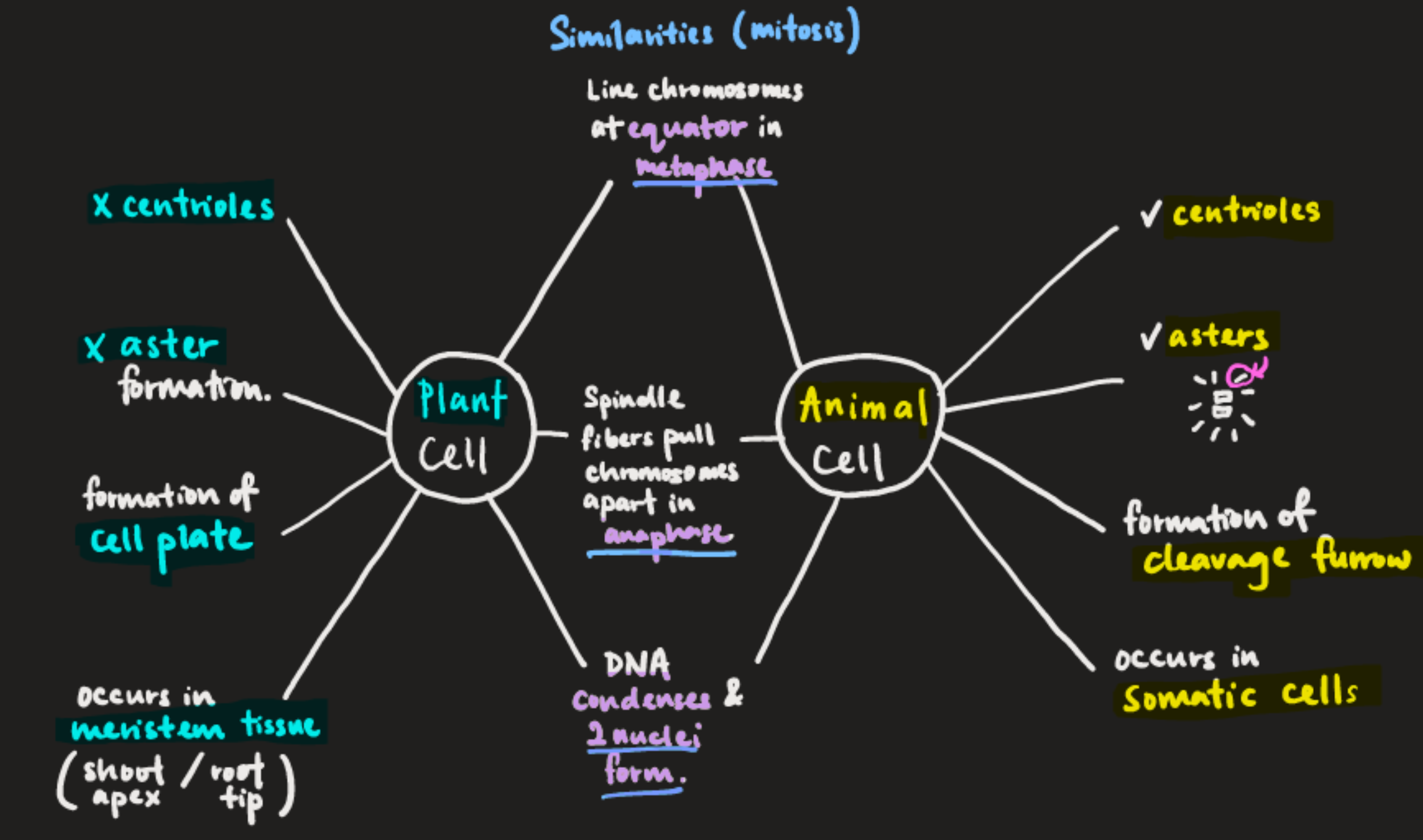
1. Chromosomes line up at the metaphase plate.
2. Chromosomes are attached to spindle fibres.

3. Cytokinesis in Animal Cell

- pinches: cleavage, appearance: cleavage furrow.
- membrane is pulled inwards by cytoskeleton.
- contractile ring forms on cytoplasmic side of cleavage furrow.
- microfilaments of the ring contracts.
- cleavage furrow deepens, reducing the diameter of contractile ring & pinches off.
- The cells are separated completely & 2 daughter cells are formed.

4. Cytokinesis in Plant Cell

- Vesicles derived from Golgi body move along microtubules to the middle of the cell.
- vesicles enlarge & fuse to form a cell plate across the equatorial of the cell.
- cell plate expands outward and fuse to plasma membranes.
- A new cell wall forms between the membranes and forming 2 cells.



5. Importance of mitosis

- Genetic stability
- Growth
- Regeneration
- cell replacement
- asexual reproduction

3.3

1. Definition of meiosis

The division of germ cell to produce four genetically non-identical haploid daughter cells with each cell having half the no. of chromosomes of the parental cell.

2. parental cell = 2n, daughter cell = n

3. Bivalent → 2 chromosomes X X

4. Tetrad → 4 chromatids 8888

5. Prophase I

- meiosis I
1. Leptotene
- chromosomes visible.
2. Zygotene
- Synapsis occurs
  - homologous chromosomes come tgt as pairs (bivalent/tetrad)
3. Pachytene
- crossing over occurs
  - region = chiasma
  - non-sister chromatids exchange genetic material.
4. Diplotene
- separation of homologous chromosomes
  - still attach at chiasma
5. Diakinesis
- chromosomes become thicker
  - chiasma appear as open crosses.
  - dispersion of nucleoli & nuclear envelope.
  - spindle fibres form.

meiosis II  
Same as mitosis.

Metaphase I

- Homologous chromosomes arranged at the metaphase plate of the spindle.

Anaphase I (centromere X split)

- Homologous chromosomes separate and move toward opposite poles.
- spindle fibres shorten & pull homologous chromosomes.

Telophase I

- Chromosomes arrived at opposite poles.
- Nuclear envelope reforms and nucleoli reappear.

6. Importance of meiosis

- produce haploid gametes for sexual reproduction.

- genetic variation.

(crossing over / random arrangement)

prophase I metaphase I