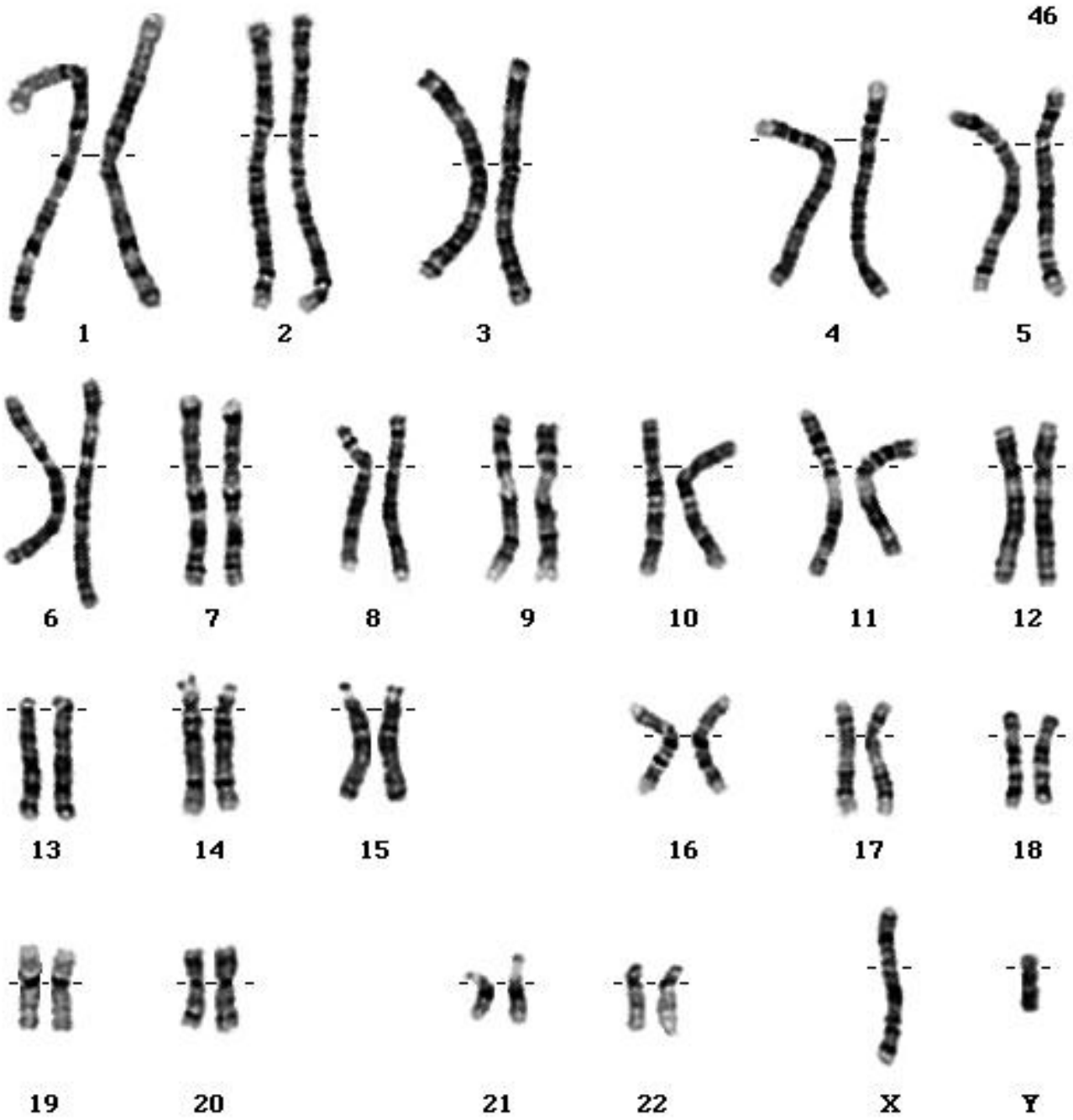
Meiosis

11-4

Chromosome Number

- You have 46 chromosomes in each body cell
- These are grouped into 23 homologous (matching) pairs.
- 23 from mom, 23 from dad
- Diploid = cell that has both (2) sets of chromosomes.
  - Humans: 2N = 46
  - Fruit fly: 2N = 8


46
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
X
Y

Gametes

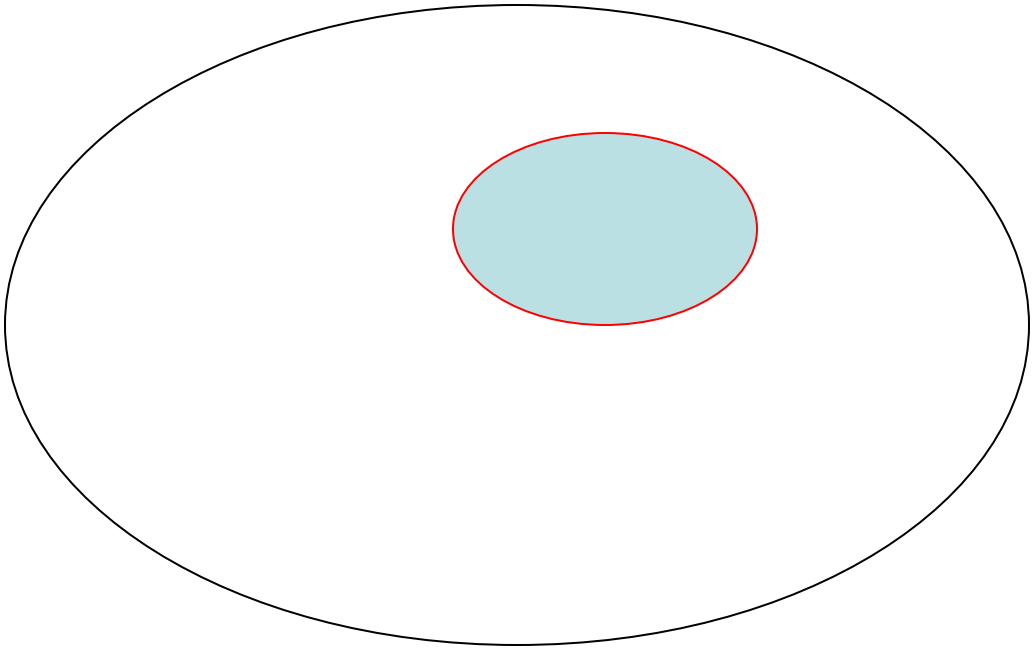
- A new organism (zygote) is formed when two gametes (sperm and ovum) combine
- If gametes each had 46 chromosomes, the offspring would have 92 chromosomes!
- Gametes have ½ the number of chromosomes = haploid
- 1 chromosome from each pair
- Humans: N = 23
- Fruit flies: N = 4

Meiosis

- Process where homologous chromosomes are separated as diploid cells are divided to produce haploid gametes
- Occurs in reproductive organs (ovaries and testies)
- 2 stages:
  - Meiosis I (separates chromosomes)
  - Meiosis II (separates chromatids)
- End result = 4 haploid gametes (egg or sperm)

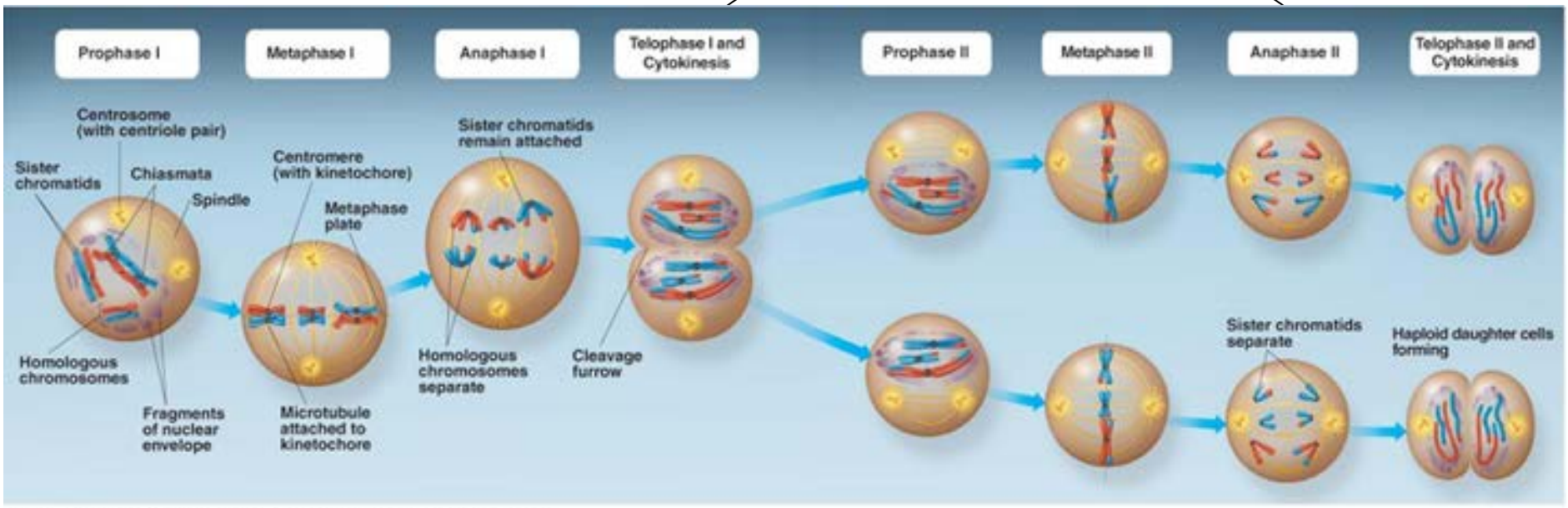
Interphase I

- DNA is replicated



Prophase I

- Nuclear envelope breaks down
- Chromosomes are formed (2 chromatids)
- Homologous chromosomes pair up (tetrad)
- Spindle forms



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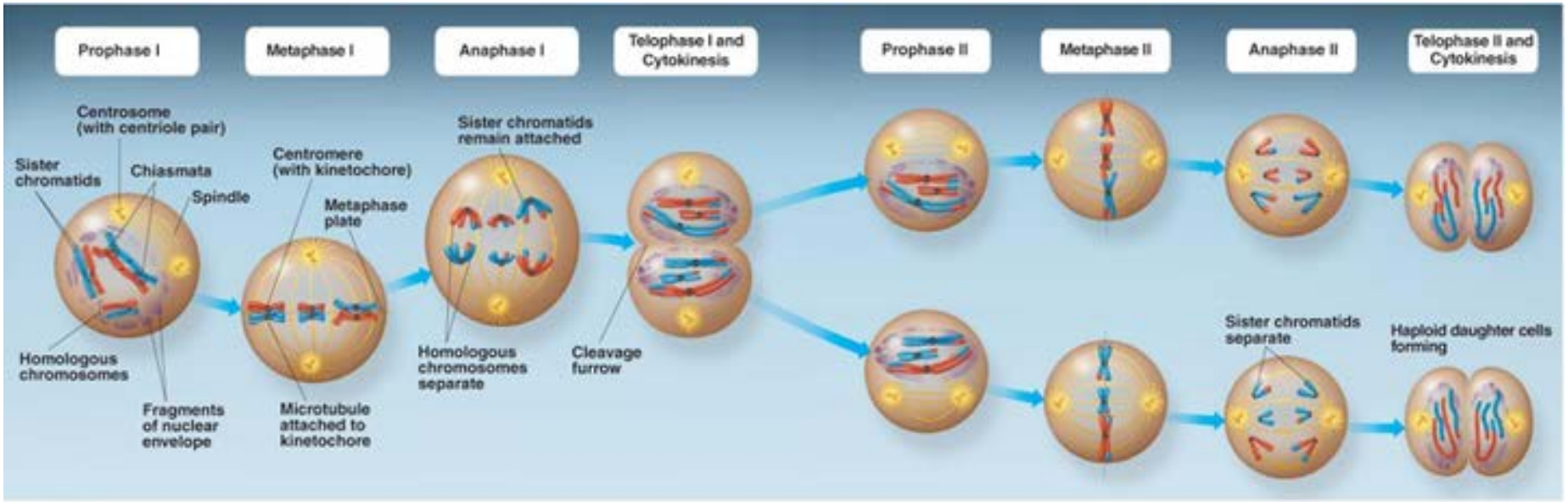
Crossing Over

- Occurs when tetrads form during Meiosis I
- Chromosomes exchange portions of their chromatids
- Results in different allele combos



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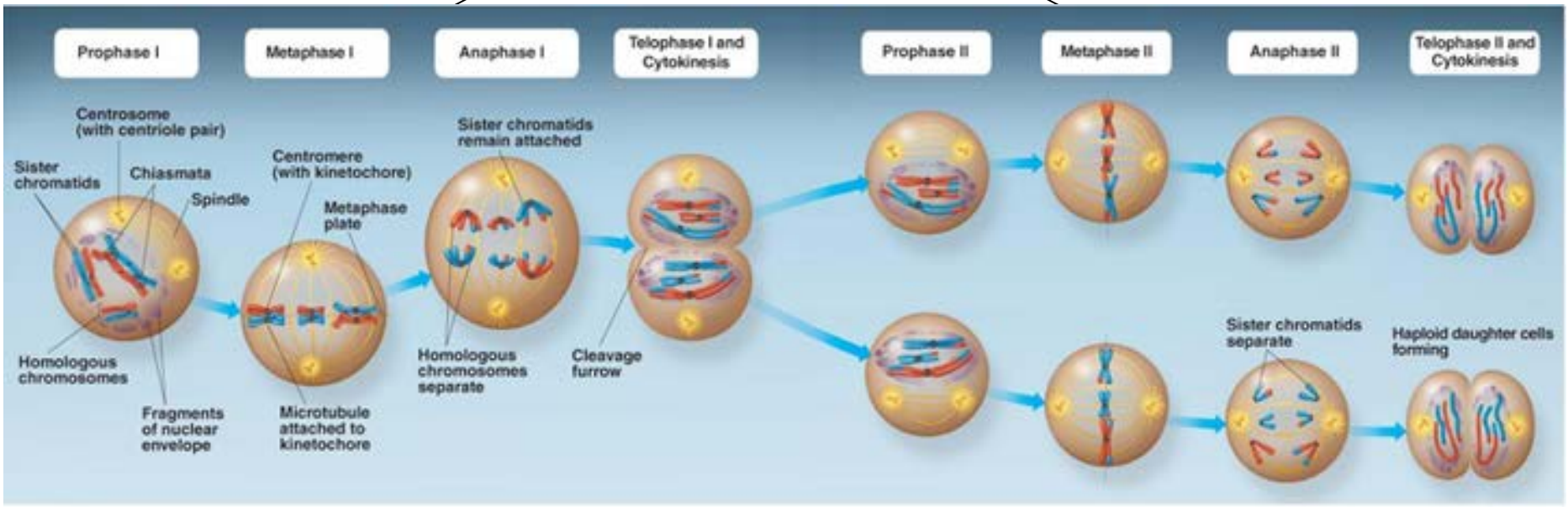
Metaphase I

- Spindle fibers attach to chromosomes
- Tetrads form in center of cell



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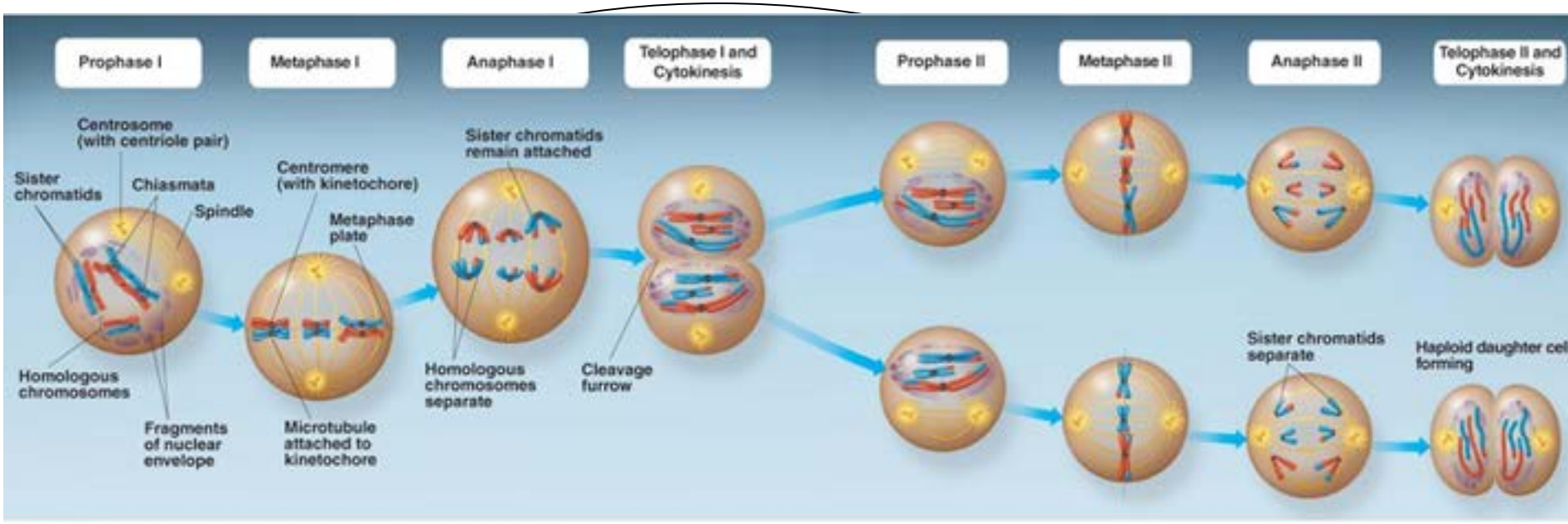
Anaphase I

- Homologous chromosomes separate



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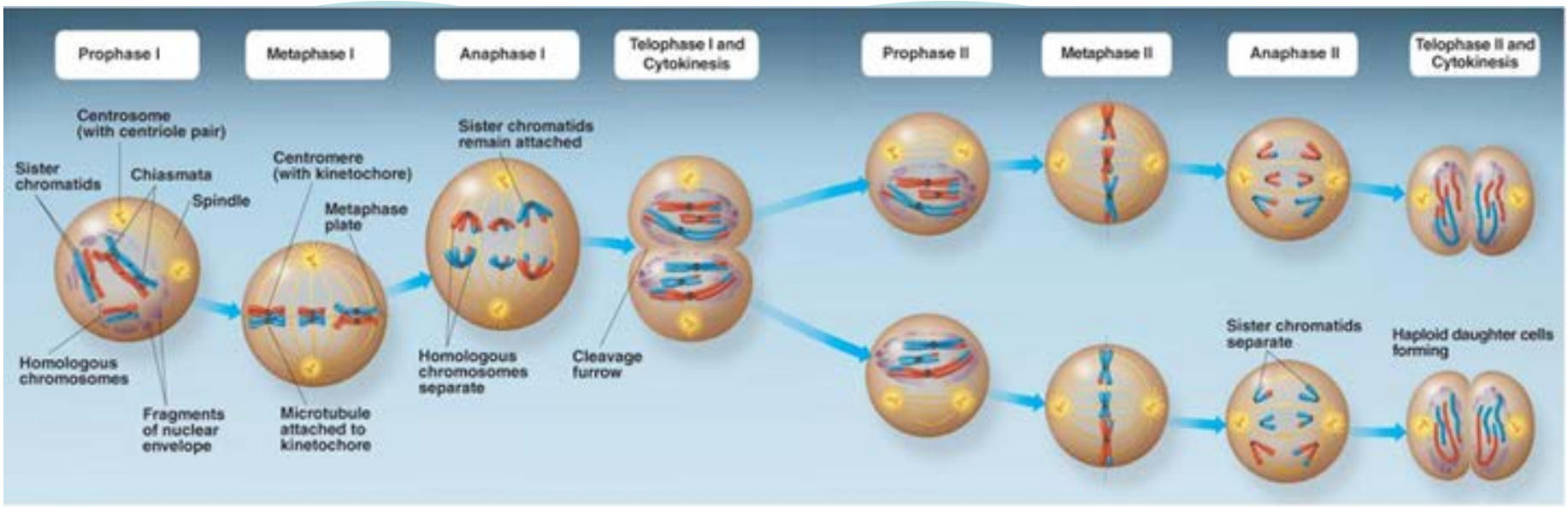
Telophase I and Cytokinesis

- Nuclear membrane reforms
- Cell divides into 2 haploid cells



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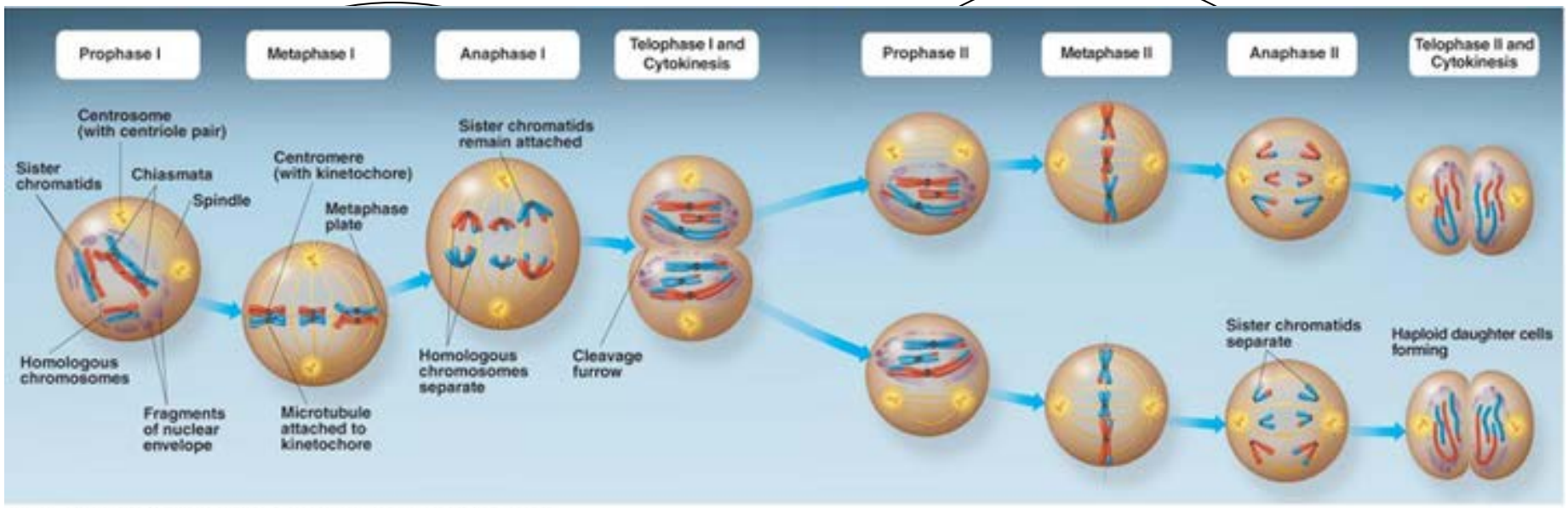
Prophase II

- Spindle forms
- Nuclear membrane breaks down



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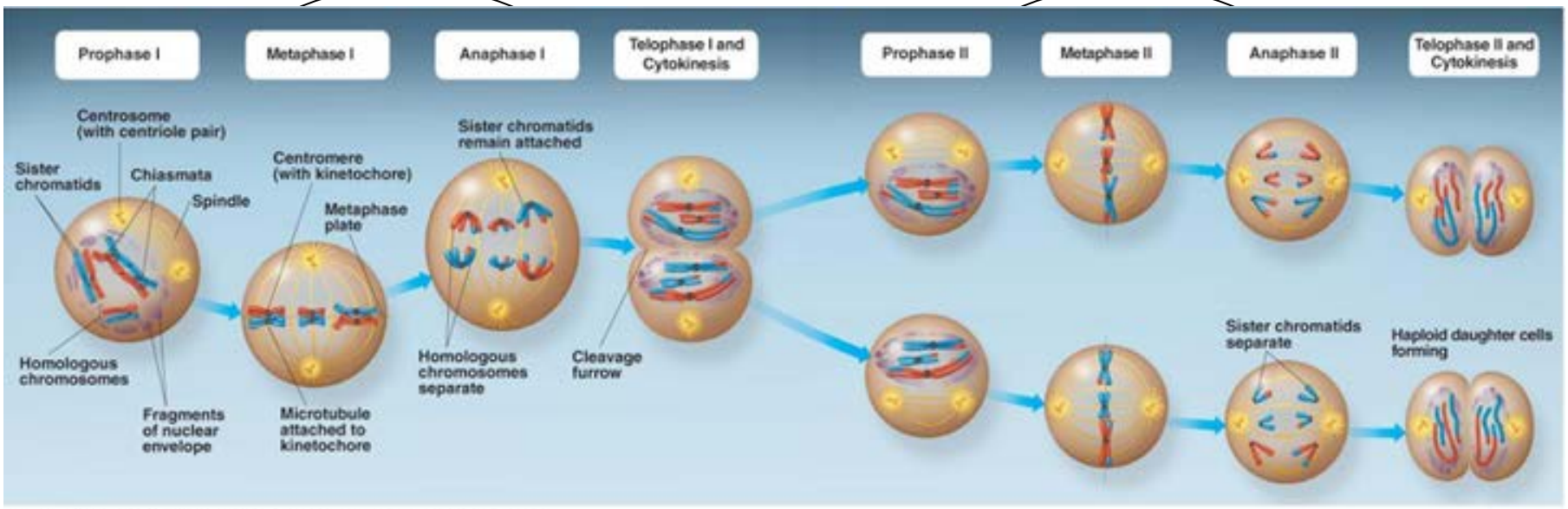
Metaphase II

- Spindle fibers attach to centromeres
- Chromosomes line up in middle



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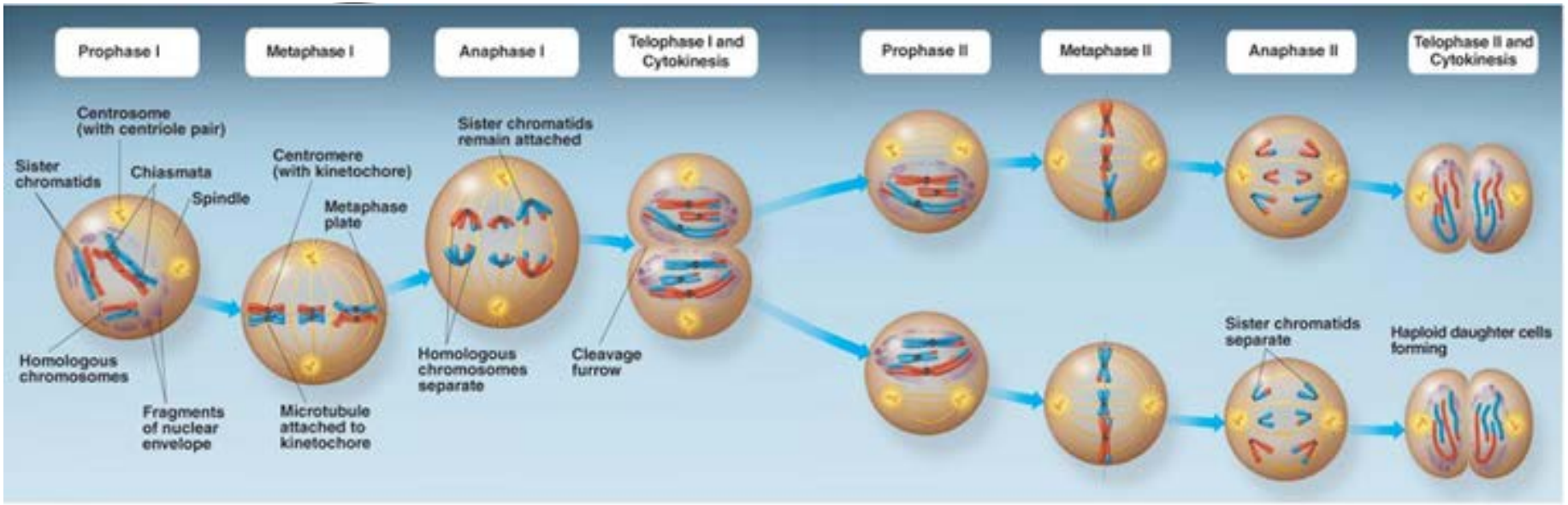
Anaphase II

- Sister chromatids separate



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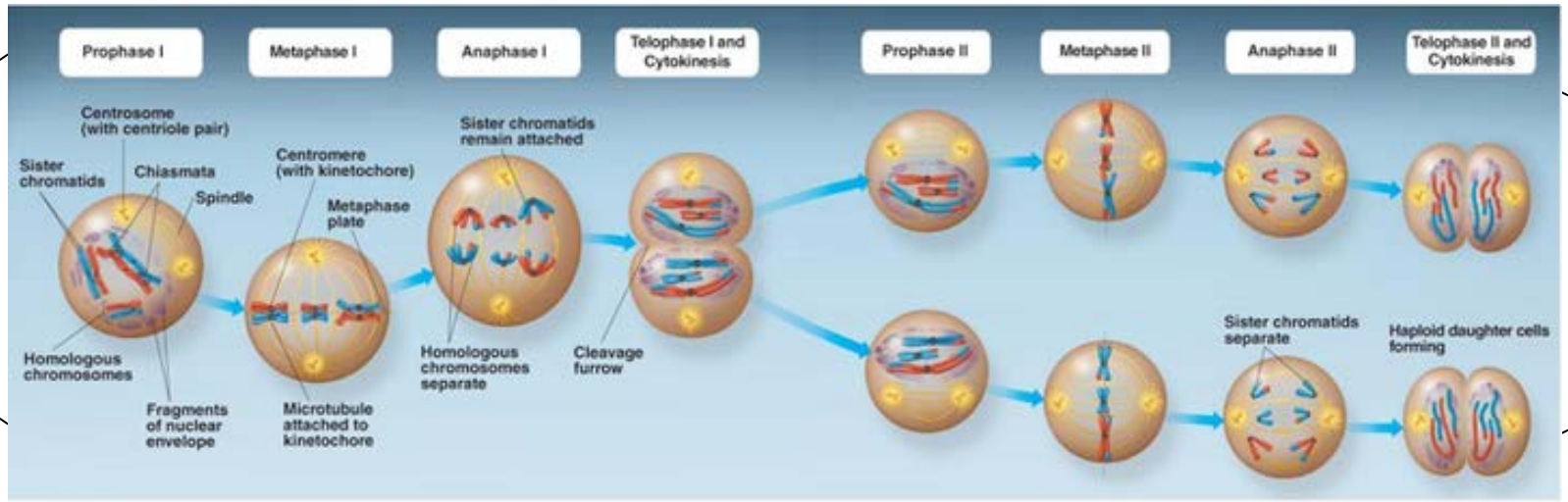
Telophase II and Cytokinesis

- Nuclear envelope reforms
- Cells divide
- End result = 4 haploid gametes
- http://highered.mheducation.com/sites/0072495855/student_view0/chapter28/animation__how_meiosis_works.html



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