These puzzles are useful aids for learning about cell division. Students will find the overview pages helpful as they work on completing their puzzles. Teachers may want to use the large phase pages as overheads during discussions about cell division.

The Puzzle of Mitosis and Meiosis
Preparation for Cell Division

**Interphase**

Chromosomes are so dispersed in the nuclei that they cannot be distinguished, but before interphase ends, their DNA has been duplicated.

**Prophase**

Chromosomes have condensed and become distinguishable; each chromosome consists of two chromatids joined at their centromeres.

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**Overview**

**Mitosis**

- **Metaphase**: Chromosomes line up on the spindle equator; homologues are not paired.
- **Anaphase**: Sister chromatids separate.
- **Telophase**: Nuclei are re-formed; each nucleus has two chromosomes of each type.
- **Interphase**: Cells have divided; chromosomes have unwound.

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**Centromeres SPLIT**
Chromosomes are so dispersed in the nuclei that they cannot be distinguished, but before interphase ends, their DNA has been duplicated.

Chromosomes have condensed and become distinguishable; each chromosome consists of two chromatids joined at their centromeres.
Preparation for Cell Division
Interphase
Prophase
Anaphase
Interphase
(NOT part of mitosis!)
Meiosis I

Metaphase I: Chromosomes line up on the spindle equator; homologues are paired.

Anaphase I: Sister chromatids stay together, but homologues separate.

Telophase I: Nuclei are not re-formed.

Meiosis II

Metaphase II: Chromosomes line up on the spindle equator; homologues are now in separate cells.

Anaphase II: Sister chromatids separate.

Telophase II: Nuclei are re-formed; each nucleus has only one chromosome of each type.
Metaphase I

Centromeres **DO NOT** split

Anaphase I

Telophase I

Metaphase II

Centromeres **SPLIT**

Anaphase II

Telophase II

**Meiosis puzzle pieces**

Chromosomes line up on the spindle equator; homologues are paired.

Sister chromatids **stay together**, but homologues separate.

Nuclei are **not** re-formed.

Chromosomes line up on the spindle equator; homologues are now in separate cells.

Sister chromatids **separate**.

Nuclei are re-formed; each nucleus has only **one** chromosome of each type.
Meiosis I puzzle
Meiosis II
Metaphase I
Anaphase I
Telophase I
Metaphase II
Anaphase II
Telophase II