AP BIO INSTA-REVIEW

TOPIC 5.1

Meiosis

IST-1.F.1

Meiosis is a process that ensures the formation of haploid gamete cells in sexually reproducing diploid organisms–

a. Meiosis results in daughter cells with half the number of chromosomes of the parent cell.

b. Meiosis involves two rounds of a sequential series of steps (meiosis I and meiosis II).

AP BIO INSTA-REVIEW

TOPIC 5.1

Meiosis

IST-1.G.1

Mitosis and meiosis are similar in the way chromosomes segregate but differ in the number of cells produced and the genetic content of the daughter cells.

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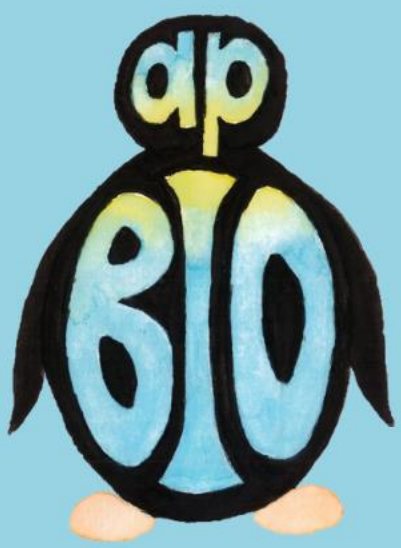
TOPIC

5.1



How many rounds of division in meiosis?

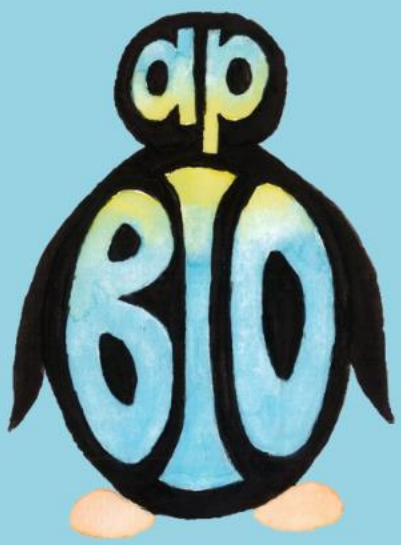
A. 0
B. 1
C. 2
D. 3

AP BIO INSTA-REVIEW

TOPIC 5.1

How many rounds of division in meiosis?

c. 2



The function of meiosis is to create FOUR HAPLOID daughter cells. In order to make FOUR cells, the parent cell must divide two times. The first division makes two cells, then the second division makes four cells.

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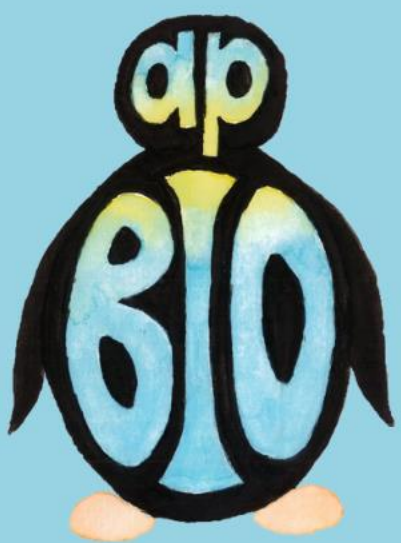
TOPIC

5.1



How many rounds of DNA replication?

A. 0

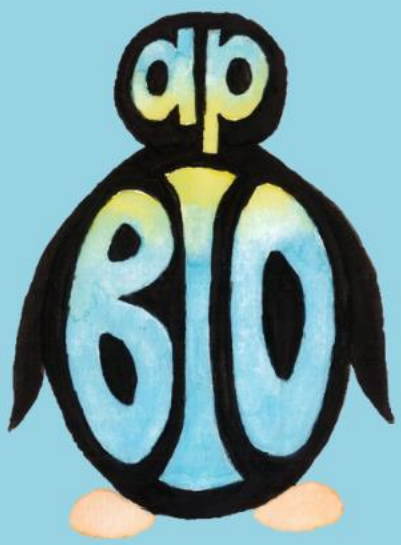
B. 1

C. 2

D. 3

AP BIO INSTA-REVIEW

TOPIC 5.1



How many rounds of DNA replication?

B. 1

The function of meiosis is to create FOUR HAPLOID daughter cells. In order to make HAPLOID cells, the parent cell must replication ONCE but divide TWICE. The first division makes two HAPLOID (with two chromatid) cells, then the second division makes four HAPLOID (with one chromatid) cells.

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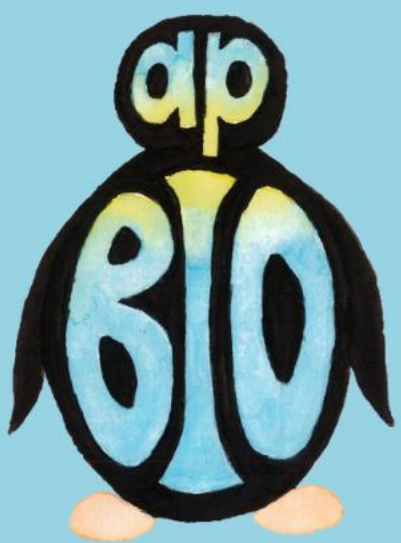
TOPIC 5.1



What phase does the crossing over take place?

A. Prophase I

B. Prophase II

C. Metaphase I

D. Metaphase II

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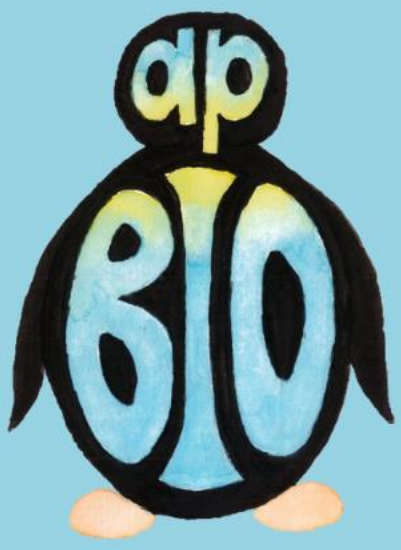
TOPIC 5.1



What phase does the crossing over take place?

A. Prophase I

Crossing over is the process where non-sister chromatids exchange genetic information. This takes place during prophase I. The chromatin condenses forming a tetrad (homologous chromosomes with two sister chromatids each). The nonsister chromatids will align and exchange genetic information.

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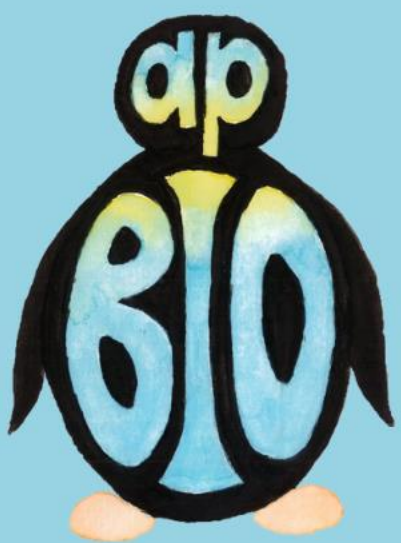
TOPIC 5.1



What phase does independent assortment take place?

A. Prophase I

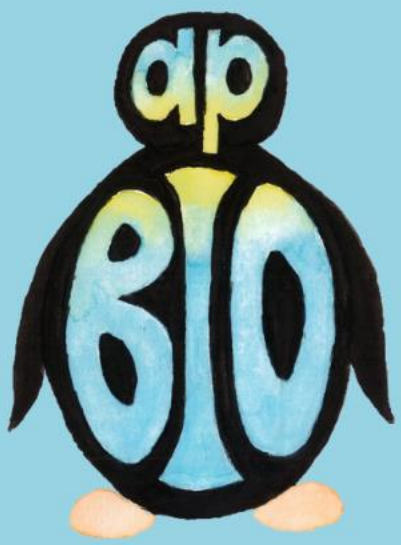
B. Prophase II

C. Metaphase I

D. Metaphase II

AP BIO INSTA-REVIEW

TOPIC 5.1



What phase does independent assortment take place?

C. Metaphase I

Independent assortment occurs when the homologous chromosomes align on the metaphase plate. This takes place during metaphase I. Recall the first round of division involves homologous chromosomes while the second round involves sister chromatids.

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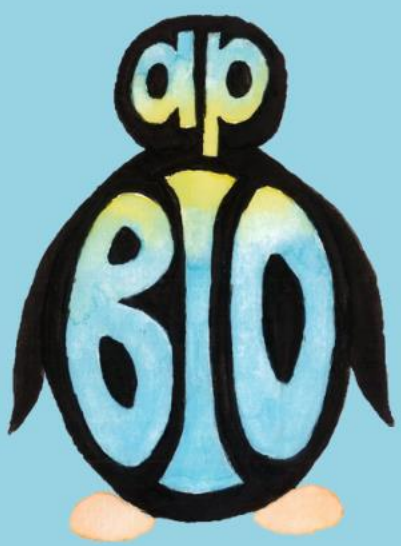
TOPIC

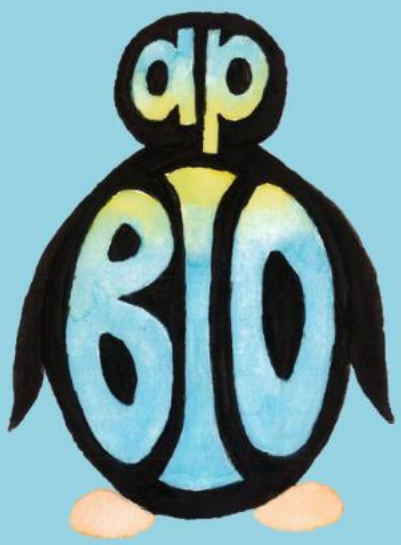
5.1



What is crossing over?

AP BIO INSTA-REVIEW

TOPIC 5.1



What is crossing over?

During prophase I, when the homologous pairs of chromosomes (maternal set and paternal set of a chromosome) pair, the non-sister chromatids (inner two) will overlap. The bonds will break and reform allowing the genetic material to switch chromatids. This results in recombinant DNA.

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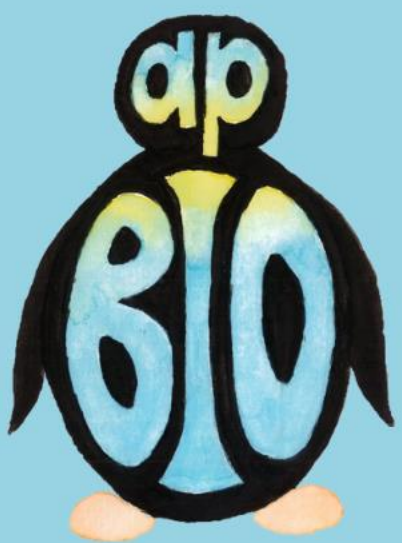
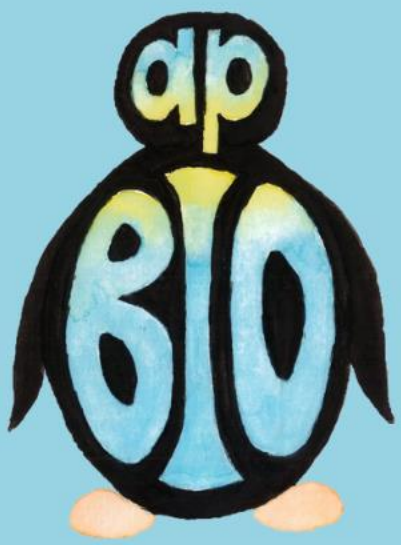
TOPIC 5.1



What is independent assortment?

AP BIO INSTA-REVIEW

TOPIC 5.1



What is independent assortment?

During metaphase I, the homologous chromosomes align on the metaphase plate. The independent assortment involves that the pairs independently align to face a pole of the cell. This means there are 2^n different combinations that could result.

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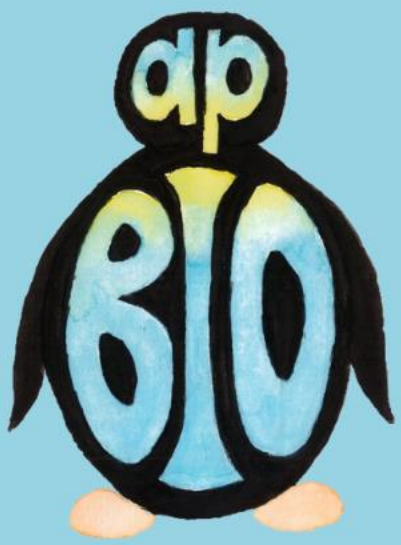
TOPIC

5.1



If parent cell is 2N, what is the ploidy of the daughter cell?

A. 0N
B. 1N
C. 2N
D. 3N

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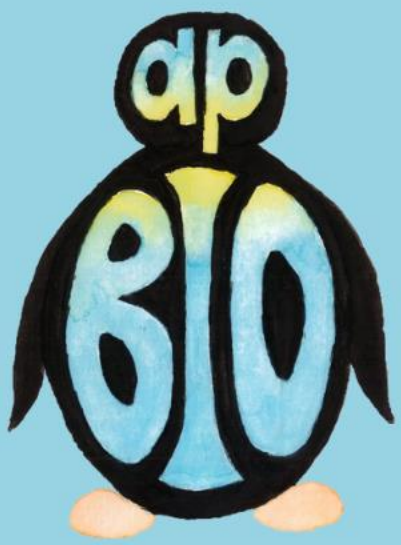
TOPIC 5.1



If parent cell is 2N, what is the ploidy of the daughter cell?

B. 1N

In meiosis, the parent cell is diploid (2N) and the daughter cell is haploid (1N). This is because the cell replicates its DNA ONCE but divides TWICE.

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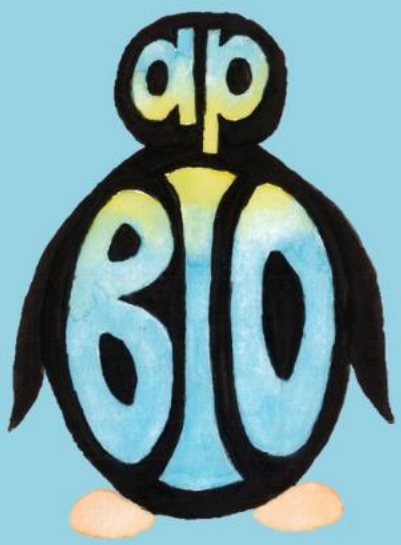
TOPIC 5.1



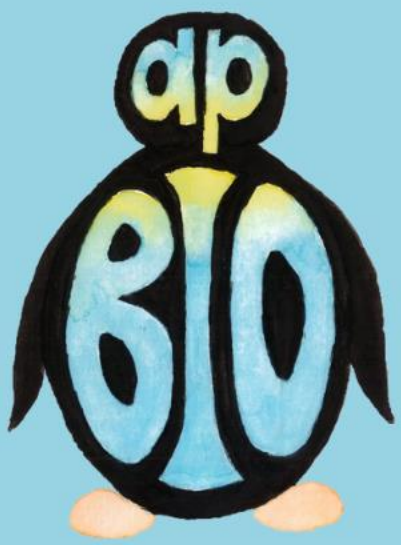
Comparing and Contrasting Mitosis and Meiosis

You should state the characteristics in mitosis AND meiosis.

Number of divisions

AP BIO INSTA-REVIEW

TOPIC 5.1



Comparing and Contrasting Mitosis and Meiosis

Number of divisions

Mitosis:
1 division

Meiosis:
2 divisions

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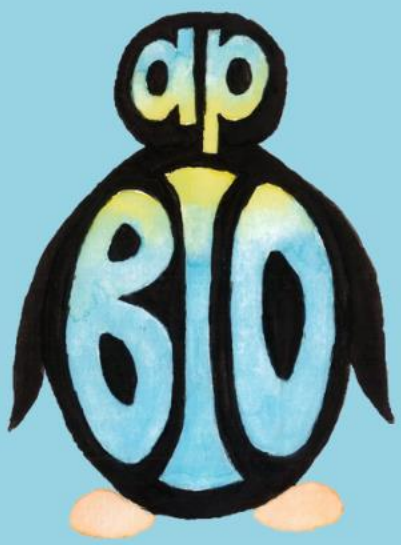
TOPIC 5.1



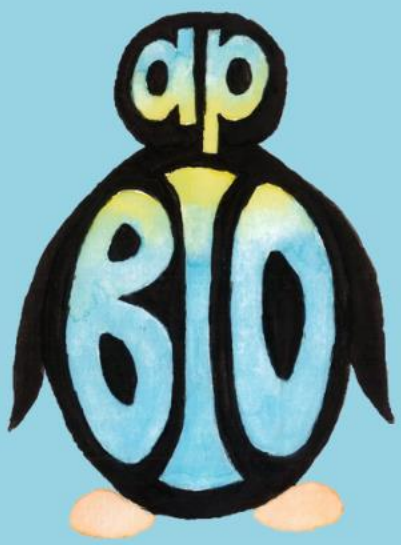
Comparing and Contrasting Mitosis and Meiosis

You should state the characteristics in mitosis AND meiosis.

Rounds of replication

AP BIO INSTA-REVIEW

TOPIC 5.1



Comparing and Contrasting Mitosis and Meiosis

Rounds of replication

Both mitosis and meiosis have 1 round of DNA replication before their division processes

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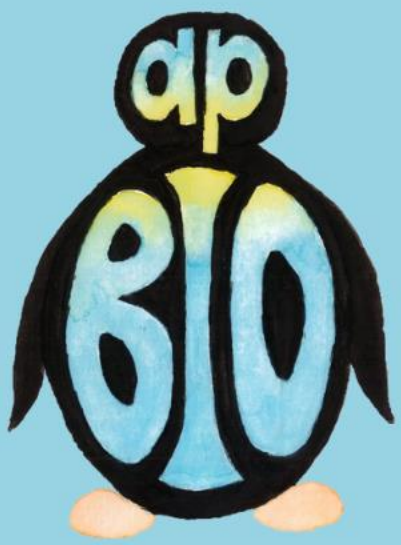

Comparing and Contrasting Mitosis and Meiosis

You should state the characteristics in mitosis AND meiosis.

Parent cell vs. daughter cell

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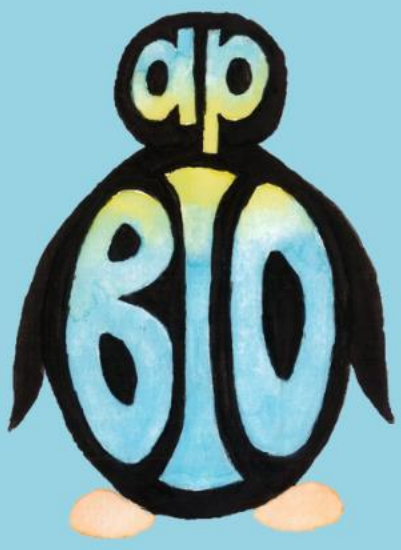
TOPIC 5.1



Comparing and Contrasting Mitosis and Meiosis

Parent cell vs. daughter cell

Mitosis:

Parent – 2N

Daughter – 2N & genetically identical

Meiosis:

Parent – 2N

Daughter – N & genetically distinct

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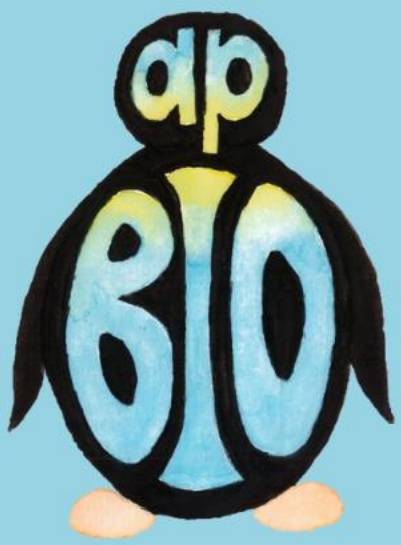

Comparing and Contrasting Mitosis and Meiosis

You should state the characteristics in mitosis AND meiosis.

Number of daughter cells

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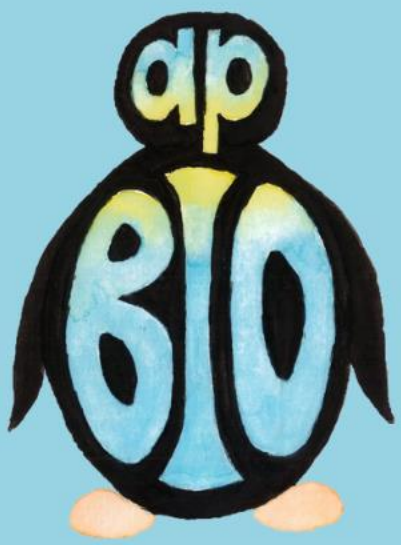
TOPIC 5.1



Comparing and Contrasting Mitosis and Meiosis

Number of daughter cells

Mitosis:
2 daughter cells

Meiosis:
4 daughter cells

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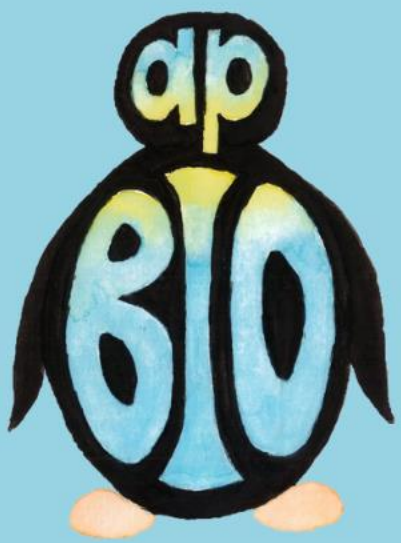
TOPIC 5.1



Comparing and Contrasting Mitosis and Meiosis

You should state the characteristics in mitosis AND meiosis.

Crossing over?

Independent assortment?

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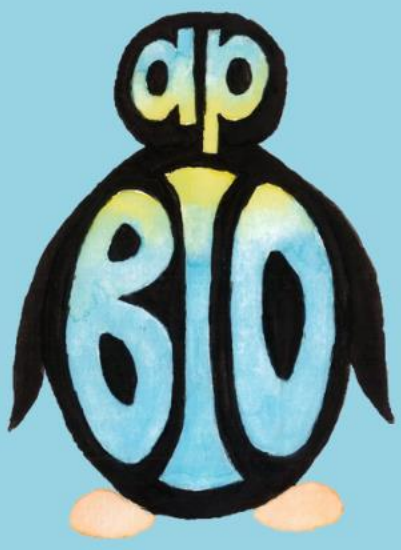
TOPIC 5.1

Comparing and Contrasting Mitosis and Meiosis



Crossing over?

Independent assortment?

Mitosis:

Crossing over – No

Independent assortment – No

Meiosis:

Crossing over – Yes

Independent Assortment - Yes

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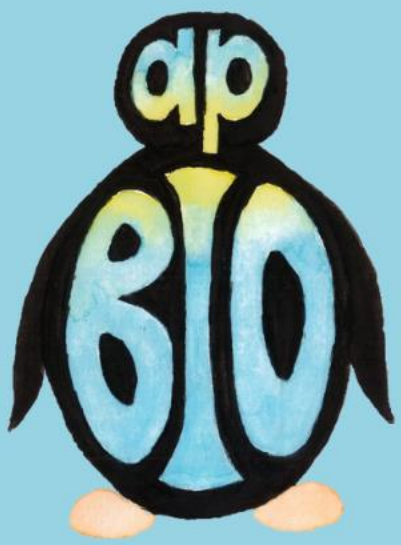
TOPIC 5.1



Comparing and Contrasting Mitosis and Meiosis

You should state the characteristics in mitosis AND meiosis.

Function of process?

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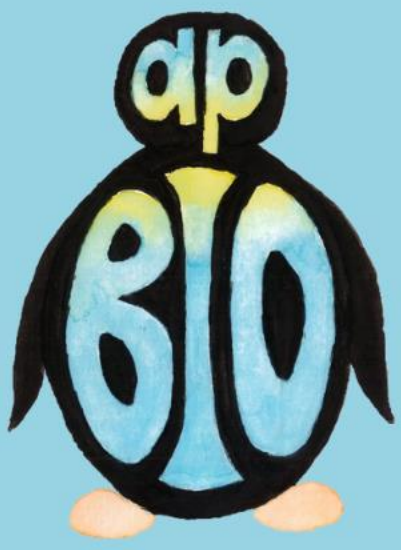
TOPIC 5.1



Comparing and Contrasting Mitosis and Meiosis

Function of process?

Mitosis:

Growth & Development

(responsible for organisms getting larger, replacing damaged cells, asexual reproduction, etc)

Meiosis:

Sexual reproduction

(forms gametes)

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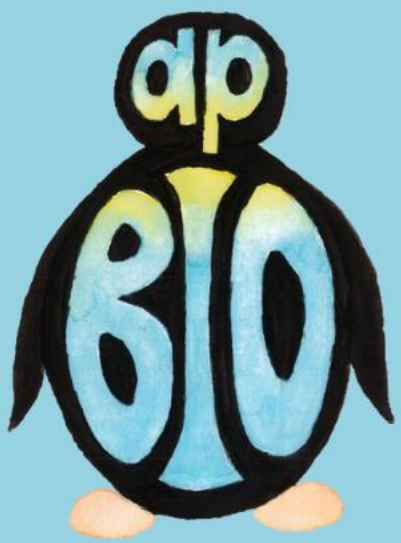
TOPIC 5.1



At the end of which round of meiosis is the cell haploid?

A. Meiosis I

B. Meiosis II

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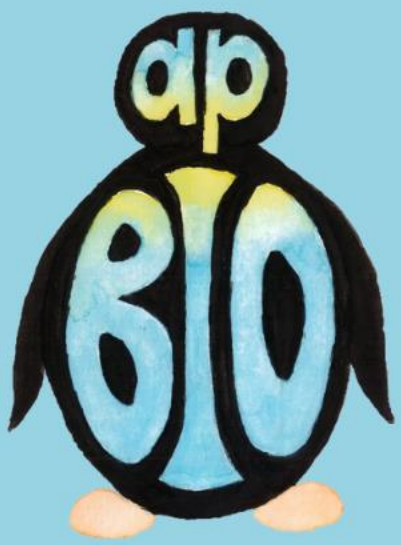
TOPIC 5.1

At the end of which round of meiosis is the cell haploid?

A. Meiosis I



The homologous chromsomes (one set from each parent) are separated during meiosis I. This leaves one SET of chromosomes in the daughter cells which is a HAPLOID cell.

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TOPIC

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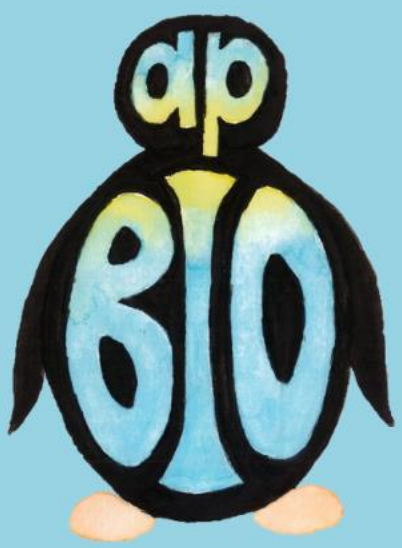

When does DNA replication occur for meiosis?

A. Before meiosis during interphase
B. During prophase when the cell is preparing
C. During metaphase when chromosomes are in the middle
D. During telophase when the nuclear envelope is forming

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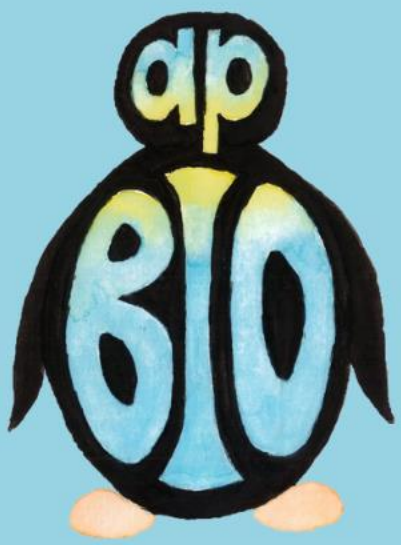
TOPIC 5.1



When does DNA replication occur for meiosis?

A. Before meiosis during interphase

DNA replication takes place during the S phase of interphase. This process takes place prior to the nuclear division involved with meiosis.

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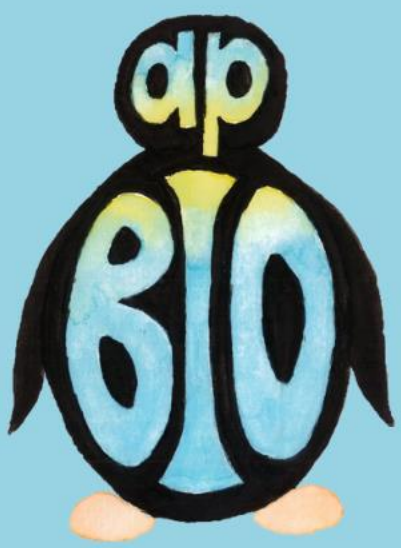
TOPIC

5.1



What phase of interphase does DNA replication occur?

A. G_1

B. G_2

C. S

D. It doesn't occur in interphase

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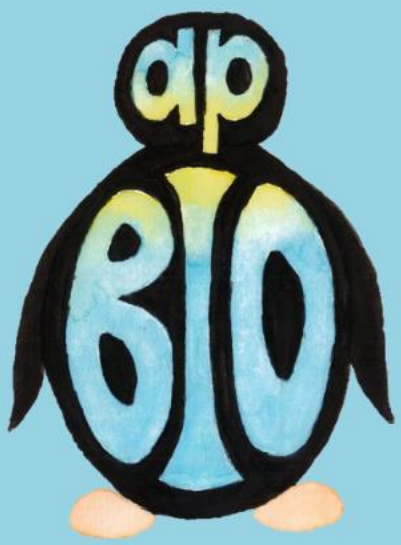
TOPIC 5.1



What phase of interphase does DNA replication occur?

C. S

Interphase is the cell preparing to divide by growing and replicating the chromosomes. The DNA replication takes place during the S phase, similar to mitosis.

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TOPIC

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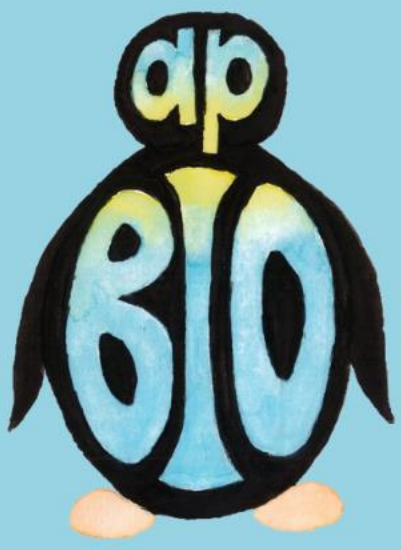

Compare and contrast number of DNA replications between mitosis & meiosis

A. Mitosis – 0, Meiosis – 1

B. Mitosis – 1, Meiosis – 1

C. Mitosis – 1, Meiosis – 2

D. Mitosis – 1, Meiosis – 0

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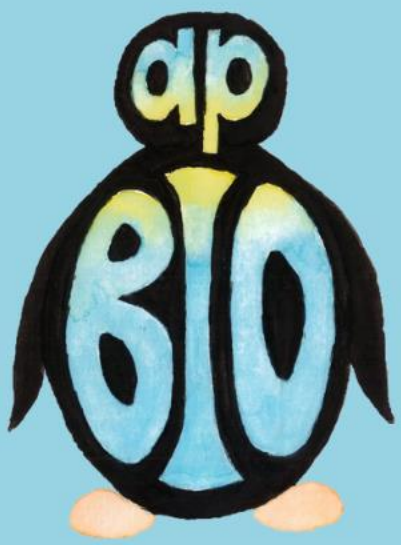
TOPIC 5.1



Compare and contrast number of DNA replications between mitosis & meiosis

B. Mitosis – 1, Meiosis – 1

Both mitosis and meiosis will replicate the DNA once.

The difference results from the number of divisions after that single round of replication.

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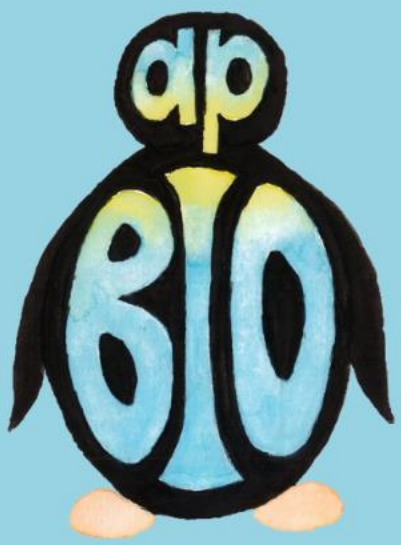
TOPIC

5.1



Compare and contrast number of divisions between mitosis & meiosis

A. Mitosis – 0, Meiosis – 1

B. Mitosis – 1, Meiosis – 1

C. Mitosis – 1, Meiosis – 2

D. Mitosis – 1, Meiosis – 0

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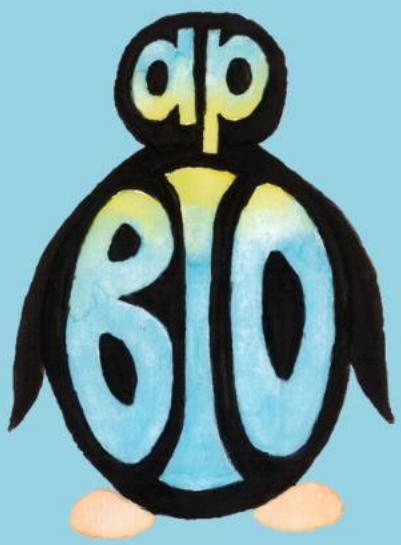
TOPIC 5.1



Compare and contrast number of divisions between mitosis & meiosis

C. Mitosis – 1, Meiosis – 2

The resulting cells of mitosis are TWO DIPLOID daughter cells, while the resulting cells of meiosis are FOUR HAPLOID daughter cells. This results because mitosis divides ONCE while meiosis divides TWICE.

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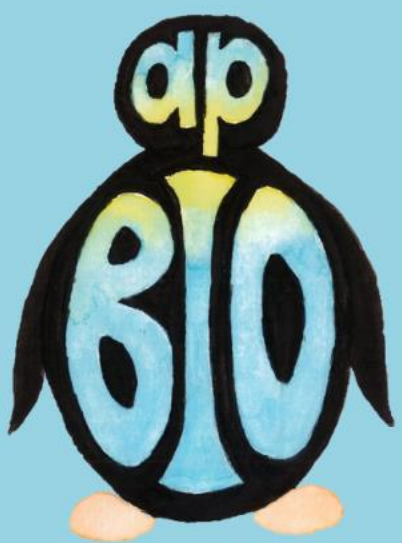
TOPIC

5.1



Identify the phases of meiosis

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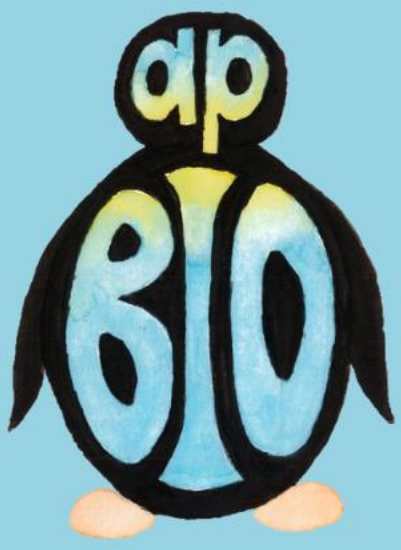
TOPIC 5.1



Identify the phases of meiosis

> Prophase I

> Metaphase I

> Anaphase I

> Telophase I

> Prophase II

> Metaphase II

> Anaphase II

> Telophase II

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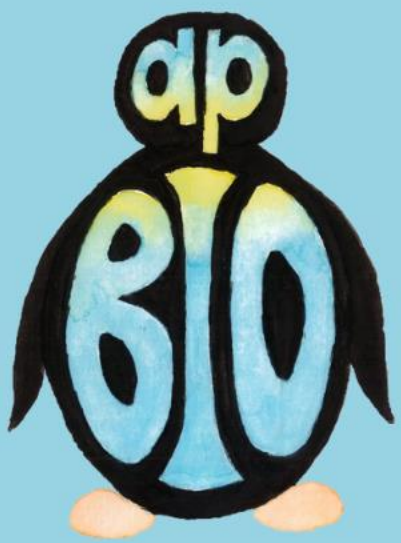
TOPIC 5.1



Describe the daughter cells in meiosis vs parent cell

The daughter cells are...

A. Identical & Diploid

B. Unique & Diploid

C. Identical & Haploid

D. Unique & Haploid

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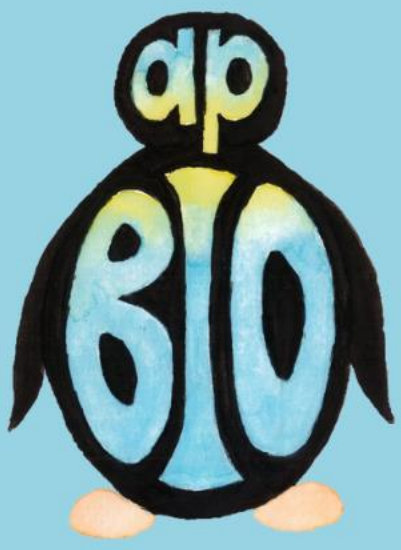
TOPIC 5.1



Describe the daughter cells in meiosis vs parent cell

The daughter cells are...
D. Unique & Haploid

The daughter cells in meiosis are haploid from one round of replication with two rounds of division. The cells are unique due to crossing over and independent assortment.

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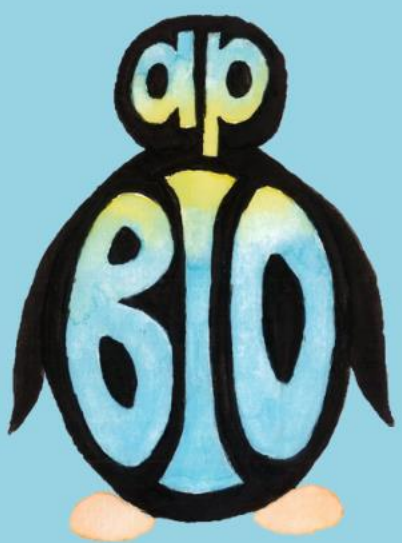
TOPIC 5.1



When does independent assortment take place?

A. Metaphase I

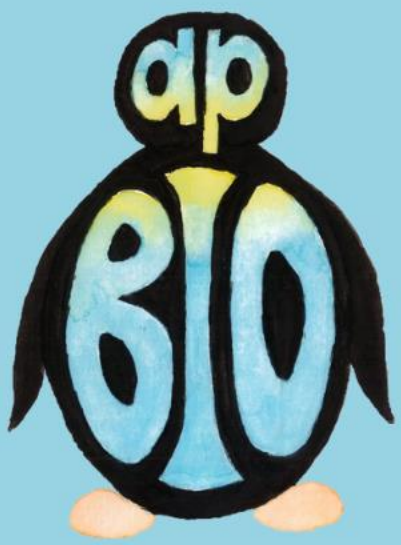
B. Metaphase II

C. Prophase I

D. Prophase II

AP BIO INSTA-REVIEW

TOPIC 5.1



When does independent assortment take place?

A. Metaphase I

Independent assortment takes place when the homologous chromosomes align on the metaphase plate. The alignment between the two sets of chromsomes in the homologous pair is independently positioned on the metaphase plate. Each set is facing an opposite pole to segregate during anaphase.

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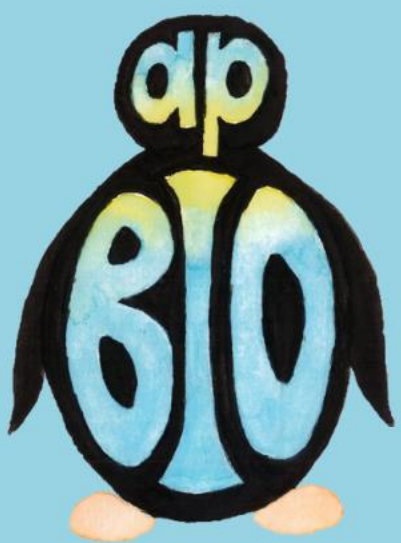

When does crossing over take place?

A. Metaphase I

B. Metaphase II

C. Prophase I

D. Prophase II

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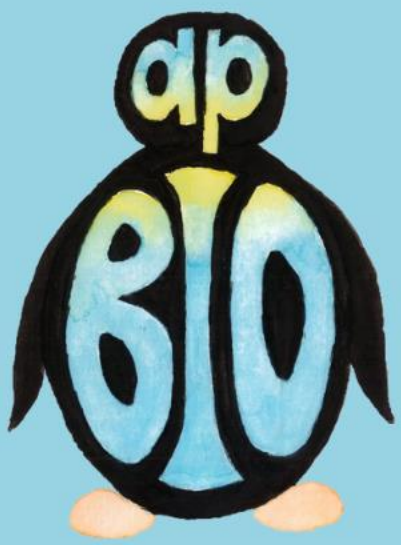

When does crossing over take place?

C. Prophase I

Crossing over takes place between non-sister chromatids during prophase I. This will take place while the homologous pairs condense and form the tetrad.

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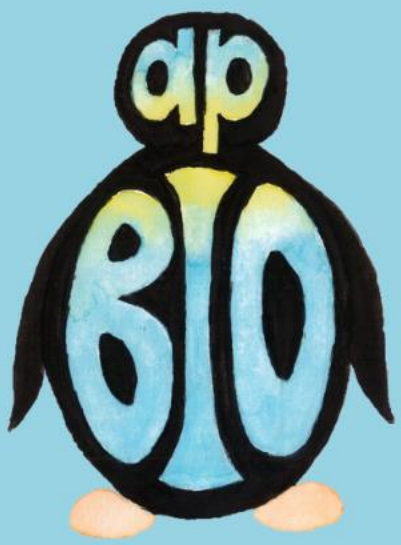

When does the cell go from diploid to haploid?

A. Meiosis I

B. Meiosis II

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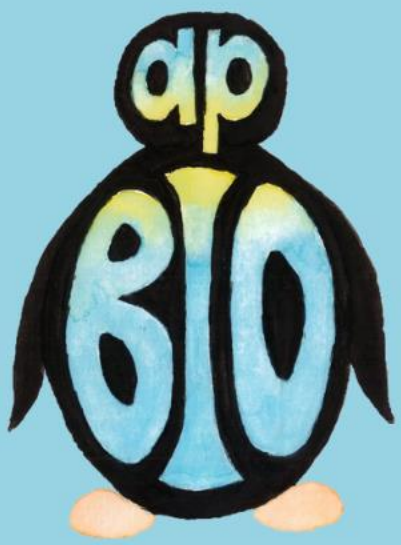
When does the cell go from diploid to haploid?

A. Meiosis I



Due to the two sets of chromosomes being separated into opposite cells at the end of meiosis I, then the cell is HAPLOID after meiosis I.

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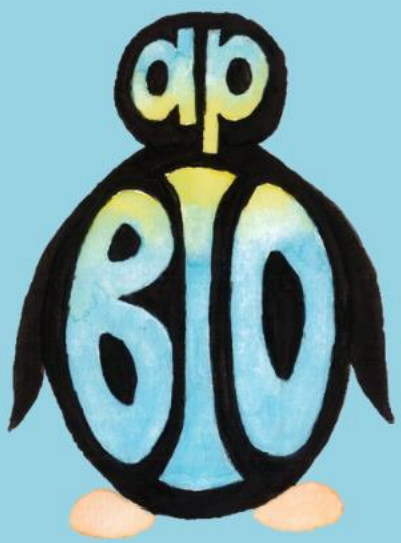

What goes through movements in Meiosis I?

A. Homologous chromosomes

B. Sister chromatids

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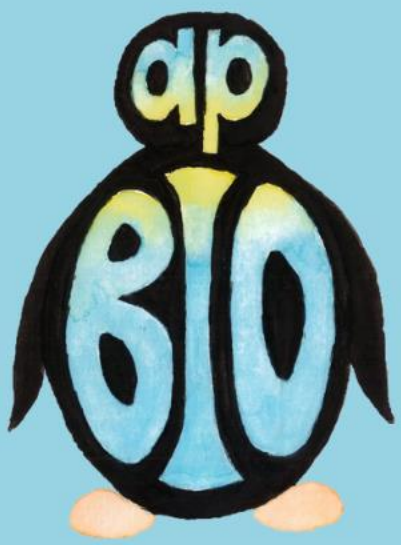
TOPIC 5.1



What goes through movements in Meiosis I?

A. Homologous chromosomes

The steps of meiosis involve the homologous chromosomes. This is one maternal set of chromosomes and one paternal set of chromosomes. This set will segregate during anaphase I.

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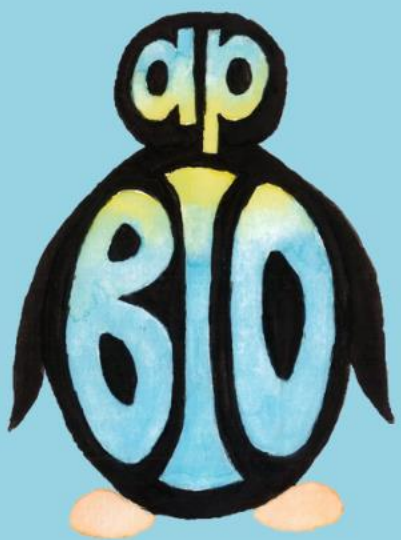
TOPIC 5.1



What goes through movements in meiosis II?

A. Homologous chromosomes

B. Sister chromatids

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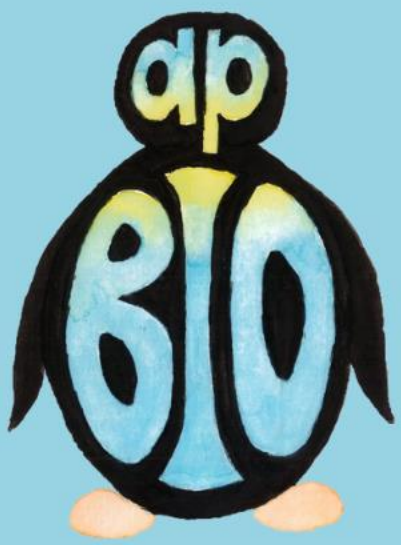

What goes through movements in meiosis II?

B. Sister chromatids

After meiosis I, the two sister chromatids remain together. The steps of meiosis II will involve the sister chromatids in the steps.