A.P. Biology Name _____

Campbell – Chapter 13 – Meiosis and Sexual Life Cycles

Variation means that offspring differ from their _____. That thought makes me very _____.

An Introduction To Heredity

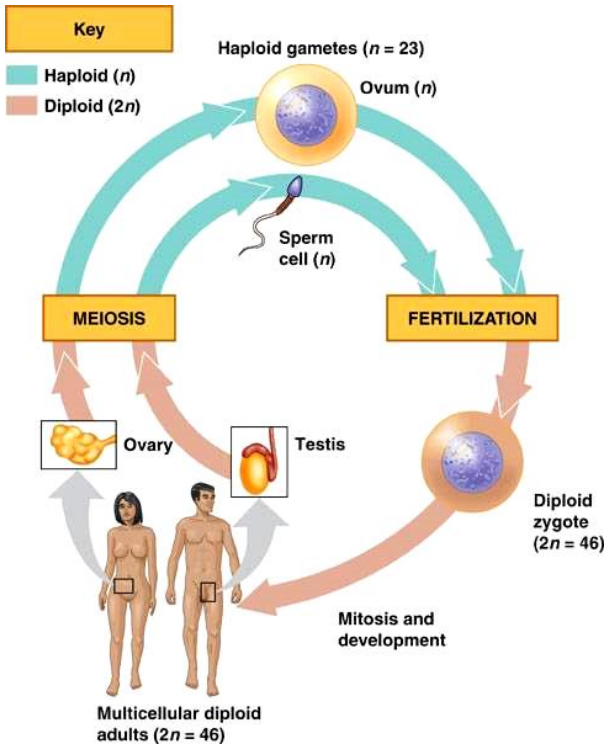
Offspring get their genes from their _____. Genes are discreet sections along the length of a c_____.
Our _____ is the combination of genes we inherit from our mother and father.
Most genes program cells to synthesize specific _____ and other _____.
In order for the transmission of hereditary traits to occur, DNA must be able to precisely _____ itself.
A gene's specific location along the length of a chromosome is its _____. (pl. _____).

Asexual Reproduction

The kingdom that is most closely associated with the use of mitosis as a reproductive mechanism is the Kingdom _____.
The textbook cites Hydra as a multicellular organism that can reproduce asexually by _____.
Does greater variation result from *asexual* or *sexual* reproduction? _____

Sexual Life Cycles

Human body cells are called _____ and they show ____ pairs of chromosomes. A display of stained human chromosomes is called a _____. Chromosomes in a pair are called _____ chromosomes. Homologues have a similar gene sequence, a similar staining pattern, are the same length, and possess a centromere in the same position.
Chromosomes exist in pairs in diploid cells. Genes are found upon chromosomes. It follows, then, that genes come in _____.
Chromosome pairs 1-22 are called _____. The 23rd pair of chromosomes are called the _____ chromosomes.
A female is designated by her sex chromosomes as an __ __ individual. A male is designated as __ __.
How many chromosomes are there in the maternal set? _____ The paternal set? _____
What is the diploid number for humans? $2n$ = _____ What is the haploid number for humans? n = _____
Another name for fertilization is _____. A haploid reproductive cell is a _____, and the union of two of these cells creates the _____. A zygote changes into a multicellular organism by _____ (mitosis / meiosis).
The only body cells NOT created by mitosis are the _____, which are made by the process of _____. This process occurs in specialized (germinal) tissue in the _____ ('nads).

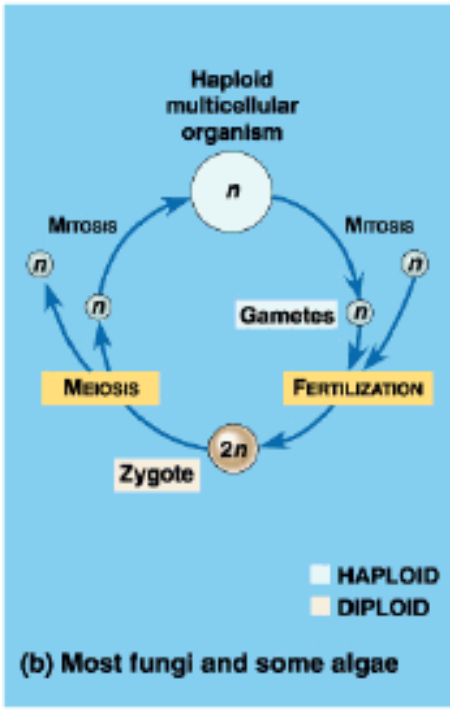


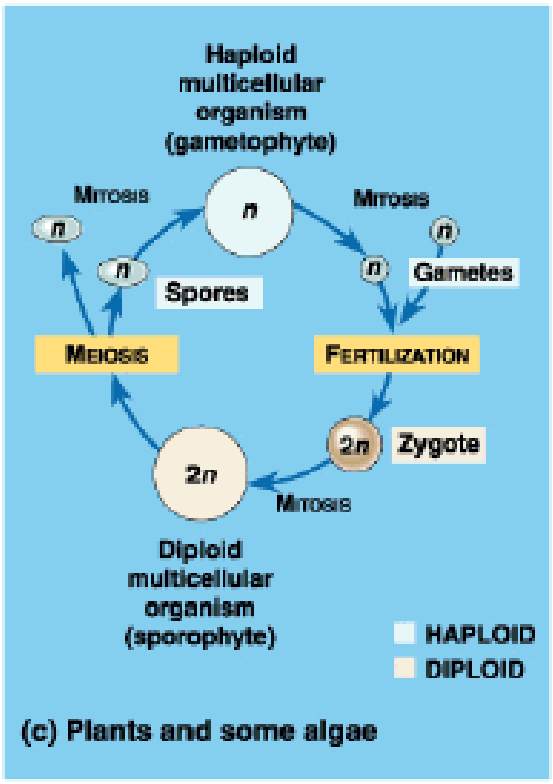
The Human Life Cycle

- In the human life cycle, the only haploid cells are the _____.
- These haploid cells are produced by _____.
- The gametes undergo no further divisions prior to _____.
- The diploid zygote divides by _____ (*mitosis* / *meiosis*).
- The adult organism is _____ (*haploid* / *diploid*).

The Life Cycle of Most Fungi and Some Algae

- Gametes are _____ (*haploid* / *diploid*).
- The zygote is _____ (*haploid* / *diploid*).
- The diploid zygote divides by _____ (*mitosis* / *meiosis*).
- Gametes arise by _____ (*mitosis* / *meiosis*).
- The only diploid stage is the _____.
- The adult organism is _____ (*haploid* / *diploid*).





The Life Cycle of Plants and Some Alage

- Meiosis produces s_____.
- Spores are _____ (haploid / diploid)
- The spore divides by _____.
- Gametes are made by _____.
- Fertilization produces a _____ (haploid / diploid) zygote.
- This zygote grows by _____ and then produces s_____ to complete the life cycle.

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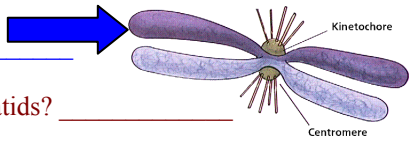
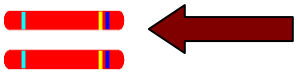
Meiosis Reduces The Chromosome Number From Diploid To Haploid

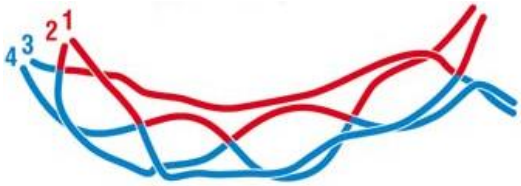
Both mitosis and meiosis are preceded by the _____ of chromosomes.
Replication means that each chromosome makes a _____ of itself.
In mitosis, this event is followed by _____ (#) division(s). In meiosis, this event is followed by _____ (#) division(s).
Meiosis results in _____ (#) daughter cells, each of them _____ (*haploid* / *diploid*).
Pictured right, do you see *homologous chromosomes* or *sister chromatids*? _____
Each individual chromosome in a homologous pair came from a different p_____.



Pictured left, do you see homologous chromosomes or sister chromatids? _____



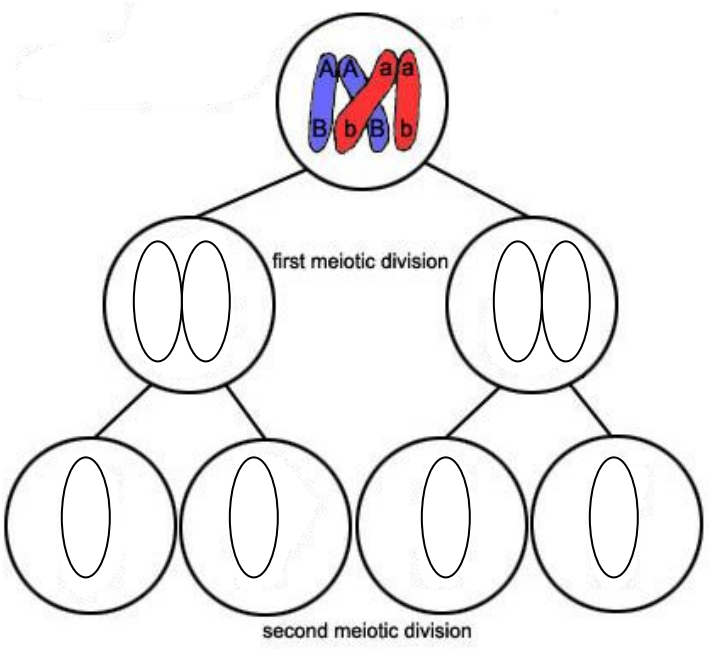
Does meiosis always begin with DNA replication? As far as I know, _____ (*Yes* / *No*)!
Are centrosomes and centrioles utilized during meiosis? I'm pretty sure they _____ (*are* / *aren't*)
During prophase I of meiosis, homologous chromosomes _____ (*pair up* / *are pulled apart*)!
Are the homologous chromosomes held together *loosely* or *tightly*? _____
A cluster of four tightly bound chromatids is called a(n) _____.
Wherever the chromatids cross, the junction is called a(n) _____.
It is possible that chromosomes exchange segments at a chiasma. These exchanges are called c_____ o_____.



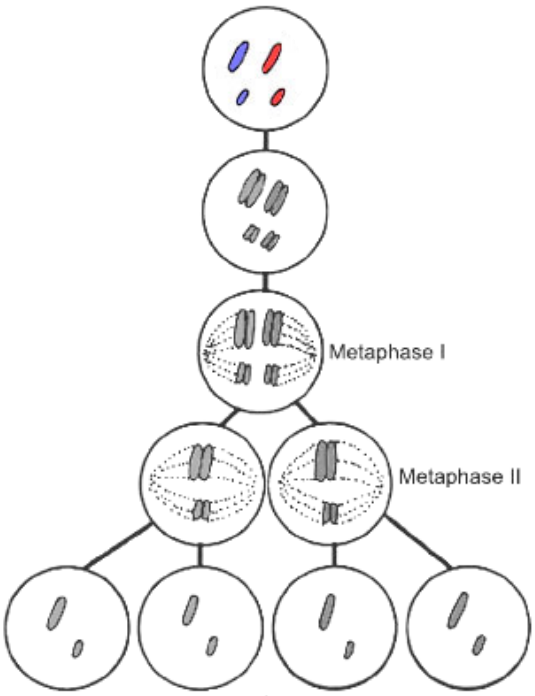
Circle each chiasma in the tetrad to the left. (Circle them all – even those that occur between sister chromatids!)
How many total chiasmata are there? _____
How many *homologue chiasmata* are there? _____

Most of the time spent during meiosis is spent in _____ (*prophase I, metaphase I, anaphase I, telophase I, prophase II, metaphase II, anaphase II, telophase II*).
Separation of homologues first occurs during what meiotic phase? (Hint: See the list above) _____
Are sister chromatids separated during the 1st meiotic division? _____ (*Yes* / *No*)
At the end of telophase I, are the daughter cells *haploid* or *diploid*? _____
Which meiotic phase is MORE like mitosis, *Meiosis I* or *Meiosis II*? _____
If the haploid number of an army ant is 17, what is the diploid number? _____ How many chromosomes are there in the gametes of an army ant? _____ How many chromosomes are there in the zygote of an army ant? _____

Finish Coloring And Labeling (A, a, B, b) The Diagram Below



Finish Coloring The Diagram Below



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Campbell – Chapter 13 – Meiosis and Sexual Life Cycles Pt. 3

Key Differences Between Mitosis and Meiosis – Matching

A – An event, structure, or outcome associated with Mitosis
B – An event, structure, or outcome associated with Meiosis

1. _____ The chromosome number is reduced in half.
2. _____ Chromosome replication followed by Prophase I.
3. _____ No arrangement for homologous chromosome pairing during metaphase.
4. _____ Synapsis
5. _____ Utilization of a tetrad.
6. _____ Sister chromatids are never paired with their homologues.
7. _____ Homologous chromosomes are separated.
8. _____ In animals, creates cells fit for fertilization only.
9. _____ In multicellular plants, is used to make spores.
10. _____ In fungi, is used to make gametes.
11. _____ In multicellular animals, is used for growth, replacement, repair.
12. _____ In multicellular plants, is used to make gametes.
13. _____ In multicellular animals, is used to make gametes.
14. _____ Number of divisions = 2.
15. _____ Crossing over occurs.
16. _____ Genetic recombination occurs.
17. _____ Nondisjunction might occur, resulting in gametes with irregular numbers of chromosomes.
18. _____ Involves a synaptonemal complex.
19. _____ Genetic variability among the daughter cells.
20. _____ Reduction division.
21. ____ Chiasmata are possible.

What is wrong with this picture?

-maternal chromatid

-paternal chromatid

Answer Here:

Crossing Over

During meiosis, do maternal and paternal chromosomes sort independently? _____ (Yes / No)
The chance that any 1 gamete will receive any 1 maternal chromosome is _____ %.
If the diploid number of an organism is 6 ($2n = 6$), what is the chance that any one gamete will have 3 maternal chromosomes? _____
In humans, there are more than __ _____ different maternal-paternal chromosome combinations in the gametes.
Is it possible that you received a DNA molecule derived from both your mother and your father? _____ (*Yes* / *No*)
Genetic recombination occurs only if crossing over occurs between _____ (*sister chromatids* / *homologous chromosomes*).
Does crossing over occur between non-homologous chromosomes? _____ (Yes / No)
Are you really unique? _____ (*Yes* / *No*)

Genetic variation is important in the biological mechanism that Charles Darwin called _____ _____. Without variation, Mother Nature cannot act differentially on members of a species. If all members of a species are exactly alike (ie. there is not variation), then all members will respond in like to environmental pressures. There would be no adaptive advantage, no mechanism to insure the continued survival of some members of the species. But *because* all natural populations show variation among their members, the individuals with suitable traits (we call them "fit") thrive (and produce more offspring) while those individuals with unsuitable traits struggle and produce fewer offspring. As a result, gene frequencies change in populations over time (as long as there is variation and there are selective forces at work). Meiosis (and crossing over) is an important source of variation in organism populations that utilize sexual reproduction. But so is mutation…and you'll learn more about THAT later. Until then, you must be satisfied with your knowledge that there are four mechanisms at work that have determined your own genetic make-up: (1) Who your parents are (2) Which of their many reproductive cells united at the very beginning of your life (3) How the homologues lined up during Metaphase I of Meiosis during the formation of your parents' gametes, and (4) The Crossovers that occurred during parental meiosis.