

Cell cycle and Heredity Exercise

1) Eukaryotic chromosomes are composed of which of the following macromolecules?

- A) DNA and RNA
- B) DNA only
- C) DNA and proteins
- D) DNA and phospholipids
- E) None of the above

2) In a diploid cell with 5 chromosome pairs ($2n = 10$), how many sister chromatids will be found in a nucleus?

- A) 5
- B) 10
- C) 20
- D) 40

3) Which of the following statements accurately describes the cellular organization of the genetic material?

- A) The genome of a cell is exclusively comprised of multiple DNA molecules.
- B) The DNA in a cell's genome is always packaged into chromosomes.
- C) Prokaryotic cells typically possess a single DNA molecule as their genome, while eukaryotic cells may have multiple DNA molecules forming their genome.
- D) Chromosomes in eukaryotic cells consist of RNA molecules instead of DNA, allowing for more efficient storage of genetic information.
- E) None of the above.

4) Which of the following statements accurately describes eukaryotic chromosomes?

- A) Chromosomes in eukaryotic cells are composed solely of DNA molecules.
- B) Somatic cells, such as skin or muscle cells, contain a single set of chromosomes.
- C) Gametes, like sperm and eggs, carry the same number of chromosomes as somatic cells.
- D) None of the above

5) How do prokaryotes, such as bacteria, reproduce?

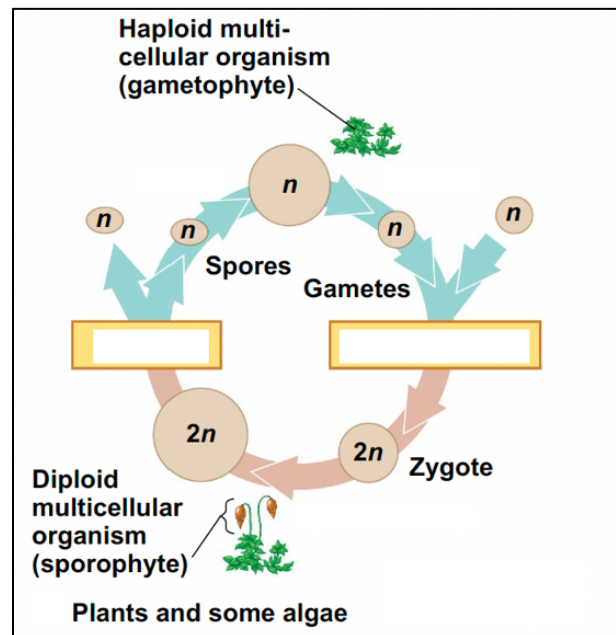
- A) By mitosis
- B) By meiosis
- C) By binary fission
- D) By gametogenesis
- E) None of the above

6) Which of the following statements accurately compares asexual and sexual reproduction?

- A) Asexual reproduction involves the fusion of gametes from two parents.
- B) Sexual reproduction results in the formation of genetically identical offspring.
- C) A clone is formed through sexual reproduction.
- D) In sexual reproduction, offspring inherit unique combinations of genes from two parents.
- E) None of the above

7) Which of the following accurately describes the **alternation of generations** in plants and some algae? Use the diagram below to help you answer the question.

- A) The diploid organism produces haploid spores through mitosis.
- B) Gametophytes produce diploid gametes through meiosis.
- C) Sporophytes make haploid spores by mitosis.
- D) Fertilization of gametes gives rise to a haploid gametophyte.
- E) None of the above.



8) How does crossing over contribute to genetic variation?

- A) Crossing over separates sister chromatids during mitosis.
- B) Crossing over increases the number of chromosomes in offspring.
- C) Crossing over produces recombinant chromosomes by combining DNA from each parent.
- D) Crossing over occurs during independent assortment of chromosomes.
- E) None of the above

9) Horizontal gene transfer, particularly in prokaryotes, involves the transfer of genes between cells of the same generation. Which of the following is a mechanisms of horizontal gene transfer occurs in bacteria?

- A) Transcription
- B) Translation
- C) Conjugation
- D) Respiration
- E) None of the above

10) How does transduction in bacteria occur?

- A) Through direct cell-to-cell contact between donor and recipient cells.
- B) Via the uptake of free-floating DNA fragments by recipient cells.
- C) Through the transfer of DNA from a donor cell to a recipient cell by a bacteriophage.
- D) By the fusion of gametes during sexual reproduction.
- E) None of the above