**SCIENCE 9**
**UNIT 4:REPRODUCTION**
**WORKSHEET 6 : MEIOSIS**

**Sexual reproduction** – Requires two parents and produces genetically different offspring. This results in genetic diversity within the species

**Haploid (n) :** half the genetic content

1. sperm has 23 chromosomes,
2. egg has 23 chromosomes

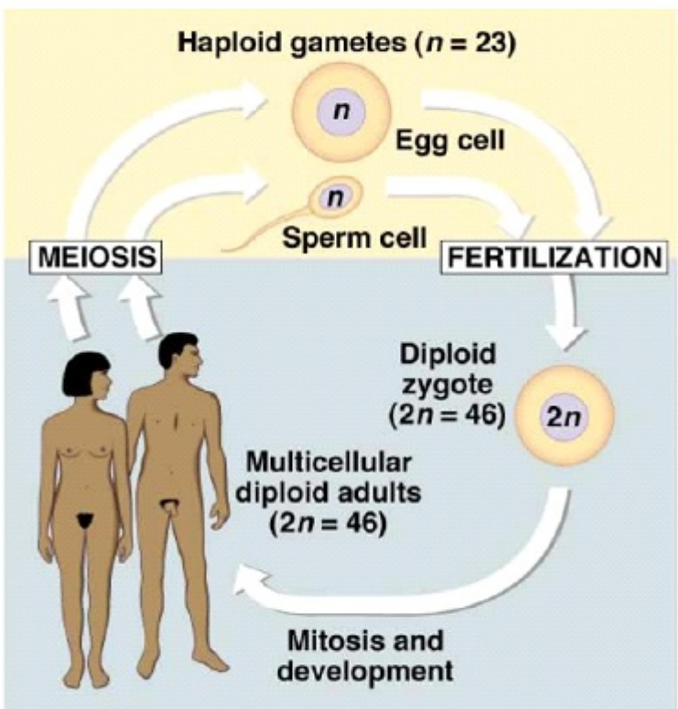
**Diploid (2n)**: genetic content equal to the parent

Through fertilization, haploid sperm (23 chromosomes)+ haploid egg (23 chromosomes)= diploid zygote (46 chromosomes, the same amount of chromosomes as the parents)

**Gametes:** Specialized cells necessary for reproduction. Gametes are haploid

- Male gametes: Sperm
- Female gametes: egg

**Zygote** : a cell that is formed when an egg and a sperm combine : a fertilized egg. It is the first body cell of a new organism. As the zygote undergoes repeated mitosis and cell division, it matures into an embryo.

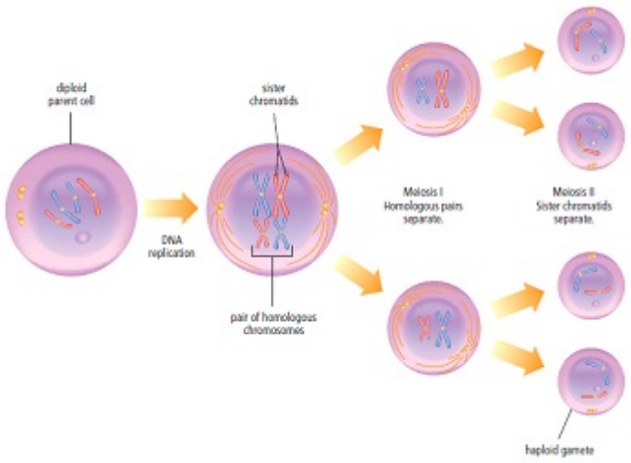



In order for human body cells to remain diploid, gametes must have one half the number of chromosomes—that is, 23. Only haploid gametes with 23 chromosomes can combine during fertilization to form a diploid zygote with 46 chromosomes.

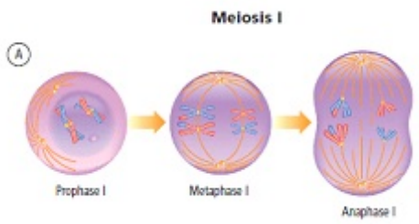
**Meiosis** the process that produces gametes with half the number of chromosomes as body cells. It is the basis of sexual reproduction. Meiosis is NOT a cycle like mitosis.

**Meiosis: Reducing Chromosome numbers:**

- DNA only replicates once, in interphase, before meiosis begins
- Two complete cell divisions occur, once after meiosis I and once after meiosis II
- By the end of Meiosis II, the 1 diploid cell that entered meiosis has become 4 haploid cells



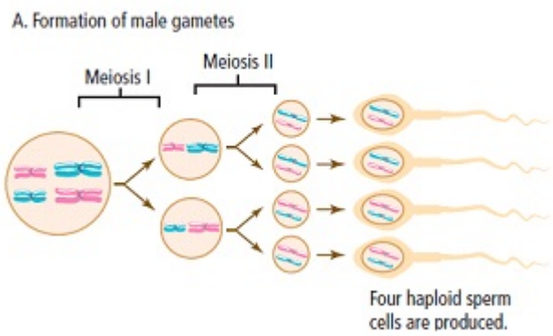

Meiosis I separates homologous chromosomes, producing two daughter cells



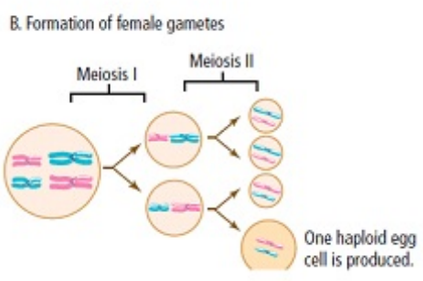

Meiosis II Results is four haploid cells, each with half the number of chromosomes. DNA is not replicated again before meiosis II begins!!

**Gamete Formation in Males and Females:**

Meiosis I produces two cells, this is immediately followed by meiosis II which results in four haploid cells which are capable of becoming sperm cells




In Females: meiosis I produces two egg cells, this is followed by meiosis II which results in 4 haploid cells. Only one of these 4 haploid cells has enough of the cytoplasm and organells to develop into an egg. The other three will disintegrate…



**PART A: MULTIPLE CHOICE**

*Instructions: Shade the letter of the correct answer on the computer scorable answer sheet provided.*

1. Which of the following refers to the production of genetically different offspring created by two parent ?

(A) Asexual Reproduction
(B) Binary Fission
(C) Fragmentation
(D) Sexual Reproduction

2. Which of the following would result in the greatest genetic diversity?

(A) Asexual reproduction
(B) Binary fission.
(C) Photosynthesis
(D) Sexual reproduction.

3. Which of the following is true for Sexual reproduction

| | |
|---|---|
| I | always produces identical offspring |
| II | requires two parents |
| III | increases genetic diversity |

(A) I and II only
(B) I and III only
(C) II and III only
(D) I, II, and III

4. How many chromosomes does a human body cell?

(A) 17 chromosomes
(B) 23 chromosomes
(C) 46 chromosomes
(D) 92 chromosomes

5. What term is used to describe a cell that has the same genetic material as the parents?

(A) Egg
(B) Diploid
(C) Haploid
(D) Sperm

6. Which of the following would be a haploid cell?

| | |
|---|---|
| I | Egg |
| II | Sperm |
| II | Zygote |

(A) I
(B) II
(C) III
(D) I and II

7. The diploid number of chromosomes in humans is 46. What would the haploid number be?

(A) 138
(B) 92
(C) 46
(D) 23

8. A peacock chick receives one set of chromosomes from its mother and one set of chromosomes from its father. Each set of these inherited chromosomes is referred to as the ?

(A) Zygote
(B) Diploid number
(C) Embryo
(D) Haploid number

9. What is formed when a female and male gamete meet?

(A) Haploid Cell
(B) Egg
(C) Sperm
(D) Zygote

10. Which word below can be used to describe sperm or an egg?

(A) Fertilization
(B) Gamete
(C) Diploid
(D) Zygote

11. What refers to the process where haploid gametes meet?

(A) Fertilization
(B) Cycle
(C) Meiosis
(D) Mitosis

12. What occur in fertilization?

(A) A zygote.
(B) A diploid cell.
(C) A cell with a new genetic combination.
(D) All of these are correct.

13. What is the basis of sexual reproduction?

(A) Mitosis
(B) Meiosis
(C) Photosynthesis
(D) One parent

14. Is the process of meiosis active in 9-year-old (prepubescent) humans?

(A) No
(B) In prepubescent girls only
(C) In prepubescent boys only
(C) Yes, in both prepubescent boys and girls

15. The process of meiosis produces gametes with _____ as body cells.

(A) The same number of chromosomes
(B) One quarter the number of chromosomes
(C) Half the number of chromosomes
(D) Double the number of chromosomes

16. A cell produced by meiosis has the _?_ number of chromosomes.

(A) Diploid
(B) Haploid
(C) Triploid
(D) Double

17. Meiosis I

(A) Starts with a diploid cell and ends with two haploid cells
(B) Starts with a haploid cell and ends with two diploid cells
(C) Starts with two diploid cells and ends with a haploid cell
(D) Starts with a two haploid cells and ends with a diploid cell

18. Meiosis II

(A) Starts with two haploid cells and ends with four haploid cells
(B) Starts with two diploid cells and ends with four haploid cells
(C) Starts with four diploid cells and ends with two haploid cells
(D) Starts with four haploid cells and ends with two haploid cells

PART B:

Match each Term on the left with the best Descriptor on the right. Each Descriptor may only be used once

| Term | Descriptor |
|---|---|
| 1. _____diploid number | A. matching chromosomes |
| 2. _____embryo | B. process in which gametes from two parents combine |
| 3. ____fertilization | C. two sets of chromosomes |
| 4. _____gametes | D. produces offspring that are genetically different from each other |
| 5. _____genetic diversity | E. develops from a zygote |
| 6. ____haploid number | F. new diploid cell formed by the process of fertilization |
| 7. _____homologous chromosomes | G. the process of mitosis |
| 8. _____sexual reproduction | H. variety in a species |
| 9. _____zygote | I. one set of chromosomes |
| | J. specialized cells; sperm from males and eggs from females |

PART C: Fill in the blank

Use the terms in the vocabulary box to fill in the blanks. You can use each term more than once. You will not need to use every term.

| | | | |
|---|---|---|---|
| 2 | 3 | 4 | 23 |
| 46 | body cell | chromosome | diploid |
| embryo | fertilization | gametes | haploid |
| meiosis | meiosis I | meiosis II | mitosis |
| zygote | | | |

1. Female and male organisms produce specialized cells called _____ that are necessary for reproduction. Eggs are the _____from female parents. Sperm are the _____ from male parents.

2. During sexual reproduction, the gametes from the two parents combine during a process called _____ to form a new cell called a _____ .

3. As the zygote undergoes repeated _____and cell division, it matures into a(n) _____ .

4. A human diploid body cell has _____ pairs of chromosomes.

5. Human gamete cells have a total of _____chromosomes. Gametes are said to be _____.

6. During meiosis, each _____in a cell is duplicated once and then the cell divides twice.

7. The first division of the cell is called_____ , which starts with a diploid cell and finishes with two haploid cells.

8. Each of the two haploid cells undergoes a second division called _____ which starts with two haploid cells and ends with four haploid cells.

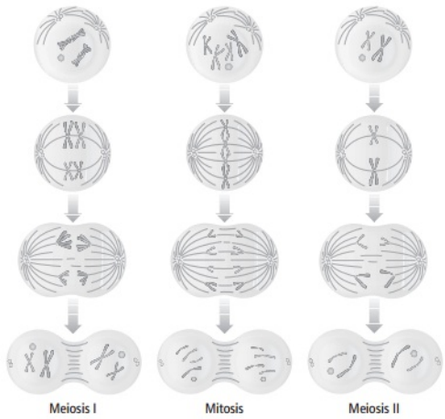
9. Meiosis starts with one _____cell and ends with _____ haploid cells.

**PART D: WITTEN RESPONSE**

1. Complete the table to show the number of chromosomes for different organisms. The table has been partially completed to help you.

| Organism | Diploid number (2n) | Haploid number (n) |
|---|---|---|
| human | | |
| fruit fly | 8 | |
| black bear | | |
| peanut | 20 | |
| chimpanzee | | 48 |

2. Examine the following diagrams showing mitosis and meiosis. Notice what happens to the chromosomes in each illustration. Then answer the questions that follow.




1. How is meiosis I similar to mitosis?

2. How is meiosis I different from mitosis?

3. How is meiosis II similar to mitosis?

4. How is meiosis II different from mitosis?