ANSWER KEY.

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Meiosis

Biology | ANSWER KEY

Show your work in the blank space. Use units and complete sentences where asked.

1. Write the chromosome number and whether the cell is diploid (2n) or haploid (n). A human has 46 chromosomes in a body cell.

Cell	Chromosomes	2n or n
Skin cell		
Sperm cell		
Zygote (fertilized egg)		

Skin cell: 46, 2n. Sperm cell: 23, n. Zygote: 46, 2n.

2. A corn plant has 20 chromosomes in each body cell (10 pairs).

(a) How many chromosomes are in one corn gamete?

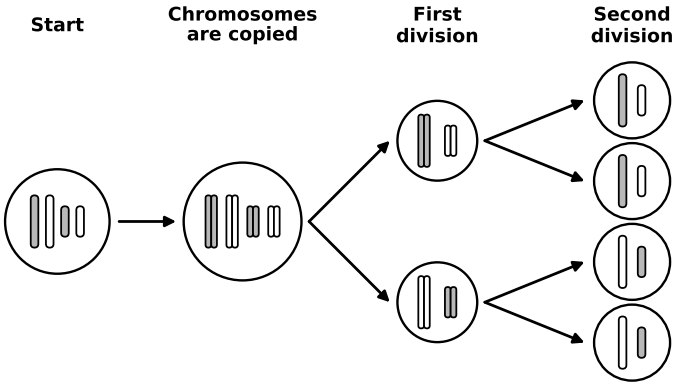
(b) How many different combinations of chromosomes can one corn plant make in its gametes, ignoring crossing over?

(a) n = 20 / 2 = **10 chromosomes**.

(b) 10 pairs, so 2^{10} = **1,024 combinations**.

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3. The diagram shows meiosis in a cell with 4 chromosomes.



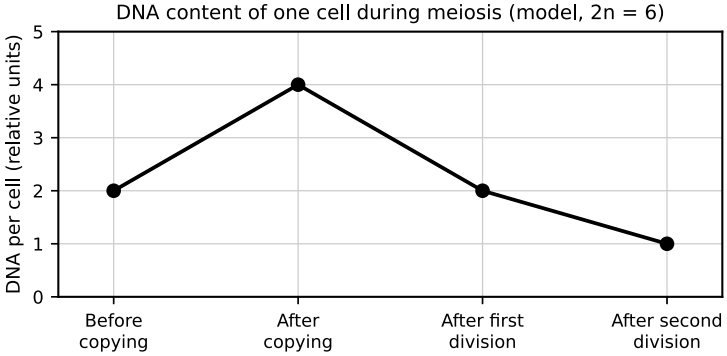
(a) How many chromosomes are in the starting cell, and in each of the four final cells?

(b) Are the four final cells identical to the starting cell? Explain.

(a) Starting cell: **4**. Each final cell: **2**.

(b) No. Each final cell is haploid: it has one of each pair, half the chromosomes.

4. The graph shows the DNA in one cell during meiosis (model, 2n = 6).



(a) How much DNA is in the cell after the second division?

(b) Explain why this is half the amount in the cell before copying.

(a) 1 relative unit.

(b) DNA is copied once, doubling it from 2 to 4 units. The cell then divides twice, so the DNA is split into 4 cells and each has 1 unit, which is half of the original 2 units.

5. One chromosome carries alleles A and B. Its homologous partner carries a and b. After crossing over, list the four combinations of alleles that can be on the four chromosomes. Which are new?

AB, Ab, aB, ab. Ab and aB are new combinations (not on either original chromosome).

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