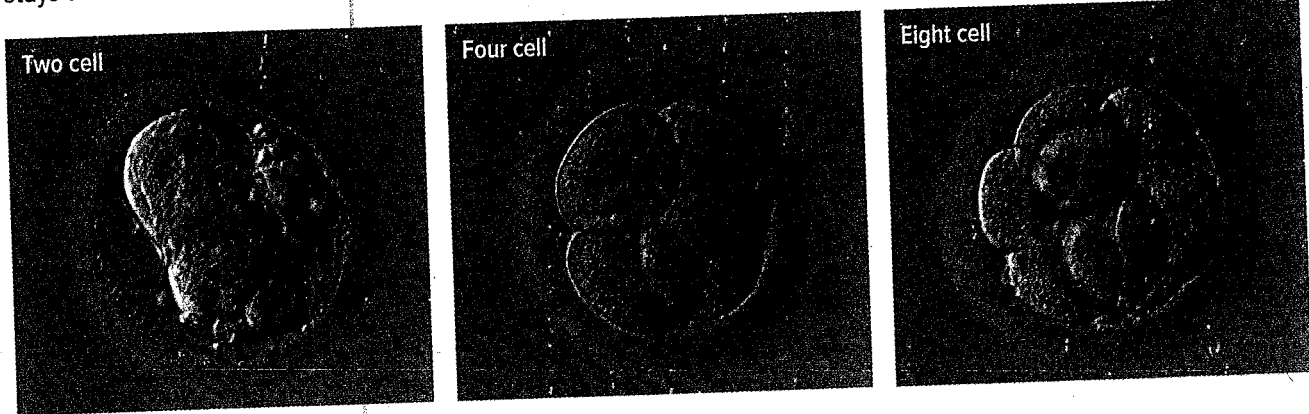


CONCEPT 3

Development of the human zygote occurs in stages.

Figure 1.21 In the first stages of cell division, the overall size of the zygote stays the same.

Human prenatal (before birth) development begins as soon as the egg is fertilized. Within about 30 hours of this event, the zygote divides by mitosis for the first time. Cell division continues at such a fast rate that there is no time for the early cells to increase in size between divisions (**Figure 1.21**). After several rounds of division, the spherical mass of actively dividing cells travels to and implants in the lining of the uterus, where development will continue.



Over a period of about 38 weeks, a zygote undergoes a complex sequence of changes as it multiplies, develops, and grows to form the many billions of cells that make up the infant human body (**Figure 1.22**).

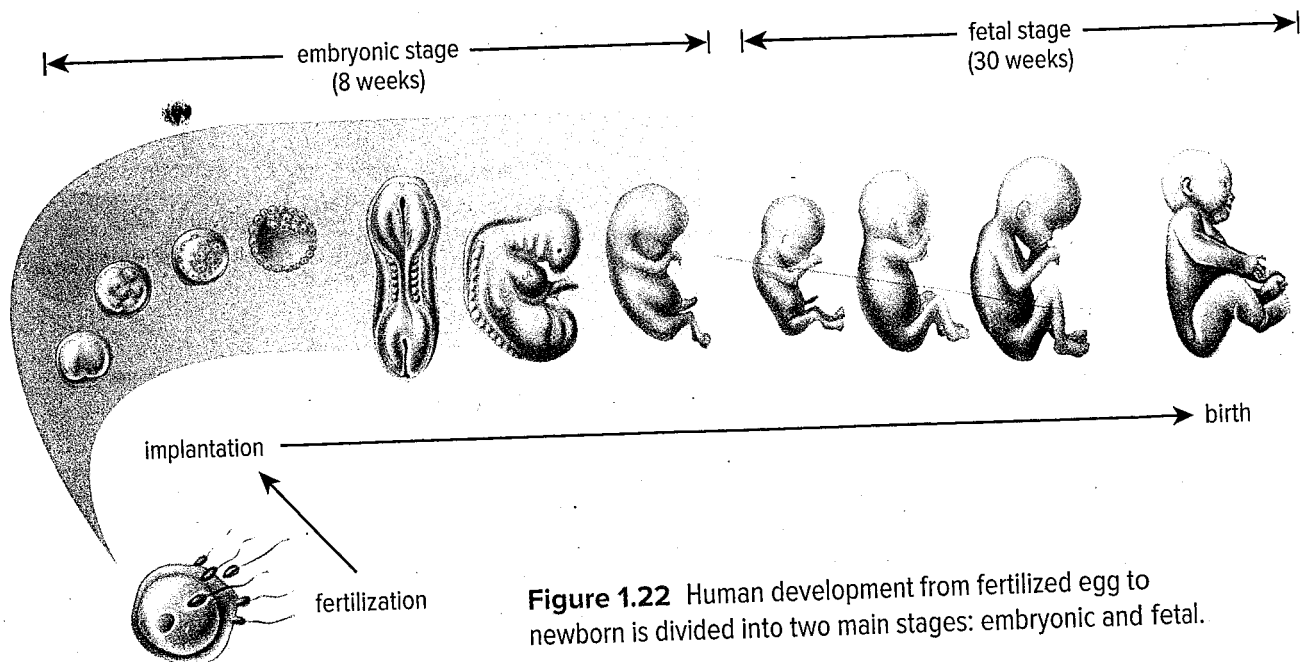


Figure 1.22 Human development from fertilized egg to newborn is divided into two main stages: embryonic and fetal.

Extending the Connections

Meiosis and Diversity

As a general rule, the number of possible unique gametes is given by the term 2^n , where n is the number of pairs of chromosomes in the cell. Since humans have 23 pairs of chromosomes, 2^{23} different gametes are possible. That is 8 388 608 unique gametes that each person could produce! Find out how meiosis produces unique gametes and how this affects the diversity of offspring from sexual reproduction.

Connect to Investigation 1-I on page 60

prophase II

- The nuclear membrane begins to disappear.
- DNA exists as chromosomes.

metaphase II

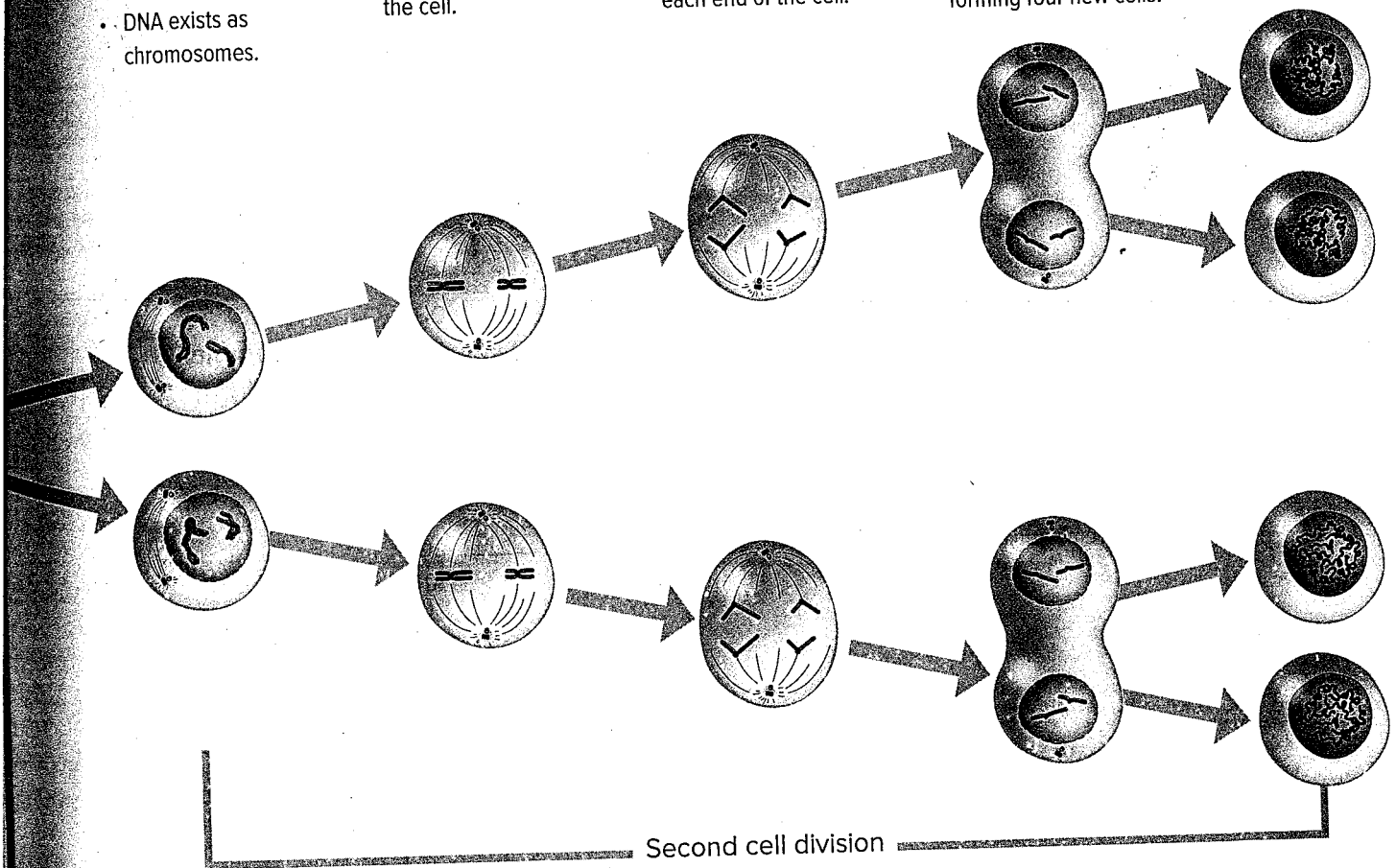
- The chromosomes line up along the middle of the cell.

anaphase II

- The copies of DNA are separated and go to each end of the cell.

telophase II

- Four nuclei form.
- The cells divide, forming four new cells.



Before you leave this page . . .

1. What role does meiosis play in sexual reproduction?
2. Use a graphic organizer to show how meiosis is similar to and different from mitosis.