

CHAPTER 2
SKILL BUILDER**BLM 2-9**

How Do the Number of Chromosomes in Body Cells and Sex Cells Compare?

Goal • Infer the relationship between the number of chromosomes in body cells and sex cells.

Think About It

What do peas, tomatoes, rabbits, chickens, and crayfish have in common? What do they have in common with you?

You might think that you have nothing in common with these organisms. This activity will show you that you do share certain characteristics even with a pea.

Cell Chart			
Organism	Body Cell Chromosomes	Egg Chromosomes	Sperm Chromosomes
Human	46	23	23
Pea	14	7	7
Tomato	24		
Corn	20		
Rabbit	44		
Chicken	78		
Mouse	40		
Crayfish	200		

There is a major difference between the number of chromosomes contained in a body cell and a sex cell. Every cell of your body has the same number of chromosomes *except* the reproductive cells (eggs or sperm). These cells have exactly half the usual number of chromosomes.

What to Do

Study the table. Use it to help you answer the questions below.

Questions

1. What relationship do you see between the number of chromosomes in the body cells and sex cells of humans and peas?

2. Fill in the numbers that complete the table.
3. The muscle cells in a housefly's leg contain 24 chromosomes. If each of the following cell types came from a housefly, how many chromosomes would each contain:
sperm _____ body cell _____
egg _____ eye cell _____

Goal • Assess your understanding of cell types and cell reproduction.

What to Do

Read the instructions before answering each set of questions.

Fill in the Blanks

In the spaces provided, write the word or phrase from the following list that best completes the sentence. Answers may be used more than once.

mitosis, body cells, sperm, chromosomes, sex cells, eggs

1. Organisms produce _____ through mitosis.
2. The main job of _____ is to join together to produce a new organism.
3. In humans, _____ have 46 chromosomes.
4. Sex cells are the only cells that are not produced by _____.
5. The _____ are the female sex cells.
6. The _____ are the male sex cells.
7. _____ contain the instructions that tell a cell how to develop.

Questions

In the spaces provided, answer the following questions.

8. Humans have 46 chromosomes. How many chromosomes are in human sperm? _____
9. The eggs of basset hounds contain 39 chromosomes. How many chromosomes are in basset hound body cells? _____
10. How many chromosomes are in the sperm of a collie? _____
11. How many chromosomes are in a white blood cell of a human?
12. A goldfish has 94 chromosomes in each body cell, a human has 46, and a guinea pig has 64. What does this suggest about the complexity of an organism and the number of chromosomes it may have?

13. What is the relationship between chromosome numbers in body cells and sex cells?

CHAPTER 2
INFORMATION
HANDOUT

Key Events in Meiosis

BLM 2-11

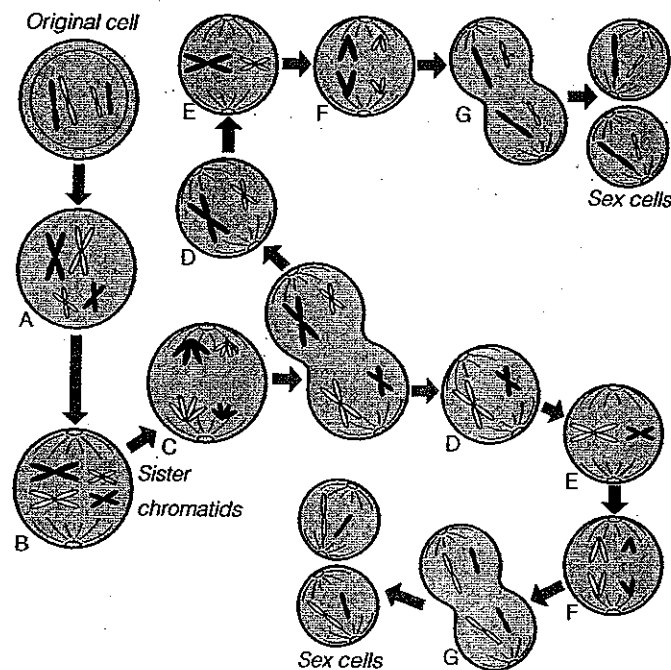
Goal • Review the steps of meiosis.

Introduction

All reproductive cells are formed in the same way, through the process of meiosis. Meiosis involves two divisions of the chromosomes in the original cell.

What to Do

Use the diagram and text below to answer the questions:



- Each chromosome doubles itself, forming two identical copies, called sister chromatids. How many chromosomes are there in the diagram? _____ How many chromatids? _____
- The doubled chromosomes come together in matching pairs. Where do they line up?

- The chromosomes now separate. Where are they pulled? _____
Are the chromosomes that have been pulled to one end all the same, or are they different?

- The first division in meiosis has occurred as the cell divides, forming two new cells. What are the contents of these cells?

- The chromosomes again line up along the centre of each new cell. How does this step differ from step 2?

- Now the sister chromatids separate and move to opposite ends of the cell. How is this stage of meiosis very similar to mitosis? _____
- The cells divide. How many new cells are formed by meiosis? _____ Compared to the original cell, how many chromosomes do the four new cells have? _____