

Chromosome Worksheet

I. What are chromosomes?

Chromosome [KROH-muh-sohm]: Threadlike structures in the nucleus of a cell that control heredity

Gamete: sex cell

Gene: Part of a chromosome that controls inherited traits.

Genetics [juh-NET-iks]: study of heredity

“Mary has her mother’s eyes.” “Tom is built just like his father.” How often have you heard remarks like these? All people resemble their parents in some ways. They have similar traits. And it is no accident. Many traits are passed on from parents to offspring. We say they are inherited. How are they inherited? The answer is found in the cell nucleus.

The nucleus has tiny bodies called chromosomes. Most are rod-shaped. In body cells, chromosomes are found in pairs. Body cells are all the cells except sperm and egg cells.

Each kind of organism has a specific number of chromosomes. For example, every body cell of a fruit fly has 8 chromosomes (4 pairs); a human has 46 (23 pairs); a garden pea has 14 (7 pairs).

Along each chromosome there are many dark bands. Each band is a small part of a chromosome called a gene. There are many, many genes, at least one million in every nucleus. Genes determine the traits of an organism.

There are genes for height, genes for nose size and shape, genes for the color of hair, skin, and eyes. In fact, there are genes for most traits any individual has. Some genes even affect traits like voice, intelligence and behavior. Genes also control the life processes of your cells.

In both asexual and sexual reproduction, chromosomes (and genes) are passed from parents to offspring. During asexual reproduction, each daughter cell receives chromosomes from a single parent cell. The daughter cell is the exact copy of the parent. Some organisms and the body cell of all organisms reproduce asexually.

During sexual reproduction, an offspring receives chromosomes from each parent cell. The chromosomes in gametes, or sex cells, are not paired. A sperm or an egg cell has only half the number of chromosomes as a body cell. When fertilization takes place, the sperm cell and the egg cell unite. Together, their chromosomes add up to the full number of chromosomes found in body cells. The fertilized egg, or zygote, has chromosomes from both of its parents. It also has traits from both parents.

II. Chromosomes and Genes

Every cell has a nucleus. Figure A shows an animal cell.

1. A nucleus contains tiny rod-shaped bodies. What are they called? _____
2. A chromosome is made up of even smaller bodies. What are they called? _____
3. How is chromosome, gene, and DNA related?

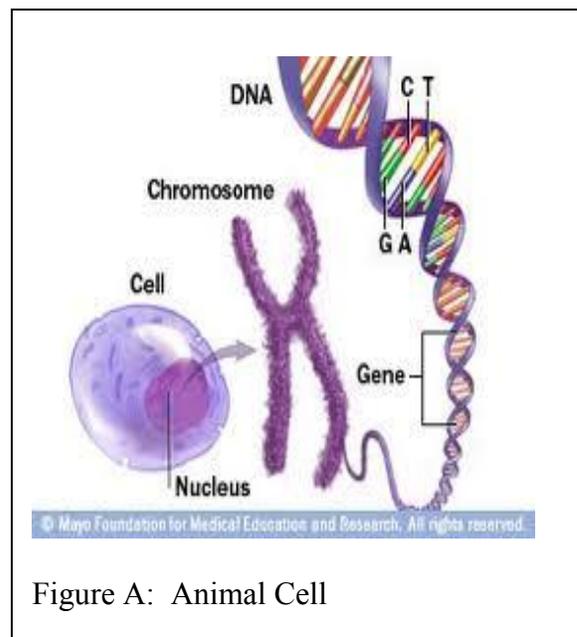


Figure A: Animal Cell

Human Chromosomes

Every body cell of a particular organism has the same chromosomes. No two individuals that reproduce sexually have the same chromosome. You have trillions of body cells. Each cell has the same chromosomes. No one else in the world has the same chromosomes. There is no “duplicate” of you – anywhere.

The study of traits and how they are passed on is called genetics. Genes contain the “plans” for the traits an organism has. What are genes made of? Scientists have discovered that genes are made of a complicated compound called DNA. DNA stands for deoxyribonucleic acid.

Fill in the Blank

Complete each statement using a term or terms from the list below. Write your answers in the spaces provided. Some words may be used more than once.

Genes	46	specific	pairs	genetics	23	inherited	traits	chromosomes
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- The characteristics an individual has are called _____.
- Traits are passed down from parents to offspring. Another way of saying this is “traits are _____.”
- The study of heredity is called _____.
- The nucleus has tiny rod-shaped bodies called _____.
- A chromosome is made up of a chain of _____.
- Genes determine the _____ of an individual.
- Every organism has a _____ number of chromosomes.
- In body cells, chromosomes are found in _____.
- Each of your body cells has _____ pairs of chromosomes.
This is a total of _____ single chromosomes.
- A human sperm or egg has _____ single chromosomes.

Matching

Match each term in Column A with its description in Column B. Write the correct letter in the space provided.

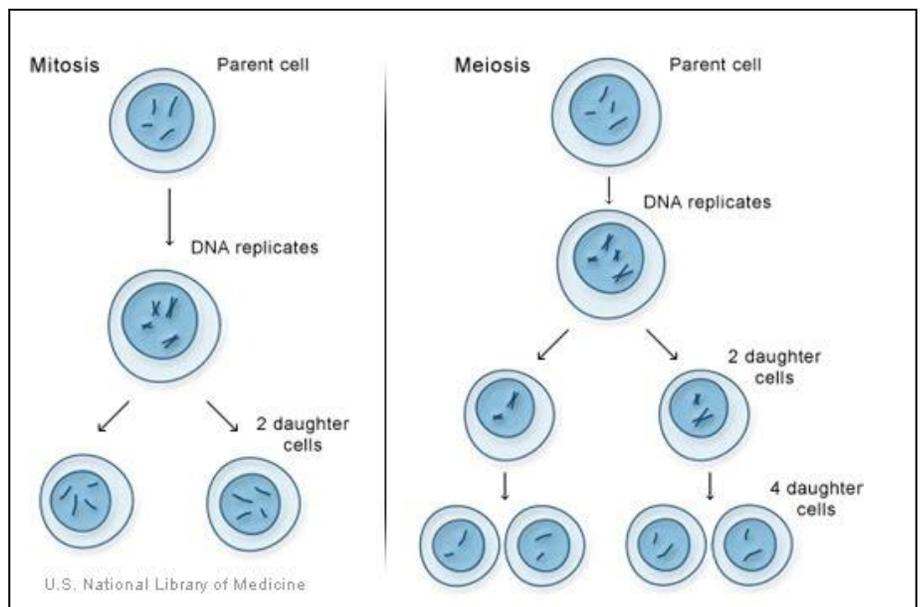
Column A	Column B
_____ 1. Genes	a) compound that makes up genes
_____ 2. chromosome	b) made up of many genes
_____ 3. DNA	c) have unpaired chromosomes
_____ 4. Body cells	d) pass on traits
_____ 5. Gametes	e) have paired chromosomes

What do the pictures show?

The pictures on the right show how chromosomes are passed from parent to offspring during asexual and sexual reproduction. Answer the following questions.

- How many chromosomes does the parent cell in Figure F have?

- How many chromosomes does each daughter cell have?



3. In Figure F, how do the parent cell's chromosomes compare to the daughter cell's chromosomes?

4. Which figure shows how body cells reproduce? _____

5. A. In figure G, how many chromosomes does each sperm cell contain? _____

B. How many chromosomes does each egg cell contain? _____

6. Gametes have _____ (half, twice) the number of chromosomes as body cells.

7. Fertilization produces a single cell. What is it called? _____

8. How many chromosomes does the zygote in Figure G have? _____

9. How many chromosomes will each body cell of the organism have? _____

10. The offspring will have traits of both the mother and father. Why? _____

Fill in the missing number of chromosomes.

	Organism	Chromosomes in each body cell	Chromosomes in each sperm or egg
1	Human	46	
2	Horse	60	
3	Housefly		6
4	Dog	78	
5	Grasshopper		7
6	Mosquito		3
7	Chicken	18	
8	Apple		17
9	Spinach	12	
10	Lily		12

11. A gamete has _____ (half, twice) the number of chromosomes that a body cell has.

12. How many pairs of chromosomes are there in each body cell of the following?

a) Horse _____

d) Lily _____

b) Mosquito _____

e) human _____

c) Spinach _____

f) housefly _____

Word Scramble

Below are several scrambled words you have used in this Lesson. Unscramble the words and write your answers in the spaces provided.

1. NEEG _____

2. HERINTT _____

3. NEGITECS _____

4. ETEMAG _____

5. CHOMEOSORM _____

TRUE OR FALSE

In the space provided, write "true" if the sentence is true. Write "false" if the sentence is false.

_____ 1. Traits are the characteristics of living things.

_____ 2. Only animals have traits.

_____ 3. Different genes control different traits.

_____ 4. Body cells have paired chromosomes.

_____ 5. Gametes have paired chromosomes.

_____ 6. A body cell and a sex cell have the same number of chromosomes.

Reaching Out

Which organism would more closely resemble its parent, one produced by asexual reproduction, or one produced by sexual reproduction? Why?
