

# HEREDITY AND VARIATION

## LESSON 1 – GENES AND CHROMOSOMES

### INTRODUCTION TO THE LESSON


**Bot:** Hello, SCI-learner! Welcome to another science adventure here in Roxas City, where family traits like smiles, dimples, or curly hair are often noticed during reunions and fiestas.


**Bot:** Have you ever wondered why you look like your parents or why you share similar traits with your siblings?

**Bot:** Today, we will explore Genes and Chromosomes—the tiny structures inside your cells that carry instructions making you *you*.

**Bot:** Ready to discover your biological blueprint?

**User:**

 Yes, let's begin!


 I'm ready!


### Fa-SCI-nate


**Bot:** Imagine this... During a family gathering in Roxas City, someone says, “Ka-itsura mo guid imo iloy!”

**Bot:** Why do you think family members look alike?

**User:**

 Because of genes

 Because they live together

 I'm not sure

### Branching Response:

**Bot (Correct):** Correct! Family members look alike because of genes passed from parents to children.

**Bot (Incorrect / Not sure):** Not quite. Living together may influence habits, but genes determine inherited traits.

### Goal SCI-tting

**Bot:** By the end of this lesson, you will be able to:

1. Describe where genes are located in chromosomes

2. Explain how genes determine traits
3. Identify phenotypes as expressions of inherited traits

**Bot:** These goals will help you understand why everyone in Capiz—and the world—is unique.

**User:**

 Continue

### Pre-SCI-ntation

**Bot:** For a long time, people had different ideas about heredity.

**Bot:** Some believed traits came from blood. Others believed traits were blended from parents.

**Bot:** But science has shown us that traits are passed through genes, not blood.

**Bot:** These genes are found in DNA, which is packed inside chromosomes.

### Inve-SCI-tigation

#### Part 1: Genes and Chromosomes

**Bot:** Genes are segments of DNA. (Note: Provide picture for this)

**Bot:** Chromosomes are threadlike structures that carry genes.

**Bot:** Where are chromosomes found in most human cells?

**User:**

 Nucleus

 Cytoplasm

 Cell membrane

#### Branching Response:

**Bot (Correct – Nucleus):** Correct! Chromosomes are found in the nucleus.

**Bot (Incorrect):** Not quite. Chromosomes are located in the nucleus of the cell.

#### Part 2: Human Chromosomes

**Bot:** Each human body cell has 46 chromosomes, arranged in 23 pairs.

**Bot:** One set comes from your mother, and one from your father.

**Bot:** What do we call cells with two sets of chromosomes?

**User:**

- ☐ Diploid
- ☐ Haploid

**Bot:** Correct! These cells are called diploid.

### **Part 3: DNA and the Genetic Code**

**Bot:** DNA looks like a twisted ladder, called a double helix.

**Bot:** It is made of four bases:

A – Adenine  
T – Thymine  
G – Guanine  
C – Cytosine

**Bot:** Which bases pair together?

**User:**

- ☐ A–T and G–C
- ☐ A–G and T–C

**Bot:** Correct! A pairs with T, and G pairs with C.

### **Part 4: Genotype and Phenotype**

**Bot:** Your genotype is the set of genes you inherit.

**Bot:** Your phenotype is what you can observe, like hair texture or eye color.

**Bot:** Which of these is a phenotype?

**User:**

- ☐ Curly hair
- ☐ DNA sequence

**Bot:** Correct! Curly hair is a phenotype.

### **Part 5: Heredity and Environment**

**Bot:** Genes are important—but the environment matters too.

**Bot:** For example, many people in Roxas City get darker skin after spending time under the sun.

**Bot:** Which affects traits like skin color?

**User:**

- ☐ Heredity only
- ☐ Environment only
- ☐ Both heredity and environment

**Bot:** Correct!

Traits are influenced by both heredity and environment.

### **Self-A-SCI-ssment**

**Bot:** Let's check what you've learned!

**Bot:**

1. What carries genes—DNA or blood?
2. What is the difference between genotype and phenotype?
3. Why must sex cells be haploid?

**User:**

- ☒ Because chromosome number must stay constant
- ☒ Because genes disappear

**Bot:** Correct! Haploid cells ensure the correct chromosome number after fertilization.

### **SCI-pplementary**

**Bot:** Did you know?

Humans have around 20,000–25,000 genes!

**Bot:** Traits like height, weight, and even talents are shaped by genes and environment.

**Bot:** Celebrate your uniqueness—because no one else has your exact genetic combination!

### **CLOSING**

**Bot:** Great job, SCI-learner! You've explored the world of genes and chromosomes—the foundation of heredity.

**Bot:** In the next lesson, we'll learn how traits are passed on from parents to offspring.

**Bot:** Padayon sa tu-on sa SCI-ensiya! See you in the next lesson!