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.

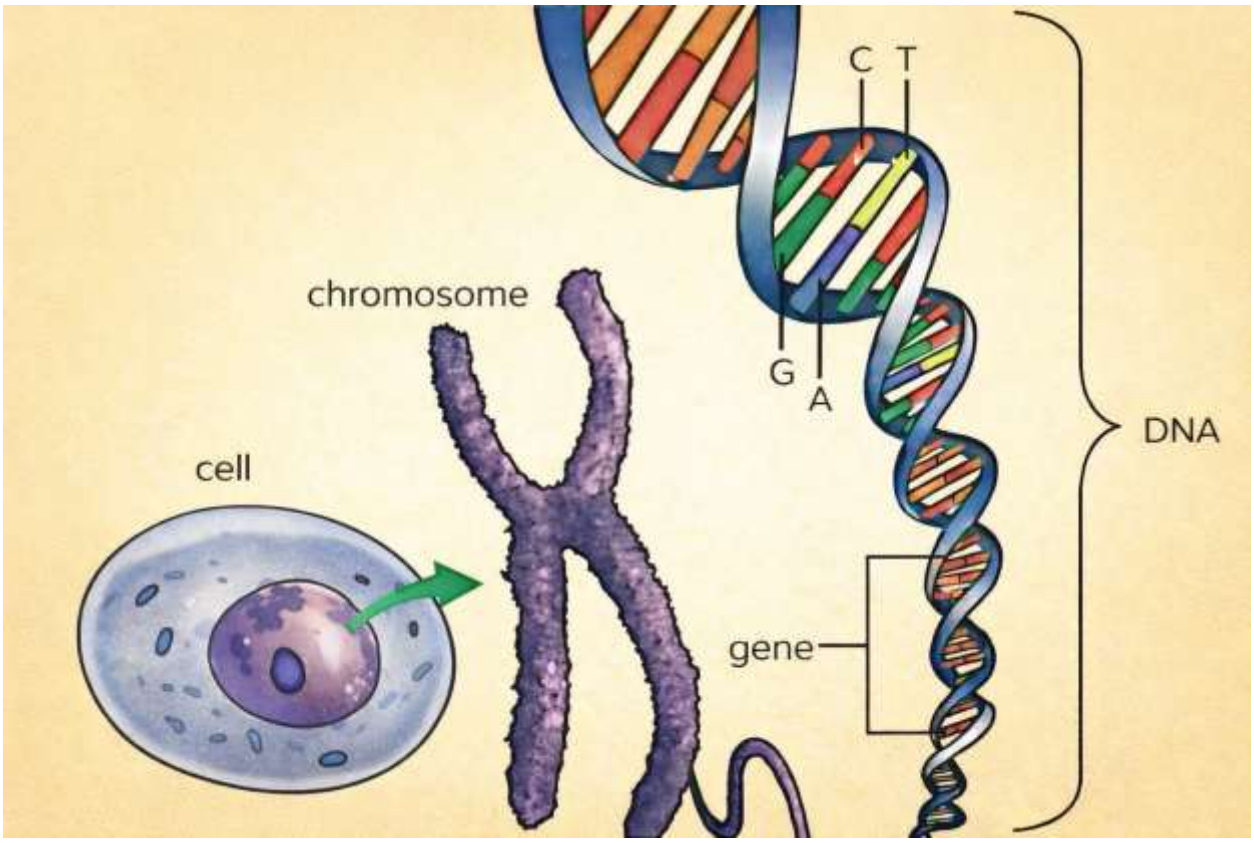
Bot: These genes are found in DNA, which is packed inside chromosomes.

Inve-SCI-tigation

Part 1: Genes and Chromosomes

Bot: Genes are segments of DNA.

Bot: Chromosomes are threadlike structures that carry genes.



Bot: Where are chromosomes found in most human cells?

User:

- Nucleus
- Cytoplasm
- Cell membrane

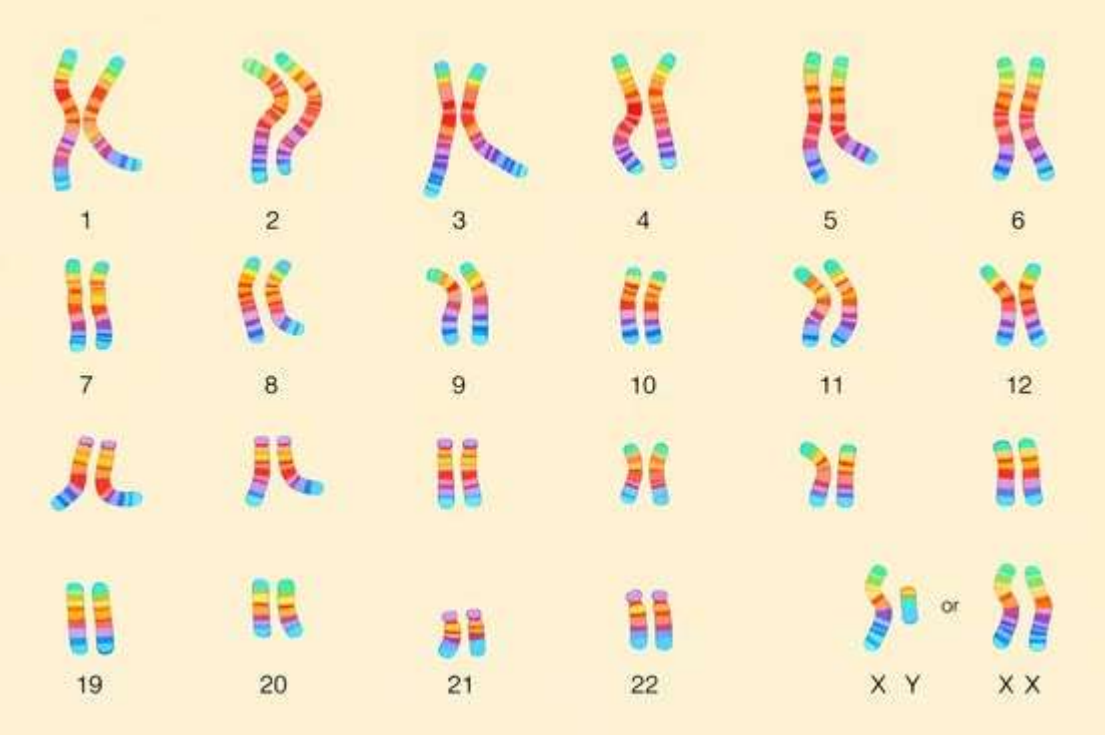
Branching Response:

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:

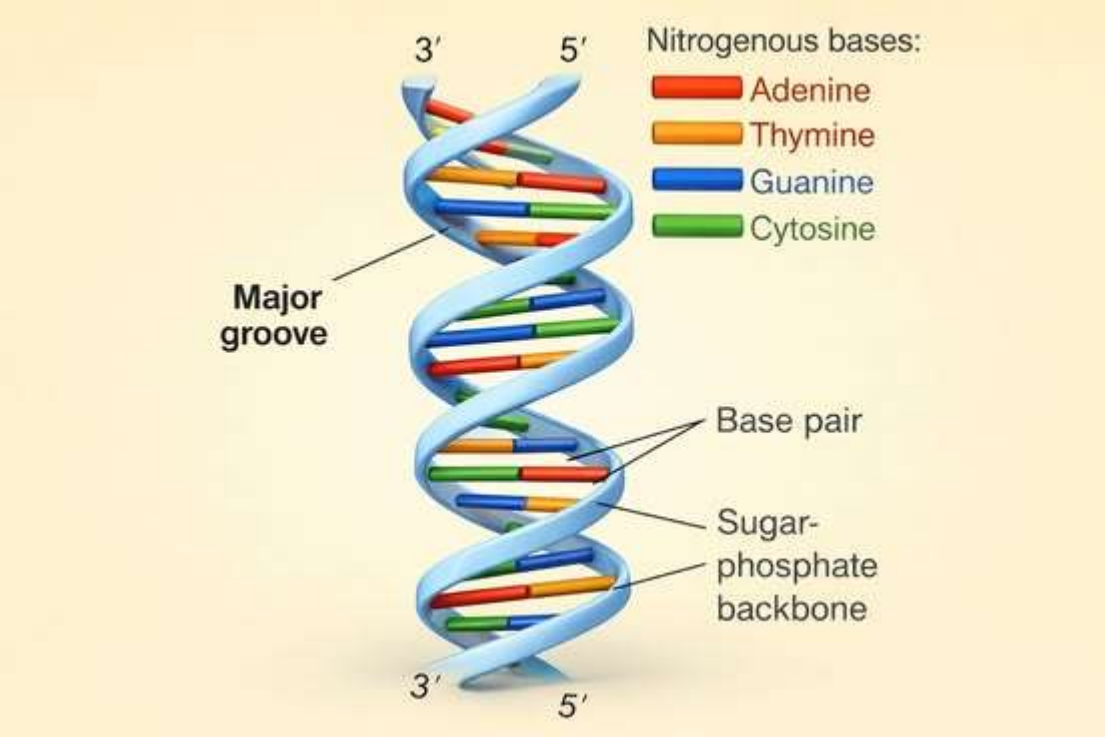
- Diploid
- Haploid

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!