

## TOPIC: GENES AND ENVIRONMENT

### Introduction to Genetics

#### Genes

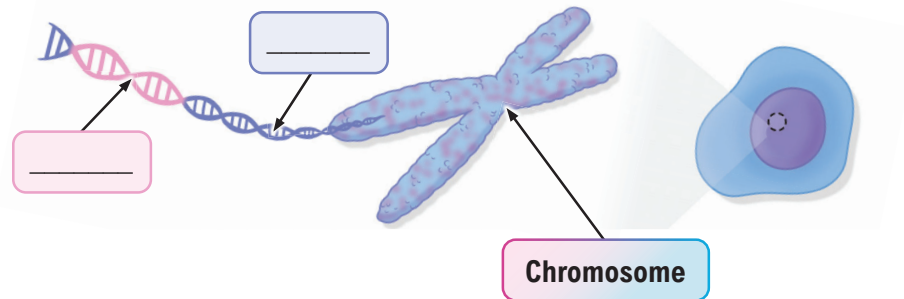
Biological units of \_\_\_\_\_  
passed from parents to offspring;  
segments of DNA.

#### DNA

The molecule that holds  
\_\_\_\_\_ information;  
organized into into chromosomes.

#### Chromosomes

Thread-like structures that  
organize and package DNA; humans  
have \_\_\_\_ pairs of chromosomes.



◆ When we study genetics, we think about both genotype and phenotype.

- **Genotype:** The complete \_\_\_\_\_ makeup of an organism.
  - Most traits are \_\_\_\_\_ genetic meaning they are influenced by more than one gene.
- **Phenotype:** Observable characteristics, including physical qualities, mental qualities, and \_\_\_\_\_.
  - Often result from the \_\_\_\_\_ of genes and environment.

### EXAMPLE

Given below are three different levels of organization of genetic material. Arrange these in order from the smallest unit of organization to the largest.

\_\_\_\_\_ → \_\_\_\_\_ → \_\_\_\_\_

#### Word Bank:

Genes  
DNA  
Chromosomes

## **TOPIC: GENES AND ENVIRONMENT**

### **PRACTICE**

The \_\_\_\_\_ is a genetic makeup of an individual for a specific trait.

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- a) Genotype.
- b) Phenotype.

### **PRACTICE**

True or False: if false, choose the answer that best corrects the statement.

Genotypes can be visible to the unaided eyes, while phenotypes cannot.

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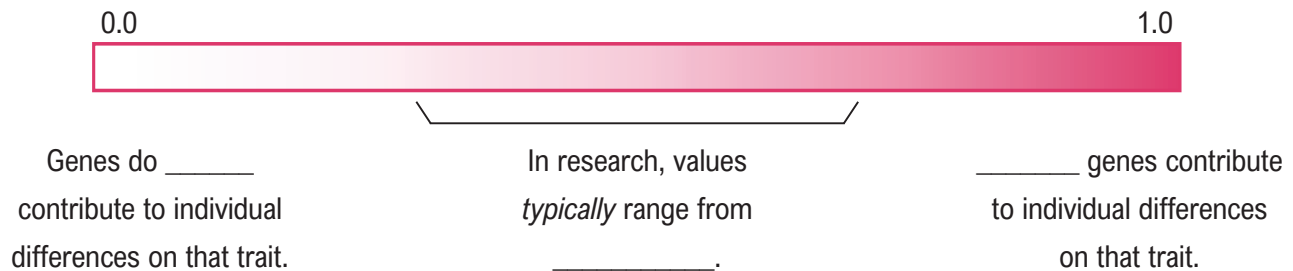
- a) True.
- b) False; phenotypes can be visible to the unaided eye, while genotypes cannot.
- c) False; both genotype and phenotype are visible to the unaided eye.
- d) False; neither genotype nor phenotype are visible to the unaided eye.

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### Heredity

◆ **Heritability:** How much \_\_\_\_\_ in phenotype across people is due to differences in genotype.

- Calculated as a proportion from 0 – 1 → called a *heritability estimate*.



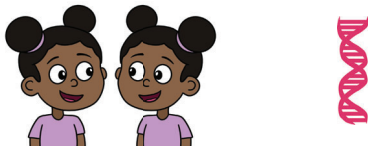
◆ Psychologists examine heredity by studying:

1. Pairs of \_\_\_\_\_.
2. \_\_\_\_\_ twins who are separated at birth.
3. \_\_\_\_\_ and their birth/adopted parents.

These study designs help us identify which traits are more influenced by genetics than environment.

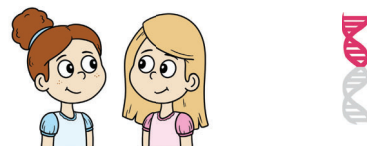
#### Monozygotic (Identical) Twins (\_\_\_\_\_)

Share \_\_\_\_\_ of their genetic material.



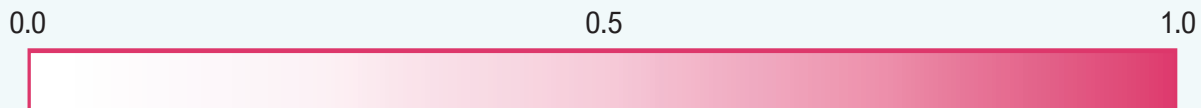
#### Dizygotic (Fraternal) Twins (\_\_\_\_\_)

Share \_\_\_\_\_ of their genetic material.



### EXAMPLE

The number line below represents how much genes contribute to the expression of a trait. Fill in the blanks below the number line on if the trait is “somewhat,” “totally,” or “not at all” controlled by genetics.



### PRACTICE

Why are studies with twins useful in psychology?

- a) They allow researchers to “control” for genetics or the environment.
- b) They allow researchers to work with twice as many subjects.
- c) They allow researchers to have a control group.
- d) They allow researchers to have an experimental group.

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### Note About Heredity

◆ Because of how we study heritability in psychology, it is important to remember that heritability is...

#### Abstract

We are usually **not** identifying  
\_\_\_\_\_ genes  
that contribute to a trait.

#### A Population-Level Concept

We're examining the role of genetics  
in trait variation within a  
\_\_\_\_\_ – **not** an individual.

#### Not Fate

Trait \_\_\_\_\_ can be  
influenced by the environment,  
interventions, therapy, etc.

### EXAMPLE

Based on what you've learned about genes and heritability, what is wrong with this statement: "His mother was an alcoholic, so he probably inherited the gene and will be one too."

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- a) Many traits, especially those involving complex behavior, are polygenetic.
  - b) Heritable traits cannot be passed from mother to son.
  - c) Heritability is not fate - trait expression can be influenced by many factors, including a person's environment.
  - d) Both A and C.