Genes and Their Functions

Name: _____ **Date:** _____

Quick Review

A **gene** is a section of DNA that contains instructions used by cells. Many genes contain instructions for making **proteins**.

Proteins help determine how cells are built and how they function. Because proteins influence cells and tissues, genes can influence an organism's characteristics or **traits**.

Genes are passed from parents to offspring. Different organisms also share many genes because all living things carry out many similar basic life processes.

Part A — Multiple Choice

1. What is a gene?

A. An entire cell
B. A section of DNA containing instructions
C. A type of protein
D. An organ in the body

2. Genes are found in:

A. DNA
B. Water
C. Proteins
D. Glucose

3. Many genes contain instructions for making:

A. Minerals
B. Proteins
C. Water
D. Cells

4. Which is an example of an inherited trait influenced by genes?

A. A scar
B. Natural eye colour
C. A broken bone
D. A suntan

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5. Genes can influence traits because they help determine:

A. Which proteins cells make
B. How much water a person drinks
C. What language a person speaks
D. What a person learns at school

6. Why do different organisms share some genes?

A. They all have identical appearances
B. They carry out many similar basic life processes
C. They all live in the same environment
D. They all have the same number of chromosomes

Part B — Match the Term

Match each term to the correct description.

A. DNA
B. Gene
C. Protein
D. Trait
E. Inherited

_____ A characteristic of an organism.

_____ Passed from parents to offspring.

_____ A molecule containing genetic information.

_____ A section of DNA containing instructions.

_____ A molecule that performs important jobs in cells and can influence traits.

Part C — Genes to Traits

Complete the sequence using the terms below.

protein — DNA — trait — gene

_____ → _____ → _____ → _____

Explain

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How can a gene influence a characteristic of an organism?

Part D — Inherited or Acquired?

Write **inherited** or **acquired** beside each characteristic.

1. Natural blood type: _____

2. A scar from an injury: _____

3. Natural hair colour: _____

4. A skill learned by practising the piano: _____

5. Certain genetically influenced features of eye colour: _____

6. A suntan caused by spending time in sunlight: _____

Part E — Genes and Proteins

Fill in the blanks using the words below.

DNA — proteins — genes — traits

_____ are sections of DNA.

Many genes provide instructions for making _____.

These molecules help cells function and can influence an organism's _____.

The genetic information is stored in _____.

Part F — Apply Your Knowledge

1. Two siblings have some similar characteristics. Why might this happen?

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2. A change occurs in a gene. How could this potentially affect a protein?

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3. Why might a human and another animal share some similar genes?

Part G — Think About It

A scientist discovers that humans and mice share many similar genes.

1. Does this mean humans and mice are identical?

2. Give one reason they might share genes.

3. Scientists sometimes study genes in mice to learn about human biology. Why could shared genes make this useful?

Exit Ticket

1. A gene is a section of _____.

2. Many genes contain instructions for making _____.

3. Give one example of an inherited trait.

4. Explain the relationship between a gene and a trait.

Genes and Their Functions — Answer Key

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Part A — Multiple Choice

1. **B** — A section of DNA containing instructions
2. **A** — DNA
3. **B** — Proteins
4. **B** — Natural eye colour
5. **A** — Which proteins cells make
6. **B** — They carry out many similar basic life processes

Part B — Match the Term

1. **D — Trait** — A characteristic of an organism.
2. **E — Inherited** — Passed from parents to offspring.
3. **A — DNA** — A molecule containing genetic information.
4. **B — Gene** — A section of DNA containing instructions.
5. **C — Protein** — A molecule that performs important jobs in cells and can influence traits.

Part C — Genes to Traits

DNA → Gene → Protein → Trait

Explain:
A gene contains instructions that can be used to make a protein. Proteins affect how cells are structured and function, which can influence an organism's traits.

Part D — Inherited or Acquired?

1. Natural blood type — **Inherited**
2. A scar from an injury — **Acquired**
3. Natural hair colour — **Inherited**
4. A skill learned by practising the piano — **Acquired**
5. Genetically influenced features of eye colour — **Inherited**
6. A suntan caused by sunlight — **Acquired**

Part E — Genes and Proteins

Genes are sections of DNA.

Many genes provide instructions for making **proteins**.

These molecules help cells function and can influence an organism's **traits**.

The genetic information is stored in **DNA**.

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Part F — Apply Your Knowledge

1. Two siblings have some similar characteristics. Why?
They inherit genes from the same parents, so they may inherit some similar versions of genes and therefore share some traits.

2. A change occurs in a gene. How could this potentially affect a protein?
A change in a gene can alter the instructions for making a protein. This may change the protein's structure or function, although some DNA changes have little or no effect.

3. Why might a human and another animal share some similar genes?
Different organisms share genes because they share evolutionary ancestry and carry out many of the same basic cellular processes.

Part G — Think About It

1. Does sharing many genes mean humans and mice are identical?
No.

2. Give one reason they might share genes.
Humans and mice share evolutionary ancestry and require many similar genes for basic processes such as cell division, metabolism, growth, and development.

3. Why can scientists study mouse genes to learn about human biology?
Some mouse genes and proteins have similar functions to human ones. Studying them can therefore help scientists understand how similar biological processes work.

Exit Ticket

1. A gene is a section of **DNA**.
2. Many genes contain instructions for making **proteins**.
3. Examples: **blood type, natural hair colour, aspects of eye colour, or other inherited characteristics**.
4. **A gene can provide instructions for making a protein, and the protein can influence how cells function and therefore affect a trait.**

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