What Is Variation?

Name: _____ **Class:** _____ **Date:** _____

Quick Review

Variation refers to differences in characteristics between individuals of the same species.

For example, humans may differ in height, eye colour, hair colour, and blood type.

Variation can result from:

- **Inherited characteristics:** Traits passed from parents to offspring through genes. Examples include natural eye colour and blood type.
- **Acquired characteristics:** Characteristics that develop during an individual's lifetime because of environmental influences, experiences, or activities. Examples include scars and suntans.
- **Both genes and environment:** Some characteristics, such as height and body mass, are influenced by inherited genes and environmental factors such as nutrition.

Variation is important because it helps populations survive changing environmental conditions. Some individuals may have characteristics that give them a better chance of survival and reproduction.

Part A — Multiple Choice

1. What is variation?

A. Differences between individuals of the same species
B. The process of producing identical organisms
C. The movement of organisms between habitats
D. The growth of an individual organism

2. Which is an example of variation within a species?

A. A cat and a dog having different body shapes
B. Two humans having different eye colours
C. A plant absorbing water
D. A bird building a nest

3. Which characteristic is mainly inherited?

A. A scar from an injury
B. A suntan
C. Blood type
D. A learned language

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4. Which characteristic is acquired during life?

A. Natural eye colour
B. Blood type
C. Natural hair colour
D. A scar

5. Why is variation important for the survival of a species?

A. It makes all individuals identical.
B. It prevents environmental changes.
C. It increases the chance that some individuals can survive changing conditions.
D. It guarantees that every organism will survive.

Part B — Inherited or Acquired?

Write **Inherited**, **Acquired**, or **Both** beside each characteristic.

1. Natural eye colour: _____
2. A scar on the arm: _____
3. Height: _____
4. Blood type: _____
5. A suntan: _____
6. Body mass: _____
7. A language learned at school: _____
8. Natural hair colour: _____

Part C — Matching

Match each term to its correct description.

Term	Answer	Descriptions
1. Variation	_____	A. A group of organisms of the same species living in the same area
2. Inherited characteristic	_____	B. A characteristic passed from parents to offspring through genes
3. Acquired characteristic	_____	C. Differences in characteristics between individuals of the same species
4. Species	_____	D. A characteristic developed during an individual's lifetime
5. Population	_____	E. A group of organisms that can generally reproduce with one another and produce fertile offspring

Part D — Identifying Variation

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A scientist studies four rabbits living in the same habitat.

Rabbit	Fur Colour	Body Mass	Ear Length
A	Brown	2.0 kg	8 cm
B	White	1.8 kg	9 cm
C	Brown	2.3 kg	10 cm
D	Grey	2.1 kg	8 cm

1. Identify two characteristics that vary among the rabbits.

a) _____

b) _____

2. Which rabbit has the greatest body mass?

3. Which two rabbits have the same fur colour?

4. Are the rabbits identical? Explain your answer.

5. Explain why body mass may be influenced by both genes and the environment.

Part E — Explaining Variation

1. Why are individuals within the same species not always identical?

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2. Explain the difference between inherited and acquired characteristics.

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3. Give one example of an inherited characteristic and one example of an acquired characteristic.

Inherited: _____

Acquired: _____

4. Can environmental conditions affect an organism's characteristics? Give an example.

Part F — Variation and Survival

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A population of beetles contains green and brown beetles. The beetles live in a forest with brown soil and fallen leaves.

Birds hunt the beetles by sight.

1. Which beetles might be harder for birds to see in this environment?

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2. Explain why these beetles might have a better chance of survival.

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3. What might happen if the environment changes and becomes covered in green vegetation?

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4. Why is having variation in a population useful when environmental conditions change?

Exit Ticket

1. Define variation.

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2. Give two examples of variation within a species.

a) _____

b) _____

3. What is the difference between inherited and acquired characteristics?

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4. Why are individuals of the same species not always identical?

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5. Explain one way variation can help a population survive.

What Is Variation? — Answer Key

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What Is Variation?

Part A — Multiple Choice

1. A — Differences between individuals of the same species.
2. B — Two humans having different eye colours.
3. C — Blood type.
4. D — A scar.
5. C — It increases the chance that some individuals can survive changing conditions.

Part B — Inherited or Acquired?

Characteristic	Answer
1. Natural eye colour	Inherited
2. A scar on the arm	Acquired
3. Height	Both
4. Blood type	Inherited
5. A suntan	Acquired
6. Body mass	Both
7. A language learned at school	Acquired
8. Natural hair colour	Inherited

Part C — Matching

Term	Answer	Description
1. Variation	C	Differences in characteristics between individuals of the same species
2. Inherited characteristic	B	A characteristic passed from parents to offspring through genes
3. Acquired characteristic	D	A characteristic developed during an individual's lifetime
4. Species	E	A group of organisms that can generally reproduce with one another and produce fertile offspring
5. Population	A	A group of organisms of the same species living in the same area

Part D — Identifying Variation

1. Identify two characteristics that vary among the rabbits.

Any two of the following:

- Fur colour
- Body mass
- Ear length

2. Which rabbit has the greatest body mass?

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What Is Variation?

Rabbit C — 2.3 kg.

3. Which two rabbits have the same fur colour?

Rabbits A and C — Both have brown fur.

4. Are the rabbits identical? Explain your answer.

No. The rabbits show differences in characteristics such as fur colour, body mass, and ear length. These differences are examples of variation within a species.

5. Explain why body mass may be influenced by both genes and the environment.

Genes can influence an organism's body size, growth, and metabolism. Environmental factors, such as food availability, nutrition, and activity, can also affect body mass.

Therefore, body mass is influenced by both inherited and environmental factors.

Part E — Explaining Variation

1. Why are individuals within the same species not always identical?

Individuals inherit different combinations of genes from their parents. Environmental factors, such as nutrition, temperature, and experiences, can also influence their characteristics.

These genetic and environmental differences produce variation.

2. Explain the difference between inherited and acquired characteristics.

- Inherited characteristics are determined partly or mainly by genes passed from parents to offspring.
- Acquired characteristics develop during an organism's lifetime as a result of environmental influences, experiences, or activities.

3. Give one example of an inherited characteristic and one example of an acquired characteristic.

- Inherited: Blood type.
- Acquired: A scar.

Other scientifically correct examples are acceptable.

4. Can environmental conditions affect an organism's characteristics? Give an example.

Yes. Environmental conditions can influence how an organism develops.

For example, a plant receiving insufficient sunlight may grow differently from a plant receiving adequate sunlight.

Another example is that nutrition can affect a person's growth and height.

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Part F — Variation and Survival

1. Which beetles might be harder for birds to see in this environment?

Brown beetles.

2. Explain why these beetles might have a better chance of survival.

Brown beetles may be better camouflaged against the brown soil and fallen leaves. Birds may have more difficulty spotting them, so they may be less likely to be eaten.

3. What might happen if the environment changes and becomes covered in green vegetation?

Green beetles may become better camouflaged and therefore less likely to be eaten by birds.

If fur colour is replaced here by beetle body colour, and that colour is inherited, green beetles may become more common over many generations because they have a survival and reproductive advantage.

4. Why is having variation in a population useful when environmental conditions change?

Variation means individuals have different characteristics.

When conditions change, some individuals may possess characteristics that help them survive and reproduce more successfully. This increases the likelihood that the population will continue to survive over generations.

Exit Ticket

1. Define variation.

Variation refers to differences in characteristics between individuals of the same species.

2. Give two examples of variation within a species.

Possible answers:

- Differences in height among humans.
- Differences in fur colour among rabbits.

Other examples include eye colour, body mass, ear length, and natural hair colour.

3. What is the difference between inherited and acquired characteristics?

Inherited characteristics are passed from parents to offspring through genes, while acquired characteristics develop during an individual's lifetime through environmental influences or experiences.

4. Why are individuals of the same species not always identical?

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What Is Variation?

They may inherit different combinations of genes and experience different environmental conditions, producing differences in their characteristics.

5. Explain one way variation can help a population survive.

Variation may allow some individuals to survive environmental changes better than others.

For example, beetles with colours that provide better camouflage may be less likely to be eaten by predators, increasing their chances of surviving and reproducing.

Teaching Notes

A few useful distinctions to emphasize when reviewing the worksheet:

- Inherited does not always mean completely determined by genes. Many characteristics, such as height, are influenced by both genetics and the environment.
- Acquired characteristics are not generally passed to offspring through genes. For example, a scar does not cause offspring to inherit the same scar.
- Variation does not guarantee survival. It increases the likelihood that some individuals in a population possess advantageous characteristics when conditions change.
- Individuals do not deliberately develop inherited traits because they need them. Natural selection acts on existing heritable variation across generations.

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