

OGUN DIGICLASS

CLASS: SECONDARY SCHOOL

SUBJECT: BIOLOGY

TOPIC: VARIATION IN POPULATION



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Learning Objectives

01

Define
variation

02

List and
explain
types of
variation

03

Describe the
causes of
variation

04

Discuss the
applications
of variation

VARIATION IN POPULATION



Variations are differences in traits or characteristics between individuals of the same species which could be hereditary or acquired from the environment.



TYPES OF VARIATION

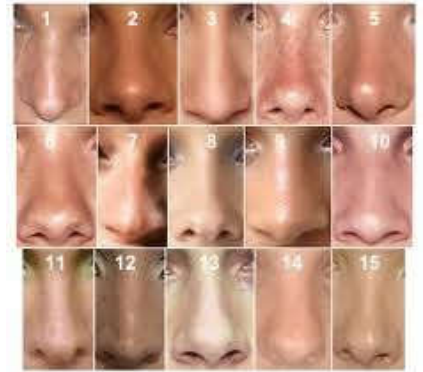
There are two types. They are ***MORPHOLOGICAL VARIATION*** and ***PHYSIOLOGICAL VARIATION***.

Morphological Variation

Noticeable physical appearance of individuals of the same species.

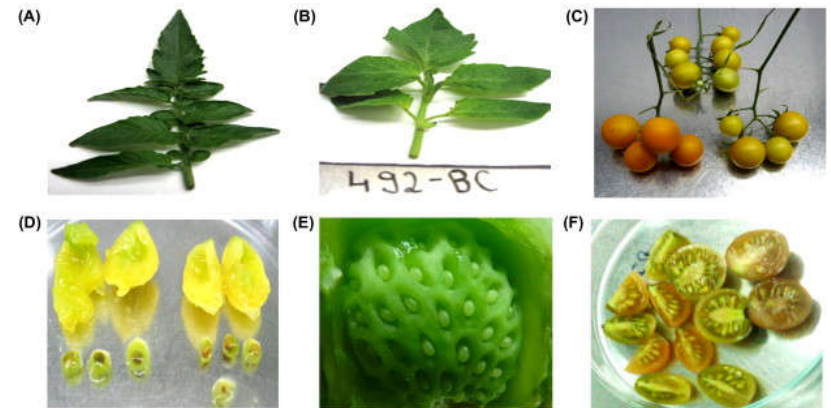
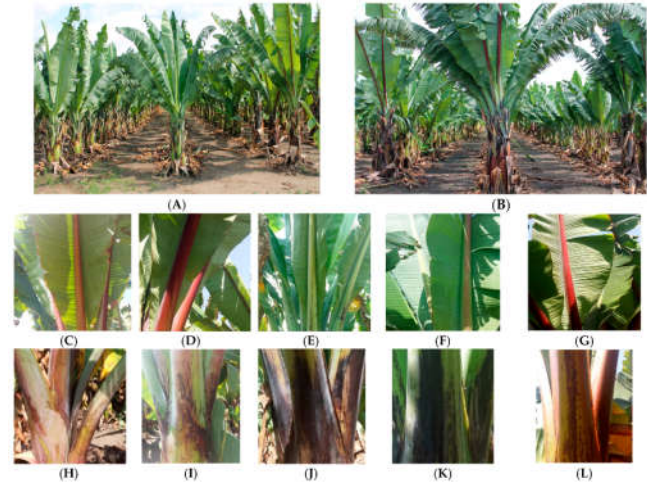
Examples in human beings are:

- Colour of parts of the body e.g. skin, hair, eye.
- Height of the body.
- Size of the head, eyes, nose.
- Weight of individuals.
- Shape of head, mouth, nose, ears, legs.
- Fingerprint e.g. loop, arch, whorl.



Examples in plants are:

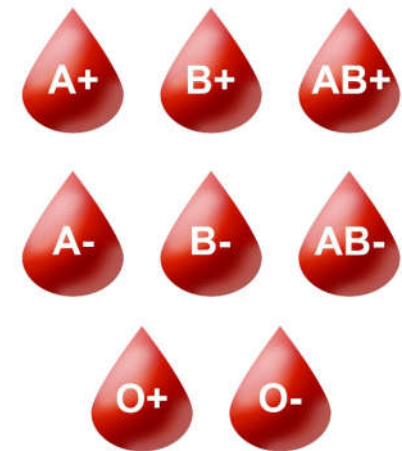
- Height of plants
- Size of stem, roots, leaves, flower, fruits.
- Shape of stem, roots, leaves, flower fruits.
- Colour of flower leaves e.g. green, white, and brown.
- Morphological variation gives rise to continuous variation which shows gradual transition or changes between two extreme forms. e.g. Height, weight.



Physiological Variation

Differences in the functions and activities of a living organism or one of its parts, no intermediates, they are discontinuous variation; it is either the organisms have or do not have the characteristics. Examples are:

- Ability to roll tongue
- Ability to close one eye and keep the other open.
- Ability to move the ears without moving the head.
- Differences in blood group A, B, AB, O.
- Ability to taste chemical phenylthiocarbamide (PTC)



Causes of Variation

Your genome is only around

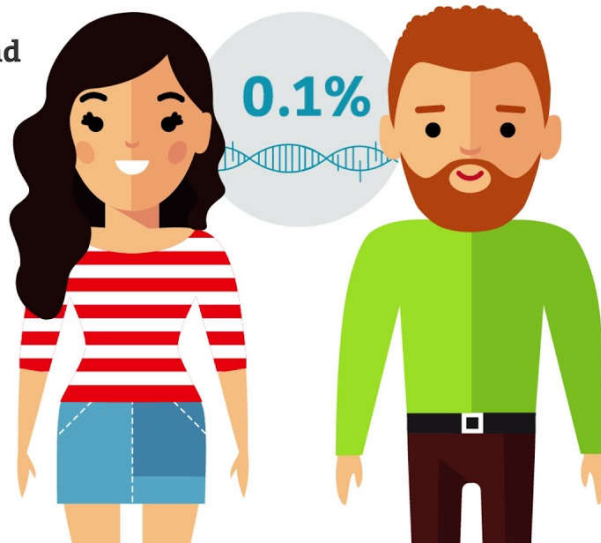
0.1%

different from any
other person's,

but that equates to

3 million

differences in your DNA



Two major causes in living organisms;

- **Genetic differences**: these are traits inherited from parents. It can also be from gene mutation i.e. when genes responsible for inherited characteristics are altered e.g. green fruit producing yellow fruit.
- **Environmental influence**: are variations caused by the surroundings. For example intelligence from parents to child may become dull if the environmental condition is not conducive e.g. housing, food, health care, parental educational facilities etc. are lacking.

Application of Variation

- **Crime detection**: use of fingerprints, blood group, height, color.
- **Blood transfusion**: blood groups are four i.e. A, B, AB, O characterized by specific proteins in the blood i.e. antigens prompt generation of antibodies and can cause immune response.



Donor-recipient compatibility in blood transfusion

RECIPIENT					
DONOR		A	B	AB	O
	A	+	-	+	-
	B	-	+	+	-
	AB	-	-	+	-
	O	+	+	+	+

NOTE: (+) represents compatibility

(-) represents incompatibility.

Blood group

Related genotypes

A----->

AA, AO

B----->

BB, BO

AB----->

AB [Codominance]

O----->

OO

Detection of paternity: Blood type can be used to determine the paternity of a child. If the two men claiming to be the father of a child have different blood type, it will be easy to know the father of the child.



QUESTION

1. A man whose blood group is heterozygous **A** is married to a woman whose blood group is **AB**. With the aid of a genetic diagram, suggest the possible blood groups of their children.



2. A woman with blood group **A** [heterozygous] claimed that her son who has blood group **O** was fathered by Mr. James who has blood group **A** [homozygous]. With the aid of a suitable genetic diagram;

a). Prove or disprove the woman's claim.

b). Give reasons to support your answer.

Answer

a). The woman's claim is wrong. Reasons

b). Half of their children are heterozygous blood group **A** and half are homozygous blood group **A**. No child is group **O**.



ASSIGNMENT

1. Can a man with blood group **AB** possibly be the father of a boy whose blood group is **B**; given that the mothers' blood group is **O**? Give reasons for your answer.
2. If the blood type of a woman is **B** and her Childs' blood type is **AB**, what are the possible blood types of the father of the child?