18. Variation and selection

18.1 Variation

Paper 1 and 2

Question Paper

Paper 1

Questions are applicable for both core and extended candidates

1 ABO blood groups are an example of one type of variation.

What is the cause of this type of variation?

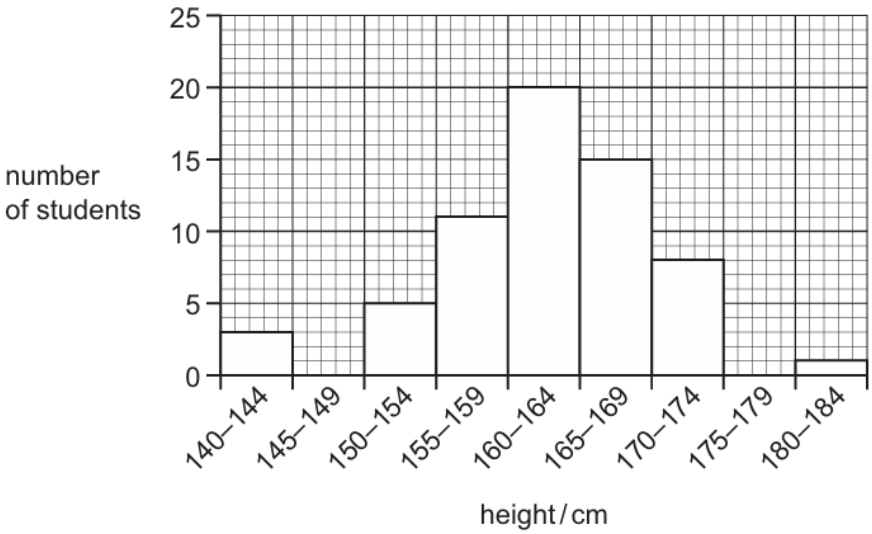
A environment only

B genes only

C genes and environment

D mutation and environment

2 The graph shows the heights of students in a class.



What is a correct statement for these data?

A There are two students who are 147 cm tall.

B The most frequent height range is 160–164 cm.

C The range of student heights measured is 150–174 cm.

D There are 72 students in this study.

3 Some phenotypes are listed.

1 blood group
2 body mass
3 height
4 seed colour in peas

Which phenotypes are examples of continuous variation?

A 1, 2 and 3 **B** 2 and 3 only **C** 2 and 4 **D** 3 and 4

4 Which definition of continuous variation is correct?

A variation that results in a limited number of phenotypes between two extremes
B variation that results in a limited number of phenotypes with no intermediates
C variation that results in a range of phenotypes between two extremes
D variation that results in a range of phenotypes with no intermediates

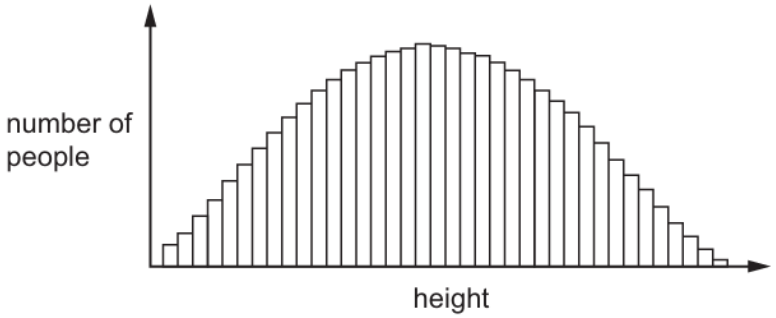
5 Which phenotype shows discontinuous variation in humans?

A foot length
B height
C sex
D weight

6 What can increase the genetic variation in a species?

A growth
B malnutrition
C mitosis
D mutation

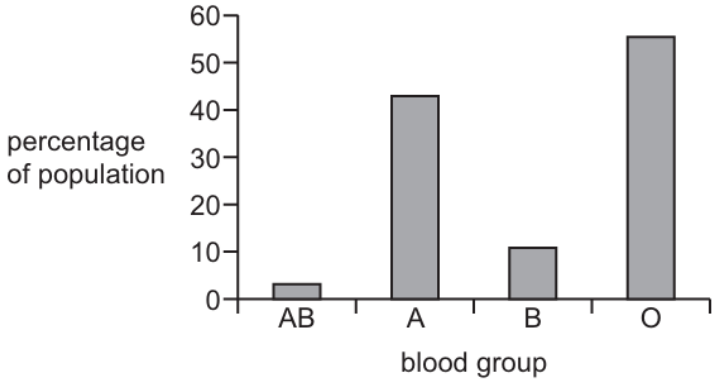
7 The graph shows the different heights of people in a human population.



Which row describes the variation shown by the graph?

	type of variation	has intermediate phenotypes
A	continuous	no
B	continuous	yes
C	discontinuous	no
D	discontinuous	yes

8 The graph shows the distribution of blood groups in one area.



This is an example of discontinuous variation.

Which statement about discontinuous variation is correct?

A There is a range of genotypes between two extremes.

B There is a range of phenotypes between two extremes.

C There are intermediates between the phenotypes.

D There are no intermediates between the phenotypes.

9 Which statement is best used to describe differences in height in humans?

A continuous variation resulting in a limited number of phenotypes

B continuous variation resulting in a range of phenotypes

C discontinuous variation resulting in a limited number of phenotypes

D discontinuous variation resulting in a range of phenotypes

10 Some human phenotypes are listed.

1 body mass

2 foot size

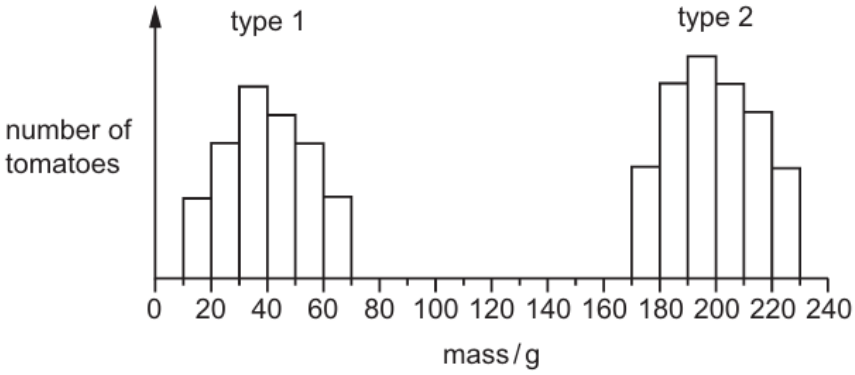
3 height

4 sex

Which features are examples of continuous variation?

A 1, 2 and 3 **B** 1, 3 and 4 **C** 1 and 4 only **D** 2 and 3 only

11 The graph shows the masses of two different types of tomato.



What can be concluded from the graph?

A Genes do not affect the mass of tomatoes.

B Type 1 tomatoes show continuous variation.

C Type 2 tomatoes are sometimes smaller than type 1 tomatoes.

D Type 2 tomatoes show discontinuous variation.

12 The following features were observed in a pair of identical twins.

feature	twin 1	twin 2
tongue rolling	yes	yes
eye colour	brown	brown
lobed ears	yes	yes
weight	60 kg	65 kg
hair length	short	long

Which features show phenotypic variation?

A eye colour and weight

B lobed ears and hair length

C tongue rolling and lobed ears

D weight and hair length

13 Which definition of continuous variation is correct?

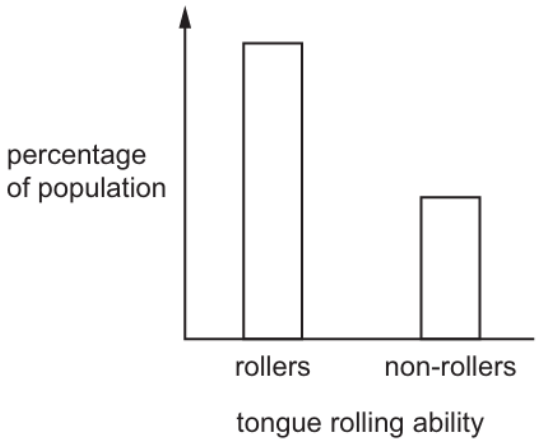
A variation that results in a limited number of phenotypes between two extremes

B variation that results in a limited number of phenotypes with no intermediates

C variation that results in a range of phenotypes between two extremes

D variation that results in a range of phenotypes with no intermediates

14 The diagram shows the percentage of tongue rollers and non-rollers in a human population.



Which word describes this type of variation?

A adaptive

B continuous

C discontinuous

D environmental

Paper 2

Questions are applicable for both core and extended candidates unless indicated in the question

15 Which statement describes a type of variation?

A Continuous variation is usually caused by the environment only.

B Continuous variation results in a limited range of phenotypes with no intermediates.

C Discontinuous variation is usually caused by genes only.

D Discontinuous variation results in a range of phenotypes between two extremes.

16 Which statement about gene mutations is correct? **(extended only)**

A A mutation is a change in the amino acid sequence of DNA.

B Mutations are a source of genetic variation.

C Mutations are caused by random mating.

D Mutations happen during random fertilisation.

17 Some statements about mutations are given. **(extended only)**

1 A random change in the amino acid sequence in DNA causes gene mutation.

2 A mutation is a genetic change.

3 Ionising radiation decreases the rate of mutation.

4 New alleles are formed by mutations.

Which statements are correct?

A 1 and 3 **B** 1 and 4 **C** 2 and 3 **D** 2 and 4

18 What are sources of genetic variation in populations? **(extended only)**

1 meiosis

2 random mating

3 random fertilisation

A 1, 2 and 3 **B** 1 and 2 only **C** 1 and 3 only **D** 2 and 3 only

19 Which term is a genetic change?

A allele

B genotype

C mutation

D phenotype

20 Which types of variation can be inherited?

	variation caused by genes	variation caused by the environment
A	✓	✓
B	✓	✗
C	✗	✓
D	✗	✗

key

✓ = yes

✗ = no

21 Which statement is correct?

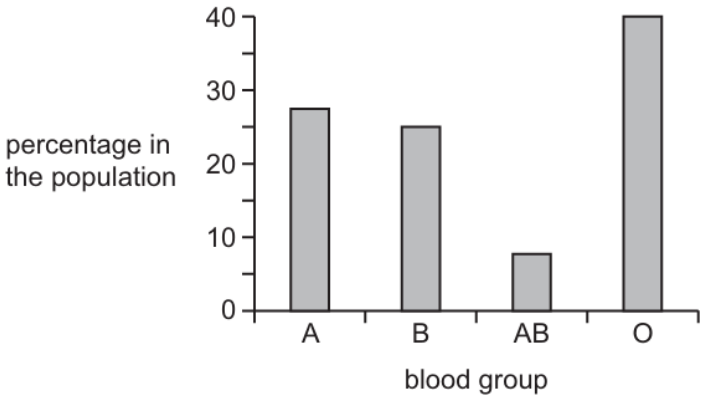
A Genetic variation can be caused by phenotypic variation.

B Mutations can be caused by phenotypic variation.

C Phenotypic variation can be caused by genetic variation.

D Phenotypic variation cannot be caused by mutations.

22 The graph shows the percentage of different blood groups in a human population.



Which type of variation is shown by human blood groups?

A continuous variation caused by genetic and environmental factors

B continuous variation caused by genetic factors only

C discontinuous variation caused by genetic and environmental factors

D discontinuous variation caused by genetic factors only

23 What is **not** affected by the environment?

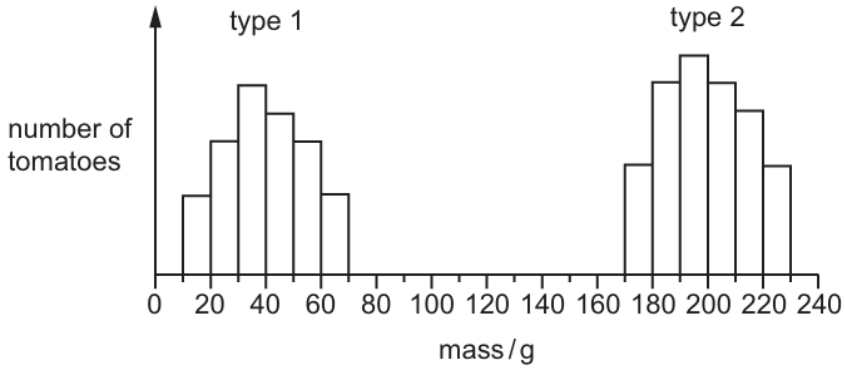
A height

B skin colour

C blood group

D weight

24 The graph shows the masses of two different types of tomato.



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