

# CIE Biology GCSE

## 18 - Variation and Selection

### Flashcards



# What is variation?



What is variation?

The difference between organisms of the same species



# What causes variation?



# What causes variation?

## Mutations in the genetic code



# What is phenotypic variation?



# What is phenotypic variation?

The variation in physical traits and characteristics of organisms of the same species



What is phenotypic variation caused by  
(Higher/Supplement)





What is phenotypic variation caused by  
(Higher/Supplement)

Both genes and the environment



# What is genetic variation?



# What is genetic variation?

The difference between the genetic makeup of different organisms of the same species



# What is discontinuous variation?



# What is discontinuous variation?

Variation that produces distinct categories (e.g. eye colour or blood groups)



# What is continuous variation?



# What is continuous variation?

Variation that cannot be placed into distinct categories and instead produces a spectrum (e.g. height, weight)



# What is a mutation?





# What is a mutation?

A random change in the genetic material of an organism



# What is a mutation? (Higher/Supplement)



What is a mutation? (Higher/Supplement)

A random change in the base sequence of the DNA of an organism



State 2 things which may increase the rate of mutation



State 2 things which may increase the rate of mutation

- Ionising radiation
- Certain chemicals (like those found in cigarette smoke)



State 3 symptoms of sickle cell anaemia  
(Higher/Supplement)



State 3 symptoms of sickle cell anaemia  
(Higher/Supplement)

Headaches

Fatigue

Fainting



# How does sickle cell anaemia arise? (Higher/Supplement)





# How does sickle cell anaemia arise?

## (Higher/Supplement)

- The base sequence in the DNA that codes for the haemoglobin protein changes
- This produces abnormal haemoglobin which leads to sickle shaped red blood cells



# How does sickle cell anaemia arise? (Higher/Supplement)



# How does sickle cell anaemia arise?

## (Higher/Supplement)

- The base sequence in the DNA that codes for the haemoglobin protein changes
- This produces abnormal haemoglobin which leads to sickle shaped red blood cells



What disease do people who are heterozygous for sickle cell anaemia have a resistance to?  
**(Higher/Supplement)**



What disease do people who are heterozygous for sickle cell anaemia have a resistance to?

(Higher/Supplement)

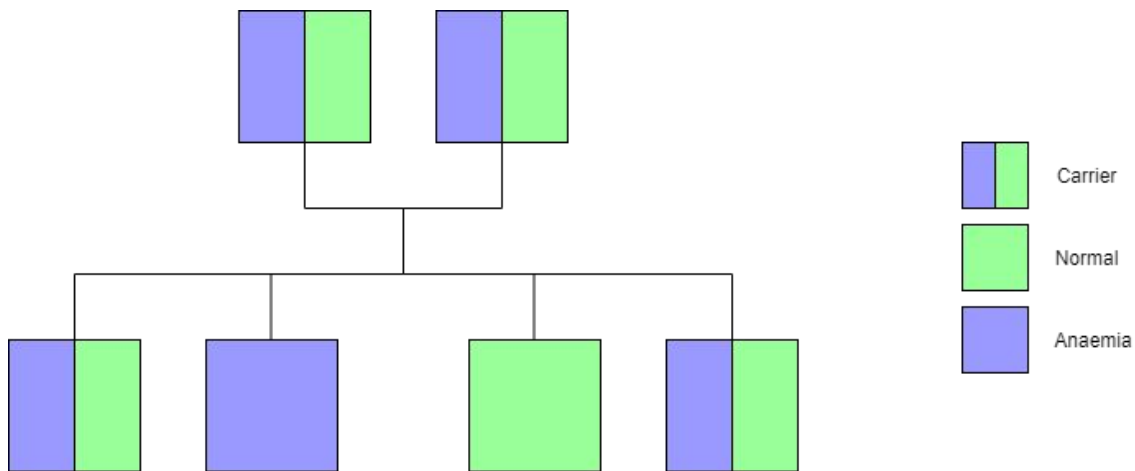
Malaria



Use a genetic diagram to show the 4 offspring produced when two heterozygous sickle cell anaemia carriers reproduce  
**(Higher/Supplement)**



Use a genetic diagram to show the 4 offspring produced when two heterozygous sickle cell anaemia carriers reproduce (**Higher/Supplement**)



Describe the distribution of sickle cell anaemia with reference to the distribution of malaria  
(Higher/Supplement)





Describe the distribution of sickle cell anaemia with reference to the distribution of malaria  
(Higher/Supplement)

Sickle cell anaemia tends to be found more in places where malaria is common



Explain the distribution of sickle cell anaemia with reference to the distribution of malaria  
(Higher/Supplement)



# Explain the distribution of sickle cell anaemia with reference to the distribution of malaria

## (Higher/Supplement)

- People who have sickle cell anaemia are resistant to malaria
- Those without sickle cell anaemia are not immune and are more likely to die from malaria
- Over time, a majority of the population will carry the sickle cell anaemia gene



# What is an adaptive feature?



# What is an adaptive feature?

Any inherited feature which helps an organism to survive in its environment and pass on its genes



# What is an adaptive feature? (Higher/Supplement)



What is an adaptive feature? (Higher/Supplement)

The inherited functional features of an organism that increase the fitness of the organism



# Define fitness (Higher/Supplement)





## Define fitness (Higher/Supplement)

The ability of an organism to survive and pass on its genes in its environment



# What are hydrophytes? (Higher/Supplement)



What are hydrophytes? (Higher/Supplement)

Plants which are adapted to live in aquatic conditions



# State 3 adaptations of hydrophytes (Higher/Supplement)



## State 3 adaptations of hydrophytes (Higher/Supplement)

- Wide and flat leaves
- Large air spaces
- Thin waxy cuticle



# What are xerophytes? (Higher/Supplement)



What are xerophytes? (Higher/Supplement)

Plants which are adapted to live in very arid and dry conditions



# State 3 adaptations of xerophytes (Higher/Supplement)





## State 3 adaptations of xerophytes (Higher/Supplement)

- Rolled leaves
- Thick waxy cuticle
- Small needle shaped leaves



# Describe the process of natural selection



# Describe the process of natural selection

- Populations are naturally varied due to random genetic mutations
- Some of these mutations provide a selective advantage
- These organisms survive and reproduce, passing on the successful genes



# Define evolution (Higher/Supplement)



Define evolution (**Higher/Supplement**)

A change in the features of organisms over time due to natural selection



# What is the process of adaptation? (Higher/Supplement)



What is the process of adaptation?

(Higher/Supplement)

Populations become more suited to their environment over time due to natural selection



What is the development of antibiotic resistance an example of?  
(Higher/Supplement)





What is the development of antibiotic resistance an example of? (Higher/Supplement)

Evolution by natural selection



Describe how antibiotic resistance arises  
(Higher/Supplement)



## Describe how antibiotic resistance arises (Higher/Supplement)

- A random genetic mutation causes a bacterium to become resistant to the antibiotic
- When the antibiotic is used, all the bacteria that do not have the mutation are killed
- The population containing just the resistant bacteria then begins to grow



Describe how selective breeding is carried out



## Describe how selective breeding is carried out

- Organisms with the desired traits are selected
- These organisms are bred together
- This process is repeated until the offspring have the desired characteristics



What is the difference between natural selection and artificial selection?  
(Higher/Supplement)



What is the difference between natural selection and artificial selection? (Higher/Supplement)

Natural selection occurs when the selection pressures are created by the environment whereas artificial selection is when humans deliberately create selection pressures

