

1. (a) Adaptive features are defined as the inherited features of an organism that increase its fitness.

State what is meant by *fitness* in this context.

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2A) Genetically modified bacteria can produce human insulin.

(i) State the name of the disease that can be treated with insulin injections.

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(ii) Insulin is a protein.

Describe the process of using bacteria in genetic engineering to produce human proteins.

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B) Crop plants can also be genetically modified.

Describe the advantages of genetically modifying crops.

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3A)

Explain how bacteria become resistant to antibiotics.

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B) The number of cases of MRSA has decreased since 2005.

Suggest reasons for this decrease.

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4) Some people have sickle cell anaemia.

Describe the cause of this type of anaemia.

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5A) The number of yellow-shouldered Amazons on Margarita Island had decreased to 700 parrots by 1989.  
The population then increased to 1600 parrots by 2009.

Part of this increase was due to the release of captive-bred parrots on the island. This is one of the few successful release programmes of parrots. A similar release programme in Arizona in the 1980s of a different species of parrot was not successful.

Suggest why release programmes for captive-bred parrots were **not** successful.

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B) Some captive breeding programmes involve very small numbers of animals.

Outline the disadvantages of such programmes.

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6) The sheep that were first introduced to Tasmania were not well adapted to the environment.

Describe how farmers can use selective breeding to improve their sheep so that they are better adapted to the environment.

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7) Body length is an example of continuous variation.

(i) Suggest what causes the variation in body length in a population of fish.

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(ii) Continuous variation is shown with a histogram.

Name the type of graph that should be used to show **discontinuous** variation.

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8) Type 1 diabetes is caused by the immune system destroying body cells.

(a) (i) Suggest which organ in the body is attacked by the immune system to cause Type 1 diabetes.

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(ii) Antibodies are part of the immune system.

Describe how antibodies function.

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9)

A modern method for improving crop productivity is to cut out sections of DNA carrying a useful gene from one organism and place them into another organism.

(i) Name the technique of inserting genes from one organism into another.

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**(ii)** A gene for producing a vaccine has been inserted into banana plants.

Give **two** other examples in which crop plants have been changed by inserting genes.

State one advantage for each example.

example 1 .....

advantage .....

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example 2 .....

advantage .....

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