

Asexual and sexual reproduction



Instructions and answers for teachers

These instructions should accompany the OCR resource ‘GCSE (9–1) Gateway Biology A ‘Asexual and sexual reproduction’ learner activity which supports OCR GCSE (9–1) Gateway Biology A.

GCSE (9–1) Gateway Biology A
Lesson Element

Asexual and sexual reproduction
Learner Activity Sheet - Activity 1

Cut these cards out and place into the correct columns in the table below:

Only 1 parent needed	Limited ability to adapt	Offspring genetically identical to parents	2 parents needed
Quick	Involves somatic cells	Offspring are a genetic mix of both parents	Slow
Involves specialised sex cells	Adaptable to environmental change	Lots of energy needed	Does not need much energy

Version 1

Learning outcomes

Explain some of the advantages and disadvantages of asexual and sexual reproduction in a range of organisms including the number of live offspring per birth, how quickly the organisms can reproduce versus the need for the introduction of variation in a population caused by environmental pressures.



This activity offers an opportunity for English skills development.



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Supporting information

To save time during the activity, the teacher could pre-cut (and maybe laminate) the cards. To save paper learners could draw out the tables into their books.

For help with the extension activity questions teachers should ensure that textbooks are available or that there is access to ICT for learners to research their answers.

Introduction

Summary of the activity

This activity is designed to be used as a consolidation tool. Learners should have covered all the key aspects of the differences between sexual and asexual reproduction; how the processes occur and what the outcome of each type of reproduction is.

Prior knowledge

Learners need to be aware that inheritance relies on the genetic information contained in the genome being passed from one generation to the next, whether sexually or asexually. The characteristics of a living organism are influenced by the genome and its interaction with the environment.

Learners need to know the processes of sexual and asexual reproduction. They should be aware of the processes of mitosis and meiosis and the difference between them.

Learners should also be clear on the different outcome of each type of reproduction.

Misconceptions

Learners often have the misconception that sexual reproduction always involves sexual intercourse. They can also sometimes think that asexual reproduction is just done by bacteria. Learners often think that sexual reproduction is always better than asexual. This resource aims to help with these misconceptions. By outlining the differences between asexual and sexual reproduction and stressing the advantages of each method learners can discuss how and why a wide range of organisms use asexual reproduction, including many plant and some animal species.

Running the activity

Learners could work individually or in pairs.

Task 1

Learners should cut out the boxes and arrange them into the correct columns.

Depending on how the activity is delivered (either a revision task or a learning aid) learners could either use their notes to help or use guided discussion with their partner or teacher to help place the cards.

Suggested answers:

Sexual	Asexual
2 parents needed	Only 1 parent needed
Adaptable to environmental change	Limited ability to adapt
Slow	Quick
Offspring are a genetic mix of both parents	Offspring genetically identical to parents
Involves specialised sex cells	Involves somatic cells
Lots of energy needed	Does not need much energy

Task 2

Once Task 1 is complete, learners should then use the same cut out cards to fill in the table on Task 2.

There is then a second set of cards that learners should cut out and match with the cards already in place in the table on Task 2.

These boxes are intended to help learners expand on the reasons for the first set of cards in the table.

Learners could use this as a prompt for discussion as to the reasons why certain points are an advantage or a disadvantage for either type of reproduction.

Suggested answers (additional boxes indicated in red):

Sexual meiosis	Asexual mitosis
Advantages	Advantages
Adaptable to environmental change - some of the population may survive even after a change in environmental conditions Offspring are a genetic mix of both parents – genetic diversity	Only 1 parent needed – reproduction can happen at any time Quick – can produce a large population in a short time Does not need much energy – few resources required
Disadvantages	Disadvantages
Slow – can only produce a small population in a short time Lots of energy needed – requires more resources 2 parents needed - Reproduction requires both parents to be together, mature and fertile	Limited ability to adapt – whole population could die off if their environment changes Offspring genetically identical to parents – no genetic diversity

Note the boxes 'Involves somatic cells' and 'involves specialised sex cells' could be used to initiate a classroom discussion as to their relative advantages and disadvantages.

Task 3 - Extension activity

As a summary activity and an extension to the tables Task 3 provides a series of questions. Some are purely revision others provide pointers for further study. Textbooks should be provided (or access to ICT) for learners to research their answers.

Answers:

Give five examples of organisms types that go through sexual reproduction

Any suitable answer eg: mammals, fish, birds, amphibians, reptiles, bacteria, fungi etc.

2. What is a mutation?

A change in the sequence of DNA which can lead to a different phenotype.

3. What can cause a mutation?

Physical change to the DNA molecule (eg mechanical breakage), chemicals (eg sodium azide – used in airbags, some metals etc.), biological agents (eg retroviruses), UV, ionizing radiation and base analogues.

4. Name three organism types that can go through asexual reproduction

Plants, Bacteria, Fungi

5. What are the four forms of asexual reproduction?

Budding, runners, fragmentation, binary fission

6. What form reproduction uses mitosis and what form uses meiosis (sexual/asexual)?

mitosis = asexual, meiosis = sexual

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