

Mutagens - How Genetic Damage Is Increased

Use this worksheet after reading the lesson to practise the key ideas and prove you can meet the success criteria.

Name _____

Date _____

Class _____

1. Key Ideas

A mutation is the DNA change itself. A mutagen is the thing that increases the chance of that change happening. UV radiation from sunlight does not "become" a mutation, but it can damage DNA in ways that raise mutation risk if repair fails.

- Mutagen and mutation are not synonyms.
- DNA damage must persist through repair/replication to become a mutation.

2. Success Criteria

By the end, you should be able to:

- Mutagen and mutation are not synonyms.
- Mutagens include radiation, chemicals and natural agents.
- Different mutagens damage DNA in different ways.

3. Key Terms

Mutagen

An agent that increases the rate of mutation by damaging DNA or interfering with replication.

UV radiation

Electromagnetic radiation that can damage DNA, especially by forming abnormal bonds between neighbouring bases.

Ionising radiation

High-energy radiation that can remove electrons from atoms and cause DNA strand breaks.

Chemical mutagen

A chemical that alters bases, causes mispairing or disrupts DNA replication.

Background radiation

Naturally occurring low-level ionising radiation from sources such as rocks, soil and cosmic radiation.

Insertion effect

A change caused when foreign genetic material becomes inserted into DNA, potentially disrupting a gene or its regulation.

4. Activity: Build the Lesson Map

Use the lesson to complete the table. Keep answers brief but specific.

Prompt	Your answer
Main concept	
Important example	
Common mistake to avoid	
How this links to the next lesson	

5. Short Answer Questions

1. Explain this lesson goal in your own words: "Mutagen and mutation are not synonyms.". Use one specific example from the lesson.

BAND 3 **2 MARKS**

2. Apply this idea to a new example: "Mutagens include radiation, chemicals and natural agents.". Show your reasoning clearly.

BAND 4 **3 MARKS**

3. Analyse why this idea matters for understanding Mutagens - How Genetic Damage Is Increased: "Different mutagens damage DNA in different ways.".

BAND 5 **4 MARKS**

6. Extend: Apply the Idea

BAND 5/6

5 MARKS

A student gives a memorised answer about Mutagens - How Genetic Damage Is Increased but does not use evidence or reasoning.

Improve the answer by writing a stronger response that uses accurate terminology, a relevant example and a clear explanation.

7. Multiple Choice

1. What is the best first step when answering a question about Mutagens - How Genetic Damage Is Increased?

- A. Identify the key concept being tested
- B. Write every fact from memory
- C. Ignore the command word
- D. Skip examples and evidence

2. Which answer would show stronger understanding of Mutagens - How Genetic Damage Is Increased?

- A. An answer with accurate terms and reasoning
- B. A copied definition only
- C. A single-word response
- D. An answer with no example

3. What should you do if a question asks you to explain?

- A. Link the idea to a reason or cause
- B. List unrelated facts
- C. Only draw a diagram
- D. Write the shortest possible answer

8. Success Criteria Proof

Finish with evidence that you can do each success criterion.

SUCCESS CRITERION 1

Prove that you can: Mutagen and mutation are not synonyms.

BAND 3

2 MARKS

SUCCESS CRITERION 2

Prove that you can: Mutagens include radiation, chemicals and natural agents.

BAND 4

3 MARKS

SUCCESS CRITERION 3

Prove that you can: Different mutagens damage DNA in different ways.

BAND 5

4 MARKS

One thing I still need help with:
