BIOLOGY YEAR 12 - MODULE 8 - LESSON 10

Cancer — Cell Cycle, Oncogenes, Tumour Suppressors and Metastasis

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

Every cancer begins with a normal cell that has lost the molecular brakes on its own division. Understanding cancer means understanding which genes control those brakes, how mutations disable them, and why a single cell out of tens of trillions can eventually kill an organism by producing descendants that invade and colonise other tissues.

- The distinction between proto-oncogenes and oncogenes, and between tumour suppressor genes and their mutant forms
- Why oncogenes are dominant (one mutant copy sufficient) but tumour suppressors are recessive (both copies must be lost)

2. Success Criteria

By the end, you should be able to:

- The distinction between proto-oncogenes and oncogenes, and between tumour suppressor genes and their mutant forms
- The role of p53 and BRCA1/2 as tumour suppressor genes
- The difference between benign and malignant tumours

3. Key Terms

G1/S checkpoint:
the cell big enough? Is DNA undamaged? Are growth signals present? p53 is a key enforcer — if DNA damage is detected, p5

G2/M checkpoint:
DNA replication complete and error-free? Are there sufficient resources for mitosis?

Understanding cancer
understanding which genes control those brakes, how mutations disable them, and why a single cell out of tens of trillio

Cancer
not a failure of the body to notice the cell is abnormal

you think multiple mutations
needed? What does this suggest about how many independent control systems the cell cycle has?

The genes mutated
likely the [accelerator/brake] genes because

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: "The distinction between proto-oncogenes and oncogenes, and between tumour suppressor genes and their mutant forms". Use one specific example from the lesson.

BAND 3 2 MARKS

2. Apply this idea to a new example: "The role of p53 and BRCA1/2 as tumour suppressor genes". Show your reasoning clearly.

BAND 4 3 MARKS

3. Analyse why this idea matters for understanding Cancer — Cell Cycle, Oncogenes, Tumour Suppressors and Metastasis: "The difference between benign and malignant tumours".

BAND 5 4 MARKS

6. Extend: Apply the Idea

BAND 5/6 5 MARKS

A student gives a memorised answer about Cancer — Cell Cycle, Oncogenes, Tumour Suppressors and Metastasis 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 Cancer — Cell Cycle, Oncogenes, Tumour Suppressors and Metastasis?

- [ ] 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 Cancer — Cell Cycle, Oncogenes, Tumour Suppressors and Metastasis?

- [ ] 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: The distinction between proto-oncogenes and oncogenes, and between tumour suppressor genes and their mutant forms

BAND 3 2 MARKS

SUCCESS CRITERION 2

Prove that you can: The role of p53 and BRCA1/2 as tumour suppressor genes

BAND 4 3 MARKS

SUCCESS CRITERION 3

Prove that you can: The difference between benign and malignant tumours

BAND 5 4 MARKS

One thing I still need help with: