CANCER CASE STUDY: WHEN CELL CONTROL FAILS

8th Grade Life Science – Mitosis & Cell Cycle Application

Student Name: _____ Date: _____

BACKGROUND

Your cells copy their DNA and divide billions of times throughout your lifetime.
Normally, **checkpoints** in the cell cycle make sure everything is correct before the cell divides.

But if a mutation damages DNA or checkpoint control fails...
➡️ **Cells divide uncontrollably.**
➡️ **Tumors can form.**
➡️ **This condition is called cancer.**

Today, you will analyze REALISTIC scenarios to apply what you have learned about the cell cycle, mitosis, and cell regulation.

1 — WHAT IS GOING WRONG?

Below are **four short cases**. For each one, identify:

✓ Which **checkpoint** failed (G_1, G_2, or M)
✓ What **phase of mitosis** is being affected
✓ What the **consequences** are
✓ What the **cell SHOULD have done**

Case 1 — The Sunburn Mutation

A 13-year-old student gets repeated sunburns without using sunscreen.
UV radiation damages DNA in her skin cells, but the cells **continue dividing anyway**.

Checkpoint failed: _____

Phase affected: _____

What went wrong: _____

What the cell should have done: _____

Case 2 — Broken Spindle Fibers

LIVEWORKSHEETS

A lung cell begins mitosis. During metaphase, **half the chromosomes are not attached** to spindle fibers, but the cell divides anyway.

Checkpoint failed: _____

Phase affected: _____

What went wrong: _____

Possible consequence: _____

Case 3 — Mutated Growth Factor

A muscle cell receives a mutated signal causing it to **stay in constant "divide" mode** even though the tissue does not need more cells.

Checkpoint failed: _____

Phase affected: _____

What went wrong: _____

Long-term effect: _____

Case 4 — Ignored DNA Damage

A cell in S phase makes several DNA-copying mistakes.
In G_2, the cell recognizes the damage, but **ignores it** and enters mitosis.

Checkpoint failed: _____

Phase affected: _____

What went wrong: _____

Resulting danger: _____

PART 2 — NORMAL VS. CANCER CELLS

LIVEWORKSHEETS

Directions: Study the pictures provided by your teacher or your slides.
Then compare **normal cells** vs. **cancer cells**.

Feature	Normal Cells	Cancer Cells
Growth rate	_____	_____
Checkpoints	_____	_____
Shape/size	_____	_____
Organization	_____	_____
Behavior	_____	_____

3 — SHORT-ANSWER QUESTIONS

1. Why is the G_1 checkpoint the most important checkpoint in your entire body?

2. How does cancer show what happens when God's order in creation is disrupted?

(Connect to **1 Corinthians 14:33**.)

3. What choices can YOU make that help protect your cells from harmful mutations?

"How does studying cancer help me appreciate God's design and understand the importance of caring for my body?"
(Use Psalm 139:14 or Romans 8:20–21.)

LIVEWORKSHEETS