

The cell cycle and mitosis

Name _____

Date _____

Period _____

Part 1 · Vocabulary

1. Write the letter of the matching description next to each term.

- | | |
|-------------------------|--|
| _____ Interphase | A Where sister chromatids are held together most tightly |
| _____ S phase | B A control point that lets the cycle continue only when conditions are right |
| _____ Sister chromatids | C G1, S and G2 — where a cell spends most of its cycle |
| _____ Cohesin | D Microtubule-organizing center, duplicated during interphase |
| _____ Centromere | E The two identical copies that make up a replicated chromosome |
| _____ Centrosome | F Protein structure at the centromere that binds spindle microtubules |
| _____ Kinetochore | G The stage in which the DNA is replicated |
| _____ Metaphase plate | H Proteins that hold sister chromatids together |
| _____ Cytokinesis | I The plane at the cell's equator where chromosomes line up |
| _____ Checkpoint | J Division of the cytoplasm into two daughter cells |

Part 2 · The cell cycle

2. What does the cell do in each stage of interphase: G1, S and G2?

3. In which stage of interphase does the cell replicate its DNA?

- | | |
|-------------|------------------|
| A G1 | C G2 |
| B S | D Mitosis |

4. A human body cell has 46 chromosomes. After S phase, how many sister chromatids does it have?

- | | |
|-------------|--------------|
| A 23 | C 92 |
| B 46 | D 184 |

5. What is G0? Give an example of cells that stay in G0 permanently.

Part 3 · Mitosis and cytokinesis

6. Put the stages of mitosis and cytokinesis in order. Number them 1–6.

- _____ Anaphase
- _____ Telophase
- _____ Cytokinesis
- _____ Metaphase
- _____ Prometaphase
- _____ Prophase

7. Describe what happens in each stage.

	What happens
Prophase	
Metaphase	
Anaphase	
Telophase	

8. Where do the chromosomes line up during metaphase?

- A At the two poles

B In one plane at the cell's equator — the metaphase plate
- C Inside the nucleus

D Along the plasma membrane

9. What happens to let the sister chromatids separate in anaphase?

- A Cohesin breaks down and spindle microtubules pull the chromatids to opposite poles

B The nuclear envelope pushes them apart
- C The DNA is replicated again

D The contractile ring cuts them apart

10. After mitosis and cytokinesis, how many chromosomes does each human daughter cell have?

- A 23

B 46
- C 92

D It varies

11. How does cytokinesis differ in animal cells and plant cells?

Part 4 · Control and differentiation

12. What does the M (spindle) checkpoint check, and why must it happen before anaphase?

13. What can happen to a cell or organism when the cell cycle is disrupted?

14. Why are a muscle cell and a nerve cell from the same person different?

A They contain different DNA

C They have different numbers of chromosomes

B They use different genes of the same DNA

D They were made by meiosis