Year 12 Science: DNA replication, mitosis and the cell cycle

Name: _____ Date: _____

Try these without your notes first, then check the answer key.

Practice

1. At what point in the cell cycle is DNA copied?

2. A cell has 8 chromosomes. How many DNA molecules does it contain at metaphase, and how many chromosomes does each daughter cell get?

3. One DNA strand reads 5' ATGCCTA 3'. Write the new strand built on it during replication, with its ends labelled.

4. In a root tip squash, 45 of the 300 cells counted are in mitosis. Calculate the mitotic index.

5. Explain why a growing root makes more cells rather than making its cells bigger.

Exam-style question: a copper skink

Copper skinks are small lizards common in Auckland gardens. Like most New Zealand skinks, they give birth to live young, and a newborn is only a fraction of its adult size. When a bird grabs its tail, the skink can drop the tail and escape, then slowly grow a new one.

6. Describe when DNA replication happens in the cell cycle, and how the DNA is copied.

7. Explain why DNA replication must happen before mitosis.

8. Explain why the young skink grows by making more cells rather than by its cells getting larger.

9. Discuss why mitosis is needed throughout the skink's life, linking the survival of its cells to the survival of the whole skink.

Fix the mistake

10. Correct this statement: "DNA replication happens during prophase, when the chromosomes appear."

11. Correct this statement: "Interphase is when the cell rests between divisions."

12. Correct this statement: "Mitosis makes four cells that are all genetically different."

13. Correct this statement: "Each daughter cell gets half of the parent cell's DNA."