

SUGGESTED ANSWERS

WHAT DO YOU REMEMBER?

1. The three stages of the cell cycle are interphase, mitosis, and cytokinesis.
2. DNA is replicated during interphase.
3. Prophase: chromosomes thicken, nuclear membrane breaks down. Metaphase: chromosomes line up in the middle of the cell on the equator. Anaphase: daughter chromosomes separate. Telophase: daughter chromosomes reach opposite sides, new membrane starts to form.
4. (a) (i) plant; (ii) plant; (iii) animal; (iv) animal
(b) (i) metaphase; (ii) cytokinesis; (iii) metaphase; (iv) cytokinesis
5. The danger of cancer cells is that they keep dividing, crowding out other cells and forming tumours. They destroy or interfere with surrounding tissues.

WHAT DO YOU UNDERSTAND?

6. The process of diffusion is responsible for odours spreading throughout the house.
7. In animal cells, the cellular membrane pinches off (cytokinesis) to form two new cells, but in plant cells, a new plate forms in between the two new cells which then becomes a new cell wall.
8. Eukaryotes are often multicellular. Without mitosis, eukaryotes cannot grow and specialize. Mitosis ensures that each new generation of cells has the exact same DNA and can perform the same function as the previous generation.
9. For a cancer cell, the cell cycle stage interphase would be much shorter.
10. Spindle fibres are responsible for moving the chromosomes around inside the cell.
11. A chromosome is all the DNA condensed into one thickened strand. A chromatid is the same condensed strand of DNA, but replicated so that there are two identical copies of the same strand on DNA attached in the middle by a centromere.
12. (a) If cells grow too large, their surface to volume ratio drops too low and the process of diffusion, used to obtain nutrients they need and get rid of wastes, is no longer efficient.
(b) Muscle cells need to be smaller because they do more work and need a constant supply of nutrients and oxygen. A smaller size means there is a larger surface area to volume ratio, making diffusion a fast and efficient process.

SOLVE A PROBLEM

13. Skin cells are exposed to more carcinogens, such as UV rays, chemicals, and pollution, unlike cells inside the body. This makes them more susceptible to cancer.
14. One major part of a plant where cells frequently undergo mitosis is the root tip.
15. Three prevention and screening steps to reduce the risk of cancer are regular Pap smear tests, self-examination of breasts or testicles, and avoiding tobacco smoke.
16. (a) A: interphase: 94.9 %, prophase: 3 %, metaphase: 0.9 %, anaphase: 0.6 %, telophase: 0.3 %, cytokinesis: 0.3 %