2.7 Cell division gone wrong: Cancer

1. Cancer cells grow unchecked. They do not respond to signals to stop undergoing mitosis.

2. (a) Some cancers run in families and are inherited or partly inherited. This means that DNA passed from one generation to the next may contain information that makes the person more susceptible to cancer.

(b) Cancer cannot be transmitted from one person to another because cancer is caused by a mistake in DNA.

3. (a) A carcinogen is a factor that increases the risk of cancer, such as smoking, UV sunlight, or certain foods.

(b) Some examples of carcinogens that may be present in everyday life are smoke, UV rays in sunlight, cleaning chemicals, viruses such as HPV, food additives, and pollution.

4. Cancer is sometimes easy to overlook because there are few symptoms in the early stages.

5. Five diagnostic techniques used to detect cancer are CT scans, ultrasound, endoscopy, MRI, and mammogram.

6. Three conventional methods of treating cancer are surgery, chemotherapy, and radiation. Surgery cuts out the tumour. Chemotherapy uses drugs to kill cancer cells and reduce the size of the tumour. Radiation also kills cells and reduces the size of a tumour.

7. Appearance of cancer cells in the blood show that the cancer exists somewhere in the body. Cancer cells in the blood may also indicate that these cells have broken off from the original tumour and have travelled to other sites in the body. Tumours may be forming at secondary sites.

8. Lifestyle choices that help reduce the risk of cancer are avoiding tanning, maintaining a healthy weight, eating a better overall diet that includes “super foods,” increasing exercise, and quitting smoking.

9. Some cancer screening tests are Pap smear, mole screening, and breast and testicle exam.

10. There is a risk of cancer recurring because neither the patient nor doctor know if all cancerous cells have been removed from the body. If any still exist, they can grow and start new tumours.
2.9 Specialized Cells

1. Complex organisms have organs and organ systems that perform very different, specialized functions. Different functions require specialized cell types.

2. Four activities my body must do to stay alive are breathe, eat, eliminate waste, and stay warm.

3. Red blood cells are smooth, flat, round, and concave (pinched in) in the middle to pass easily through blood vessels.

   Muscle cells are organized in fibres that, when activated by a nerve signal, suddenly contract and pull together, causing the attached bone to move.

4. Because every cell came from one fertilized egg cell, the original zygote had all of the instructions (DNA) for forming all of the different types of cells in the body. Every cell has exactly the same DNA.

5. Plant cells specialize in different ways in some cases. For example, plants do not have blood, so they do not have blood cells. Plants do transport water, so they have special cells for water transport. Animals do not photosynthesize, so they do not have cells with chloroplasts like plants do. Similarly, only plants have guard cells to prevent water loss in leaves.

6. With only one cell, single-celled organisms cannot specialize.