

## **Grade 8 Science**

### **Unit 4: “Cells, Tissues, Organs & Systems”**

**At the end of this unit, students should be able to:**

1. Compare the early idea that living organisms were made with air, fire, and water with the modern cell theory.
2. Define **cell**.
3. Describe the four characteristics to living things. Include:
  - **Growth**
  - **Movement (locomotion)**
  - **Response to stimuli**
  - **Reproduction**
4. Describe how optical technologies have developed through systematic trial and error processes constrained by the optical properties of the materials.
5. Identify and state the functions of the major parts of the **compound microscope**.
  - **Eyepiece**
  - **Objective lenses**
  - **Stage**
  - **Coarse adjustment knob**
  - **Fine adjustment knob**
  - **Light source/ lamp**
  - **Iris diaphragm**
  - **Base**
  - **Barrel (body tube)**
  - **Arm**
  - **Revolving nosepiece**
6. Use a light microscope to produce a clear image of cells.
7. Identify and suggest explanations for discrepancies in data.
8. Organize data using format that is appropriate to the task.
9. Estimate measurements of plant cells viewed with microscope.
10. Demonstrate proper care in the use and storage of the compound microscope.
11. Examine the field view under low and medium power.
12. Prepare and observe a wet mount slide.

13. Illustrate and explain that the cell is a living system that exhibits the 4 characteristics of life.

14. Explain that it is important to use proper terms when comparing **plant and animal cells**.

15. Examine and explain the role of the following organelles:

- **Cell wall**
- **Cell membrane**
- **Chloroplast**
- **Cytoplasm**
- **Nucleus**
- **Vacuole**
- **Mitochondrion**

16. Label organelles on diagrams of typical plant and animal cells.

17. State the **cell theory**.

18. Work co-operatively with team members to develop and construct models of cells.

19. Evaluate individual and group processes used in constructing models of cells.

20. Distinguish between typical plant and animal cells.

21. Produce labelled drawings of each type of cell.

22. List three differences between plant and animal cells.

23. Explain that growth and reproduction depend on cell division.

24. Explain that **mitosis** is the process of division of cells.

25. Relate the needs and functions of various cells and organs to the needs and functions of the human organism as a whole.

26. Explain that cells and organisms require the same basic necessities of life. Include oxygen, nutrients and waste removal.

27. Explain structural and functional relationships between and among cells, tissues, organs and systems in the human body.

28. Describe these levels of organization found in living things.

- **Cells**
- **Tissues**
- **Organs**
- **Organ systems**
- **Organisms**

29. Diagram the relationships between cells, tissues, organs, organ systems and organisms in a flow chart.

30. Evaluate individual and group processes used in presenting the roles of the main organ systems.

31. Identify the main function of the following organ systems in keeping organisms alive.

- **Circulatory**
- **Respiratory**
- **Digestive**
- **Excretory**
- **Nervous**
- **Muscular**

32. Describe the basic factors that affect the functions and efficiency of the human respiratory, circulatory, muscular, digestive, excretory and nervous systems.

33. Explain the roles that diet, nutrition, exercise and stress have on the systems mentioned above.

34. Debate lifestyle choices such as diet choices, smoking, drinking alcohol or sedentary lifestyle and their effects on body systems.

35. Illustrate examples of conflicting evidence related to how we should maintain and/ or treat body systems.

36. Describe the science underlying various technologies used to assist or replace unhealthy organ systems. Include the **insulin pump** and the **artificial heart**.

37. Provide examples of scientific knowledge that have resulted in the development of technologies.

38. Describe how a community's needs can lead to developments in science and technology.

39. Make informed decisions about applications of science and technology, taking into account environmental and social advantages and disadvantages.

40. Propose a course of action on social issues related to science and technology, taking into account human and environmental needs.

41. Design and carry out an experiment to compare and contrast **heart rate** and **breathing rate** in an individual during various levels of activity, and identify and control the major variables.

42. Rephrase questions into testable form about the factors that affect physical fitness and health.

43. State a hypothesis based on background information or an observed pattern of events.

44. Carry out procedures controlling the major variables.

45. Identify and suggest explanations for discrepancies in data.

46. Compile and display data using tables and graphs.

47. Suggest explanations for variations in the heart rate and the breathing rate of an individual during various levels of activity when the experiment is repeated.

48. Describe three examples of the interdependence of various systems of the human body.

Include:

- Circulatory/ respiratory
- Digestive/ circulatory
- Nervous/ muscular

49. Provide examples of careers that are associated with the health of body systems.

50. Make informed decisions about applications of science and technology that are associated with human body systems taking into account personal and social advantages and disadvantages.