### DIFFERENTIATED INSTRUCTION DETAILS

**Knowledge of Students**

- **Differentiation based on student:**
  - Readiness
  - Interests
  - Preferences:
    - Styles
    - Intelligences
    - Other (e.g., environment, gender, culture)

**Need to Know**

- Student interests in diseases and abnormalities, learning preferences and prior experience with presentation formats to design RAFT options

**How to Find Out**

- Observation prior to this lesson and during the Minds On Centres activity; discussions regarding interests and learning preferences

**Differentiated Instruction Response**

- Topic, Entry Point (content)
- Ways of learning (process)
- Ways of demonstrating learning (product)
- Learning environment

### CURRICULUM CONNECTIONS

**Big Idea:** Plants and animals, including humans, are made of specialized cells, tissues, organs that are organized into systems.

**Fundamental Concepts:** Systems and interactions, structure and function, change and continuity

**Overall Expectation:** A. Scientific Investigation Skills and Career Exploration

- **A1.** Demonstrate scientific investigation skills (related to both inquiry and research) in the four areas of skills: initiating and planning (IP), performing and recording (PR), analyzing and interpreting (AI), and communicating (C)

**Overall Expectation:** B. Biology: Tissues, Organs, and Systems of Living Things

- **B2.** Investigate cell division, cell specialization, organs, and systems in animals and plants, using research and inquiry skills, including various laboratory techniques

**B3.** Demonstrate an understanding of the hierarchical organization of cells, from tissues to organs to systems in plants and animals

### ASSESSMENT AND EVALUATION

**Assessment/Success Criteria**

- Knowledge and Understanding
  - **A1.** Identify the parts of a plant and animal cell
  - **A1.** Describe the function of organelles in a cell or organism
  - **A1.** Explain how a disease or abnormality connects to cells, tissues, organs, and systems
  - **A1.** Use appropriate language in a selected format

- **Thinking and Inquiry**
  - **A1.** Analyze the role of each system in an organism's survival
  - **A1.** Select information that is relevant to the research questions

- **Communication**
  - **A1.** Communicate research findings

**Assessment Tools:**

- Checklist
- Rubric
- Anecdotal Comments
- Rating Scale

### PRIOR LEARNING

Prior to this lesson, students will have:

- An understanding of the primary functions of a variety of systems in plants and animals
- An understanding of the interaction of different systems within an organism and why such interactions are necessary for the organism's survival
- Knowledge of how to locate resources (basic Internet research skills)

### MATERIALS AND RESOURCES

**Materials:**

- Six to eight centres with high-interest materials to motivate further investigation (e.g., photos of diseases/abnormalities, newspaper headlines, slide images of affected cells, quotes)
- Chart paper
- Access to a computer lab

**Appendix A:** Internet Resources (Teacher Reference)

**Appendix B:** Suggestions for Grade 10 Science, Applied (SNC2P) Biology (Teacher Reference)

**Appendix C:** Place Mat: Steps to Finding Out Information—one per centre (photocopy on ledger-size paper)

**Appendix D:** Research Process Checklist—one per student

**Appendix E:** Criteria for Evaluating Sources for Reliability and Bias—one per student

**Appendix F:** Diseases and Abnormalities RAFT Research Assignment Rubric—one per student

**Appendix G:** Diseases and Abnormalities RAFT Research Assignment—one per student

**Appendix H:** Research Note-taking Organizer—one per student

**Appendix I:** Diseases and Abnormalities RAFT Research Assignment: Self and Peer Assessment Rating Scale—one per student

**Internet Resources:**

- See Internet Resources (Teacher Reference) (Appendix A)

**Resources:**

- Marzano’s Categories of Instructional Strategies (See Resources, below.)
- Differentiated Instruction Structure
Note: This Teaching/Learning Example may be adapted for use in Grade 10 Applied Science. See Suggestions for Grade 10 Science, Applied (SNC2P) Biology (Teacher Reference) (Appendix B).

Groups of Four → Centres/Place Mat—Steps to Finding Out Information

Set up six to eight (depending on the size of the class) centres around the room, each with a Place Mat—Steps to Finding Out Information (Appendix C) and one or more items related to a particular disease/abnormality of humans or plants (e.g., photo, newspaper headline, slide image of an affected cell, a quote from an expert or someone who has had the disease)—see Internet Resources (Teacher Reference) (Appendix A). Include items that are high interest and will motivate further investigation.

Students:
• Select a centre of interest and go to that area; form groups of no more than four students per centre
• Examine the item(s), clarify their understanding of the item(s) as a small group and prepare a short statement of explanation for a speaker from their group to share with the class
• Individually, respond to the question: “If you had to provide some basic information on this disease/abnormality for a local radio station, what steps would you take to find accurate information about this disease/abnormality so that you could present it clearly and concisely to the listening/viewing public?”
• Write their steps in point form in their individual section of the Place Mat—Steps to Finding Out Information (Appendix C)
• Share their response with their small group
• As a group, agree upon and list at least three steps they could take and note these steps in the centre of the Place Mat.

Whole Class/Centre Groups → Facilitated Discussion/Classification (Scientific Research Skills)

Indicate that taking steps to find out more information on a topic is research and that the steps in the research process are skills based. Students will apply Scientific Investigation Skills in four broad areas: initiating and planning, performing and recording, analyzing and interpreting, and communicating. Use these four broad areas of skills as headings for four pieces of chart paper/cabinets drawn on the board. Have a few centre groups share some of their agreed-upon steps from the Place Mat, Appendix C, and indicate the skill areas into which the steps fit. Record these steps on the chart paperboard in the appropriate columns. Provide feedback and clarify as needed. Distribute the Research Process Checklist (Appendix D) and have centre groups classify their steps in the appropriate skill areas.

Facilitate a class discussion as groups share; note and explain the skill areas that received the most and least attention, ensuring that students understand the importance of all steps.

Whole Class/Pairs → Discussion/Think-Pair-Share

Initiate a discussion on the importance of accurate information related to health and the possible consequences of inaccurate or incomplete information (e.g., health-related websites developed by companies that profit from selling products to poorly informed customers).

Students:
• Individually, list factors to consider when assessing the reliability of resources and information sources
• Discuss with a partner and refine their list
• Share, as a pair, with the class to create a list of criteria for evaluating the reliability of an information source (e.g., the author, the publisher, the date)

Refine Criteria for Evaluating Sources for Reliability and Bias (Appendix E), based on student input and distribute to students. Work with the class to apply the criteria to a pre-selected, health-related website or brochure to determine the reliability of its information. Review and provide an example of how to document sources. (See information in the Think Literacy Subject-Specific documents in Appendix A.)

CONNECTIONS

Grade 10 Science, Academic (SNC2D) Biology: Researching Diseases/Abnormalities—Science

CONSOLIDATION AND CONNECTION

Differentially assigned task(s) based on the performance of the student (see Appendix F).

Pairs → Peer Assessment

Students:
• In pairs, examine each other’s RAFT product using the RAFT Research Assignment: Self and Peer Assessment (Appendix I); discuss and refine their RAFT product as appropriate
• Hand in final RAFT product for teacher evaluation. See RAFT Research Assignment Rubric (Appendix F)
• Consider how the products could be shared with the class or another audience