Tissues, Organs and Systems: Unit Overview

SNC2D, Grade 10 Science (Academic), Unit 2. 16 classes of 75 minutes, plus a summative work period and one class for the unit test (18 classes, about four weeks).

The big question

How do cells divide and specialize to build tissues, organs and systems, and how do new technologies that work with these systems affect our health and society?

Students use microscopes to compare plant and animal cells, model the cell cycle, count cells in each phase of mitosis and compare normal and cancerous division with original data. They study specialized cells and stem cells (including Toronto's Till and McCulloch), trace the hierarchy from cells to systems, test plant tissues with celery and leaf peels, model digestion, measure heart and breathing rates, and dissect a flower alongside a free virtual frog. The unit closes with disease research, medical imaging, public health and an ethics debate. Labs use cheap materials; all data sets and cases are original.

Lessons

#	Lesson	Classes	Question	Expectations	What's inside
1	**Cells Up Close**	1	How do we see cells?	A1.2, B2.1, A1.4	Organelles; microscope care; field of view
2	**Plant and Animal Cells Lab**	1	How do plant and animal cells differ?	B2.3, A1.5	Onion and Elodea mounts; labelled diagrams
3	**The Cell Cycle**	1	How does one cell become two?	B3.1, B2.1	Phases of mitosis; chromosome model
4	**Mitosis Lab**	1	How long does each phase last?	B2.2, A1.6	Root tip count table; phase times; graph
5	**When Cell Division Goes Wrong**	1	What makes cancer cells different?	B2.5, A1.8	Mitotic index; culture growth data
6	**Specialized Cells and Stem Cells**	1	How do cells become specialized?	B2.4, B3.2	Radish root hairs; stem cells; Till and McCulloch
7	**From Cells to Systems**	1	How are living things organized?	B3.3	Tissue types; hierarchy card sort
8	**Plant Tissues and Systems**	1	How do plant systems work together?	B3.3, B2.1, A1.5	Celery xylem; leaf peels; stomata
9	**The Digestive System**	1	How does food reach our cells?	B3.4	Gut-in-a-bag model; villi surface area
10	**Circulation and Respiration**	1	How do oxygen and blood get around?	B3.4, B3.5, A1.6	Heart and lungs; heart and breathing rates

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11	**Systems Working Together**	1	Why can't a system work alone?	B3.5	Systems web; journey to a muscle cell
12	**Dissection: Systems Inside an Organism**	1	How do systems connect?	B2.6, A1.4	Flower dissection; free virtual frog dissection
13	**Disease Detectives**	1	How does disease affect systems?	B2.7, A1.7, A1.9	Case files; research; source checks
14	**Seeing Inside the Body**	1	Why does medical imaging matter?	B1.2, A2.1, A2.2	Imaging compared; cobalt-60; careers
15	**Public Health**	1	How do we protect communities?	B1.3	Outbreak data; HPV, MMR; screening
16	**Ethics in Systems Biology**	1	What should we do?	B1.1, A1.11	Ethical lenses; structured debate

Assessment

Type	In this unit
Assessment for learning	Lab sheets and drawings, data analyses, card sort, case files, debate planner, exit tickets
Assessment as learning	Self-checks against success criteria, debate reflection
Assessment of learning	Systems Biology Issue Report with rubric (suggested weight 7% of the final mark) and Unit Test with answer key (suggested weight 5%)

What's included

In the Start Here folder:

- **Summative Task and Rubric:** the Systems Biology Issue Report, with a checklist
- **Unit Test and Answer Key:** multiple choice, short answer, calculations and an application question, with worked answers

Safety: every hands-on activity has safety notes in its lesson plan. Cheek cells are optional, only where board policy allows.

What's in each lesson

- Teacher lesson plan with expectations, timed sequence, differentiation, look-fors and answer guides
- Slides with speaker notes
- Student handouts and organizers
- Editable Word and PowerPoint files, plus PDFs

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