Linking ON Science Curriculum to Binogi: GRADE 8

• Understanding Life Systems = A • Understanding Structures and Mechanisms = B • Understanding Matter and Energy = C • Understanding Earth and Space Systems = D

Strand	Overall Expectations Category	Overall Expectation	Specific Expectation Category	Specific Expectation	Binogi Video
STEM Skills and Connections	A1	**STEM Investigation and Communication Skills:** use a scientific research process, a scientific experimentation process, and an engineering design process to conduct investigations, following appropriate health and safety procedures	1.1	use a scientific research process and associated skills to conduct investigations	Science and pseudoscience
			1.2	use a scientific experimentation process and associated skills to conduct investigations	Scientific method – Chemistry
			1.3	use an engineering design process and associated skills to design, build, and test devices, models, structures, and/or systems	The scientific method – Physics The scientific method - Biology Scientific knowledge
			1.4	follow established health and safety procedures during science and technology investigations, including wearing appropriate protective equipment and clothing and safely using tools, instruments, and materials	The chemistry lab Heat sources in the science lab Laboratory apparatus
			1.5	communicate their findings, using science and technology vocabulary and formats that are appropriate for specific audiences and purposes	Scientific knowledge Scientific report Videos on Statistics and Data Handling
	A2	**Coding and Emerging Technologies:** use coding in investigations and to model concepts, and assess the impact of coding and of emerging technologies on everyday life and in STEM-related fields	2.1	write and execute code in investigations and when modelling concepts, with a focus on obtaining input in different ways for a variety of purposes	Videos on Programming
			2.2	identify and describe impacts of coding and of emerging technologies, such as artificial intelligence systems, on everyday life, including skilled trades	N/A

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	A3	**Applications, Connections, and Contributions:** demonstrate an understanding of the practical applications of science and technology, and of contributions to science and technology from people with diverse lived experiences	3.1	describe practical applications of science and technology concepts in various occupations, including skilled trades, and how these applications address real-world problems	What is biology? What is technology?
			3.2	investigate how science and technology can be used with other subject areas to address real-world problems	N/A
			3.3	analyse contributions to science and technology from various communities	The history of biology From Aristotle to classical physics From classical to modern physics
Life Systems: Cells	B1	**Relating Science and Technology to Our Changing World:** assess developments in cell biology and their impact on individuals, society, and the environment	1.1	assess how various technologies have enhanced our understanding of cells and cellular processes	N/A
			1.2	Analyse beneficial and harmful effects of developments in cell biology and associated emerging technologies on human health and the environment, while taking different perspectives into consideration	The Human Genome project Gene technology Biotechnology
	B2	**Exploring and Understanding Concepts:** demonstrate an understanding of the basic structure and function of plant and animal cells and cell processes	2.1	describe an understanding of cells, using cell theory	The animal cell Cell domains *(the above videos not refer to cell theory)*
			2.2	Identify organelles and other cell components, including then nucleus, cell membrane, cell wall, chloroplasts, vacuole, mitochondria, and cytoplasm, and explain their basic functions	The animal cell The plant cell
			2.3	compare the structure and function of plant and animal cells	The animal cell The plant cell
			2.4	Explain the processes of diffusion and osmosis within a cell	Osmosis Diffusion *(does not refer to cell)*
			2.5	describe various unicellular and multicellular organisms, and compare ways in which these two types of organisms meet their basic needs	Unicellular organisms

					Unicellular organisms: Good or bad? Cell domains
			2.6	describe the organization of cells into tissues, organs, and systems	Organs and organ systems Tissue
Matter and Energy: Fluids	C1	**Relating Science and Technology to Our Changing World:** analyse uses of various technologies that rely on the properties of fluids, and assess the impact of these technologies on society and the environment	1.1	assess the environmental, social, and economic impacts of various innovations and technologies that are based on the properties of fluids	N/A
			1.2	assess the environmental and social impacts of fluid spills, including impacts on First Nations, Métis, and Inuit communities, and including the cost and technical challenges related to cleanup and remediation efforts	Sea pollution
	C2	**Exploring and Understanding Concepts:** demonstrate an understanding of basic fluid mechanic, including the properties and uses of fluids	2.1	demonstrate an understanding of the factors that affect viscosity, and compare the viscosity of various fluids, including volumetric flow rate	N/A
			2.2	demonstrate an understanding of the relationship between mass, volume, and density	Weight, mass, and volume Density
			2.3	explain the difference between solids, liquids, and gases in terms of their density, using the particle theory of matter	N/A
			2.4	explain the difference between liquids and gases in terms of their compressibility and how their compressibility affects their technological applications	Pneumatics Hydraulic
			2.5	determine the buoyancy of an object, given its density, in a variety of fluids	Buoyancy Does it float?
			2.6	explain in qualitative terms the relationship between pressure, volume, and temperature when a liquid or a gas is compressed or heated	Gas: Pressure, volume, and temperature
			2.7	describe how forces are transferred in all directions in fluids, including using Pascal's law to quantify the transfer of forces in fluids	Pressure in liquids *(does not refer to Pascal's law)*
			2.8	describe factors that affect the flow of fluids	N/A
			2.9	describe the differences between pneumatic and hydraulic systems	Pneumatics Hydraulic

			2.10	compare how fluids are used and how their flow is regulated in living organisms and in mechanical devices or systems	Communicating vessels Osmosis Diffusion
Structures and Mechanisms: Systems in Action	D1	**Relating Science and Technology to Our Changing World:** assess the social and environmental impacts of various systems, and evaluate improvements to the systems or alternative ways of meeting the same needs	1.1	assess the social, economic, and environmental impacts of automating systems	N/A
			1.2	assess the impact on individuals, society, and the environment of alternative ways of meeting needs that are currently met by existing systems, taking different points of view into consideration	Environmental sustainable development
	D2	**Exploring and Understanding Concepts:** demonstrate an understanding of different types of systems and the factors that contribute to their safe and efficient operation	2.1	identify various types of systems	N/A
			2.2	describe the purpose, inputs, and outputs of various systems, including systems related to food processing	N/A
			2.3	identify the various processes and components of a system that allow it to perform its function efficiently and safely	N/A
			2.4	use the scientific terms *displacement*, *force*, *work*, *energy*, and *efficiency* to describe everyday experiences	Mechanical work *(does not refer to 'efficiency')*
			2.5	demonstrate an understanding of the relationships between work, force, and displacement in simple systems	Simple machines: The inclined plane, the lever and the wedge Simple machines; The wheel, the screw, and the block-and-tackle
			2.6	explain the relationship between input and output forces and determine the mechanical advantage of various mechanical systems, including simple machines	Simple machines; The wheel, the screw, and the block-and-tackle
			2.7	identify ways in which energy can dissipate from mechanical systems, and describe technological innovations that make these systems more efficient	Mechanical energy
			2.8	explain how providing information and support to consumers helps to ensure that the systems they use run safely and efficiently	N/A
			2.9	describe technological innovations involving mechanical systems that have increased productivity in various industries	Hydroelectric power

			2.10	identify social factors that influence the evolution of a system	N/A
Earth & Space Systems: Water Systems	E1	**Relating Science and Technology to Our Changing World:** assess the impact of human activities and technologies on the sustainability of water resources	1.1	assess the social and environmental impact of the scarcity of freshwater, and propose a plan of action to help address freshwater sustainability issues	Factors affecting water supply Water footprints Water conservation and sustainability Why should we save water? Global access to safe drinking water
			1.2	demonstrate an understanding of First Nations, Métis, and Inuit knowledges and values about water, connections to water, and ways of managing water resources sustainably	N/A
			1.3	assess the impact of scientific discoveries and technological innovations on local and global water systems	Factors affecting water supply Water supply system Water supply and quality
	E2	**Exploring and Understanding Concepts:** demonstrate an understanding of the characteristics of Earth's water systems and of factors that affect these systems	2.1	identify the states of water on Earth's surface, their distribution, relative amounts, and circulation, and the conditions under which they exist	The water cycle Ocean currents
			2.2	demonstrate an understanding of a watershed, and explain its importance to water management and planning	Watersheds
			2.3	explain how human activity and natural phenomena cause changes in the water table	Factors affecting water supply Climate change – the biology perspective
			2.4	identify factors, including climate change, that have contributed to the melting of glaciers and polar ice-caps, and describe the effects of this phenomenon on local and global water systems	The history of climate change Climate change – the biology perspective
			2.5	explain changes in atmospheric conditions caused by the presence of bodies of water	The water cycle
			2.6	describe various indicators of water quality, and explain the impact of human activity on those indicators	Water supply and quality

			2.7	explain how municipalities process water and manage water usage	Treatment of drinking water Waste water treatment Desalination

**Curriculum Expectation were adapted from The Ontario Curriculum: Science and Technology Grade 8. Toronto: Ministry of Education and Training (2022)* *https://assets-us-01.kc-usercontent.com/fbd574c4-da36-0066-a0c5-849ffb2de96e/bd6e27e0-79ca-4e85-8311-2b62c51aee7f/SciTech_G6_AODA.pdf*