Applied Design, Skills, and Technologies: Kindergarten–Grade 3			
Big Ideas:			
Designs grow out of natural curiosity.			
Skills can be developed through play.			
Technologies are tools that extend human capabilities.			
Curricular Competencies:	Elaborations:	Content:	Elaborations:
Students are expected to be able to do the following: **Applied Design** **Ideating** • Identify needs and opportunities for designing, through exploration • Generate ideas from their experiences and interests • Add to others' ideas • Choose an idea to pursue **Making** • Choose tools and materials • Make a product using known procedures or through modelling of others • Use trial and error to make changes, solve problems, or incorporate new ideas from self or others **Sharing** • Decide on how and with whom to share their product • Demonstrate their product • Tell the story of designing and making their product • Identify how their product contributes to the individual, family, community, and/or environment • Use personal preferences to evaluate the success of their design solutions • Reflect on their ability to work effectively	**Ideating:** forming new ideas or concepts **technologies:** things that extend human capabilities (e.g., scissors)	*Students are expected to use the learning standards for Curricular Competencies from Applied Design, Skills, and Technologies K-3 in combination with grade-level content from other areas of learning in cross-curricular activities to develop foundational mindsets and skills in design thinking and making.*	

both as individuals and collaboratively in a group **Applied Skills** • Use tools and materials in a safe manner • Develop their skills and add new ones through play and collaborative work **Applied Technologies** • Explore the use of simple, available tools and **technologies** to extend their capabilities			

Applied Design, Skills, and Technologies: Grades 4-5			
Big Ideas:			
Designs can be improved with prototyping and testing.			
Skills are developed through practice, effort, and action.			
The choice of technology and tools depends on the task.			
Curricular Competencies:	Elaborations:	Content:	Elaborations:
Students are expected to be able to do the following: **Applied Design** **Understanding context** • Do **research** to understand the background of the design issue • Gather information about or from potential **users** **Defining** • Identify a design issue • Identify key features or user requirements • Identify the main objective for design and any **constraints** **Ideating** • Generate potential ideas • Add to others' ideas • Screen ideas against the objective and constraints • Choose an idea to pursue **Prototyping** • Outline a general plan, identifying tools and materials • Construct a first version of the product, making changes to tools, materials, and procedures as needed • Record iterations of prototyping **Testing** • Test the product • Gather peer feedback and inspiration	**research:** seeking knowledge from other people as experts (e.g., Aboriginal elders) and from secondary sources **users:** may include self, peers, younger children, family or community members, customers, plants, or animals **Defining:** setting parameters **constraints:** limiting factors such as task or user requirements, materials, expense, environmental impact, issues of appropriation, and knowledge that is considered sacred **Ideating:** forming ideas or concepts **share:** may include showing to others, use by others, giving away, or marketing and selling	*Students are expected to use the learning standards for Curricular Competencies from Applied Design, Skills, and Technologies 4-5 in combination with grade-level content from other areas of learning in cross-curricular activities to develop foundational mindsets and skills in design thinking and making.*	

• Make changes and test again, repeating until satisfied with the product **Making** • Construct the final product, incorporating planned changes **Sharing** • Decide on how and with whom to **share** their product • Demonstrate their product • Explain their process • Reflect on their design thinking and processes • Determine whether their product met the objective • Identify new design issues • Identify how their product contributes to the individual, family, community, and/or environment • Reflect on their ability to work effectively both as individuals and collaboratively in a group, including their ability to share and maintain a co-operative work space **Applied Skills** • Use tools and materials in a safe manner, including having an awareness of the safety of others • Identify the skills required for a task and develop those skills as needed **Applied Technologies** • Use familiar tools and technologies to extend their capabilities when completing a task • Choose appropriate technologies to use for specific tasks • Demonstrate a willingness to learn about new technologies as needed			

Applied Design, Skills, and Technologies: Grades 6-7			
Big Ideas:			
Design can be responsive to identified needs.			
Complex tasks require the acquisition of additional skills.			
Complex tasks may require multiple tools and technologies.			
Curricular Competencies:	Elaborations:	Content: *Over the course of Grades 6 and 7, students will be exposed to a variety of content chosen from the provincial options below and/or locally developed options. Students will experience a minimum of three modules of ADST in each of Grades 6 and 7. Schools may choose from among the modules listed below or develop new modules that use the Curricular Competencies of ADST 6-7 with locally developed content. Locally developed modules can be offered in addition to, or instead of, the modules in the provincial curriculum*.	Elaborations:
Students are expected to be able to do the following: **Applied Design** **Understanding context** • Engage in **research** to understand a design issue • Gather information from potential **users** • **Empathize** with potential users to find issues and uncover needs **Defining** • Identify a design issue • Identify key features or potential users and their requirements • Identify criteria for success and any **constraints** **Ideating**	**research:** seeking knowledge from other people as experts (e.g., Aboriginal elders) and from secondary sources **users:** may include self, peers, younger children, family or community members, customers, plants, or animals **empathize:** share the feelings and understand the needs of others to inform design **Defining:** setting parameters **constraints:** limiting factors such as task or user requirements, materials, expense, environmental impact, issues of appropriation, and knowledge that is considered sacred **Ideating:** forming ideas or concepts **share:** may include showing to others, use by others,	**Computational Thinking** *Students are expected to know the following:* • **simple algorithms** that reflect computational thinking • **visual representations** of problems and data • **evolution of programming languages** • **visual programming**	**Computational Thinking** **simple algorithms:** for sorting, searching, sequence, selection, and repetition; specific statements to complete a simple task; cryptography and code breaking (e.g., cyphers) **visual representations:** graphs, charts, network diagrams, info graphics, flow charts, lists, tables, or arrays **evolution of programming languages:** historical perspectives, evolution (e.g., Ada Lovelace, punch cards, Hollerith, Grace Hopper, Alan Turing, Enigma, cyphers) **visual programming:** for example, Kodu, Scratch

• Generate potential ideas • Add to others' ideas • Screen ideas against criteria and constraints • Evaluate personal, social, and environmental impacts and ethical considerations • Choose an idea to pursue **Prototyping** • Identify and use sources of information • Develop a plan that identifies key stages and resources • Explore and test a variety of materials for effective use • Construct a first version of the product or a prototype, as appropriate, making changes to tools, materials, and procedures as needed • Record iterations of prototyping **Testing** • Test the first version of the product or the prototype • Gather peer and/or user and/or expert feedback and inspiration • Make changes, troubleshoot, and test again **Making** • Identify and use appropriate tools, technologies, and materials for production • Make a plan for production that includes key stages, and carry it out, making changes as needed • Use materials in ways that minimize waste **Sharing** • Decide on how and with whom to **share** their product	giving away, or marketing and selling	**Computers and Communications Devices** *Students are expected to know the following:* • computer system architecture, including hardware and software, network infrastructure (local), intranet/Internet, and personal communication devices • strategies for identifying and troubleshooting simple hardware and software problems • function of input and output devices, including 3D printing and adaptive technologies for those with special needs • ergonomics in use of computers and computing devices	**Computers and Communications Devices**
		Digital Literacy *Students are expected to know the following:* • **Internet safety** • digital self-image, relationships, and communication • legal and ethical considerations, including creative credit and copyright, and cyberbullying • methods for **personal media management** • search techniques, how search results are selected and ranked, and **criteria** for evaluating search results • strategies to identify **personal learning networks**	**Digital Literacy** **Internet safety:** including privacy and security (secured connections, passwords, personal information), digital footprint and dossier, cyberbullying, online scams, and cybercrimes **personal media management:** for example, personalization and organization, bookmarks, content management **criteria:** accuracy, timeliness, appropriateness, credibility, and bias **personal learning networks:** personalized digital instructional tools to enhance learning and engagement (apps, websites, videos, tutorials, games)
		Drafting *Students are expected to know the following:* • technical drawing, including sketching techniques and manual **drafting techniques** • elements of plans and drawings • simple computer-aided **drafting programs**	**Drafting** **drafting techniques:** geometric concepts and scale, isometric, orthographic, and oblique drawings **drafting programs:** for example, SketchUp, 123Design

• Demonstrate their product • Explain their process, using appropriate terminology, and provide reasons for their selected solution and modifications • Reflect on their design thinking and processes • Evaluate their product against criteria • Identify how their product contributes to the individual, family, community, and/or environment • Identify new design issues • Evaluate their ability to work effectively both as individuals and collaboratively in a group, including their ability to share and maintain an efficient co-operative work space **Applied Skills** • Use safe working practices and demonstrate an awareness of precautionary and emergency safety procedures • Identify the skills and skill levels needed to complete a project • Evaluate their skills and skill levels, individually or as a group, in relation to a specific task, and develop them as needed **Applied Technologies** • Identify, and as needed learn about, appropriate technologies to extend their capability to complete a task • Evaluate tools and technologies that are present in their everyday lives • Identify the impact, including unintended negative consequences, of the choices they make about technology use • Identify how the land and natural resources influence First Peoples' design and technologies • Identify how technology use can differ depending on culture, economics, access to resources, and social expectations • Identify personal, social, and environmental impacts of technology use		**Entrepreneurship and Marketing** *Students are expected to know the following:* • role of entrepreneurship in designing and making products and services • **market niche** • branding of products, services, institutions, or places • pricing product/service, including decision to seek profit or break even • role of basic financial record-keeping and budgeting	**Entrepreneurship and Marketing** **market niche:** a subset of the market on which a specific product is focused, created by identifying needs or wants not provided by competitors
		Food Studies *Students are expected to know the following:* • basic food handling and simple preparation **techniques** and **equipment** • factors in ingredient use, including balanced eating/nutrition, function, and **dietary restrictions** • factors that influence food choices, including cost, availability, and family and cultural influences	**Food Studies** **techniques:** for example, cutting, blending, heating, and chilling foods; storing foods; clean hands and food preparation surfaces **equipment:** for example, blender, utensils, knife, scissors, hot plate, stove, solar oven, ice bath, wooden skewers, steam basket, microwave, birch bark container, tagine, wok **dietary restrictions:** allergens (e.g., dairy, nuts), sensitivities/intolerances (e.g., gluten)
		Media Arts *Students are expected to know the following:* • media types, non-digital and digital, and their distinguishing characteristics and uses • techniques for using images, sounds, and text to communicate information, settings, ideas, and story structure • media technologies and **techniques** to capture, edit, and manipulate images, sounds and text for specific purposes • influences of digital media for the purpose of communication and self expression	**Media Arts** **techniques:** for example, crop, print, record/capture, sequence
		Metalwork *Students are expected to know the following:* • characteristics and uses of metals • metalworking **techniques and processes** using **hand tools**	**Metalwork** **techniques and processes:** for example, bending, cutting, filing, drilling, soldering (with fume extractor) **hand tools:** for example, cordless and corded drills, rotary tool, hammer, screwdriver, hacksaw, jeweller's

		• metals as a non-renewable resource	saw, scribe, square, punch, clamp and vise, files
		Power Technology *Students are expected to know the following:* • power is the rate at which energy is transformed • **forms of energy** • energy is **conserved** • devices that **transform energy**	**Power Technology** **forms of energy:** sound, thermal, elastic, nuclear, chemical, magnetic, mechanical, gravitational, and electrical **conserved:** the law of conservation of energy — energy cannot be created or destroyed but can be changed **transform energy:** for example, electrical to mechanical, elastic to mechanical, chemical to electrical, electrical to light
		Robotics *Students are expected to know the following:* • a robot is a machine capable of carrying out a complex series of actions automatically • uses of robotics • main components of robots: **sensors**, **control systems**, and **effectors** • various **ways** that objects can move • programming and logic for robotics components • various **platforms** for robotics	**Robotics** **sensors:** "sense" — the parts of the robot that allow it to gather information about its environment that guides its behaviour **control systems:** "think" — the part of the robot that determines the robot's behaviour **effectors:** "act" — the parts of the robot that do the work **ways:** straight line, back-and-forth, round-and-round, zigzag, fast and slow, fixed distances in set patterns **platforms:** for example, VEX IQ, LEGO Mindstorms/NXT, Cubelets
		Textiles *Students are expected to know the following:* • range of **uses** of textiles • variety of textile **materials** • **hand construction techniques** for producing and/or repairing textile items • consumer concerns that influence textile choices, including availability, cost, function (e.g. waterproof), and textile care	**Textiles** **uses:** construction (e.g., sails at Canada Place), automotive, apparel, function (e.g., fire blanket), ceremonial (e.g., regalia) **materials:** for example, leather, cedar, wool, cotton, felt, embroidery thread, yarn, grasses and reeds, pine needles, sinew, plastic, used items and fabrics (e.g., food wrappers, old clothing) **hand construction techniques:** for example, hand sewing, knitting (needles, arm, spool), crocheting, weaving, darning, up-cycling (e.g., turning an underused item into something else), embellishing existing items

		Woodwork *Students are expected to know the following:* • ways in which wood is used in local cultural and economic contexts • characteristics of wood as a material • **woodworking techniques** and **basic joinery** using **hand tools**	**Woodwork** **woodworking techniques:** for example, cutting materials according to plan, layout, sanding methods, abrasive applications **basic joinery:** for example, butt joints (with and without dowel), rabbit joints, gluing, nails and screws **hand tools:** for example, cordless and corded drills, rotary tool, hammer, screwdriver, backsaw, coping saw, nail set, square, clamp and vise

Applied Design, Skills, and Technologies: Grade 8			
Big Ideas:			
Design can be responsive to identified needs.			
Complex tasks require the acquisition of additional skills.			
Complex tasks may require multiple tools and technologies.			
Curricular Competencies:	Elaborations:	Content: *The curriculum is designed to be offered in modules or courses of various lengths. The requirement will be that students take a yearlong "course" in ADST. This "course" can be made up of one or more modules. Schools may choose from among the modules listed below or develop new modules that use the Curricular Competencies of ADST 8 with locally developed content. Locally developed modules can be offered in addition to, or instead of, the modules in the provincial curriculum*.	Elaborations:
Students are expected to be able to do the following: **Applied Design** **Understanding context** • Engage in **research** to understand a design issue • Gather information from potential **users** • **Empathize** with potential users to find issues and uncover needs **Defining** • Identify a design issue • Identify key features or potential users and their requirements	**research:** seeking knowledge from other people as experts (e.g., Aboriginal elders) and from secondary sources **users:** may include self, peers, younger children, family or community members, customers, plants, or animals **empathize:** share the feelings and understand the needs of others to inform design **Defining:** setting parameters **constraints:** limiting factors such as task or user requirements, materials, expense, environmental impact, issues of appropriation, and knowledge that is considered sacred	**Computational Thinking** *Students are expected to know the following:* • software programs as specific and sequential instructions with algorithms that can be reliably repeated by others • debugging algorithms and programs by breaking problems down into a series of sub-problems • binary number system (1s and 0s) to represent data • programming languages, including **visual programming** in relation to text-based programming and **programming modular components**	**Computational Thinking** **visual programming:** for example, Scratch, Alice, Greenfoot, BlueJ **text-based programming:** for example, HTML **programming modular components:** for example, Arduino, LEGO Mindstorms

• Identify criteria for success and any **constraints** **Ideating** • Generate potential ideas • Add to others' ideas • Screen ideas against criteria and constraints • Evaluate personal, social, and environmental impacts and ethical considerations • Choose an idea to pursue **Prototyping** • Identify and use sources of information • Develop a plan that identifies key stages and resources • Explore and test a variety of materials for effective use • Construct a first version of the product or a prototype as appropriate, making changes to tools, materials, and procedures as needed • Record iterations of prototyping **Testing** • Test the first version of the product or prototype • Gather peer and/or user and/or expert feedback and inspiration • Make changes, troubleshoot, and test again **Making** • Identify and use appropriate tools, technologies, and materials for production • Make a plan for production that includes key stages, and carry it out, making changes as needed • Use materials in ways that minimize waste **Sharing**	**Ideating:** forming ideas or concepts **share:** may include showing to others, use by others, giving away, or marketing and selling	**Computers and Communications Devices** *Students are expected to know the following:* • design and function of digital infrastructures, including personal communication systems to **wide area networks** and the **Internet of Things** • social, cultural, and economic impact of mobile devices • systems for information transfer and communication, including videos, blogs, podcasts, and social media	**Computers and Communications Devices** **wide area networks:** for example, global, satellite **Internet of Things:** Internet access across all technologies
		Digital Literacy *Students are expected to know the following:* • **elements of digital citizenship** • ethical and legal implications of **current and future technologies** • strategies for curating personal digital content, including management, personalization, organization, and maintenance of digital content; e-mail management; and workflow • search techniques, how search results are selected and ranked, and **criteria** for evaluating search results • strategies to engage with **personal learning networks**	**Digital Literacy** **elements of digital citizenship:** for example, digital self-image, creative credit and copyright, relationships and communication, cyberbullying, legal and ethical issues **current and future technologies:** for example, hacking (white hat and black hat), P2P Sharing, Torrents, VPNs, tracking, data collection, anonymity; automation, artificial intelligence, mobile devices, data collection, robotics, digital currencies (e.g., Bitcoin) **criteria:** accuracy, timeliness, appropriateness, credibility, and bias **personal learning networks:** personalized digital instructional tools to support learning (web forums, tutorials, videos, digital resources, global communities, group communication and etiquette, online learning)
		Drafting *Students are expected to know the following:* • manual and computer-aided **drafting techniques** • elements of technical plans and drawings • advantages of **using** vector files • **virtual creation** using CAD	**Drafting** **drafting techniques:** isometric, orthographic, oblique, scale, 2D and 3D drawings **using:** for example, converting raster to vector in order to use plotters and vinyl cutters **virtual creation:** for example, layout and planning of a project, creating plans for a model

• Decide on how and with whom to **share** their product • Demonstrate their product • Explain their process, using appropriate terminology, and provide reasons for their selected solution and modifications • Reflect on their design thinking and processes • Evaluate their product against criteria • Identify how their product contributes to the individual, family, community, and/or environment • Identify new design issues • Evaluate their ability to work effectively both as individuals and collaboratively in a group, including their ability to share and maintain an efficient co-operative work space **Applied Skills** • Use safe working practices and demonstrate an awareness of precautionary and emergency safety procedures • Identify the skills and skill levels needed to complete a project • Evaluate their skills and skill levels, individually or as a group, in relation to a specific task, and develop them as needed **Applied Technologies** • Identify, and as needed learn about, appropriate technologies to extend their capability to complete a task • Evaluate tools and technologies that are present in their everyday lives • Identify the impact, including unintended negative consequences, of the choices they make about technology use • Identify how the land and natural resources influence First Peoples' design and technologies • Identify how technology use can differ depending on culture, economics, access to resources, and social expectations • Identify personal, social, and environmental		**Entrepreneurship and Marketing** *Students are expected to know the following:* • **characteristics** of entrepreneurial activity • characteristics of social entrepreneurship in First Nations communities • recognition of a market need and identification of target market • development of a product or service, including its features and benefits • **forms** of advertising and marketing that can influence a potential customer or buyer • differences between consumer **wants** and **needs** • role of money management in financing an idea or developing a product	**Entrepreneurship and Marketing** **characteristics:** goal, element of risk, personal commitment, planning and preparation, commitment of resources **forms:** print, social media, web, digital **wants:** what one would like to have; what one can do without **needs:** what one must have; what one cannot do without
		Food Studies *Students are expected to know the following:* • cross-contamination, including prevention and management • food preparation practices, including elements of a recipe, techniques, and equipment • effects of removing or substituting ingredients, including nutritional profile, food quality, taste • social factors that affect food choices, including eating practices • variety of **eating practices** • local **food systems** • First Peoples' traditional food use	**Food Studies** **eating practices:** with whom, what, when, how, why, where food is consumed in a variety of settings (e.g., informal, formal, special, and/or ceremonial occasions) **food systems:** growing, harvesting, processing, packaging, transporting, marketing, consumption, and disposal of food and food-related items
		Media Arts *Students are expected to know the following:* • media types, non-digital and digital, their distinguishing characteristics, and their uses, including layout and design, graphics and images, and video production • techniques for using images, sounds, and text to represent characterizations and points of view of people, including themselves, as well as settings and ideas	**Media Arts** **story principles:** electing and organizing the elements of structure, intent, characters, settings and points of view within the conventions of a genre **genre conventions:** traditional or culturally accepted ways of doing things based on audience expectations **techniques:** layout, storyboard, and manipulation **elements of media arts:** composition, time, space, sound, movement, lighting

impacts of technology use		• **story principles** and **genre conventions** • media technologies and **techniques** to shape space, time, movement, and lighting within images, sounds, and text for specific purposes • processes for manipulating and testing digital media data • issues in ethical media practices, including cultural appropriation, moral copyright, reproduction, and privacy • **elements of media arts** used to communicate meaning • influences of digital media, including on communication and self-expression	
		Metalwork *Students are expected to know the following:* • characteristics and uses of ferrous and non-ferrous metals • metal fastening techniques, including basic **welding** and fabrication practices • metalworking **techniques and processes** using **hand tools** and **power equipment** • elements of plans and drawings • reclamation and repurposing of metals	**Metalwork** **welding:** for example, gas welding, brazing, cutting **techniques and processes:** brazing, turning, machining, drilling, cutting, sanding, grinding, polishing **hand tools:** for example, cordless and corded drills, rotary tool, screwdriver, wrench, hacksaw, jeweller's saw, scribe, square, hammer, punch, clamp and vise, file, chisel, machinist square, shears, aviation snips, box and pan brake, rollers, anvil **power equipment:** for example, sandblaster, band saw, drill press, grinder, sander, buffing wheel
		Power Technology *Students are expected to know the following:* • uses of power technology • renewable and non-renewable sources of energy • conversion and transmission of energy • **kinetic** and **potential** energy • effect of mass and inertia on speed and distance • role of aerodynamics • effects of **forces** on devices	**Power Technology** **potential:** stored energy of position **kinetic:** energy of motion **forces:** for example, tension, torsion, compression, shear, friction

		Robotics *Students are expected to know the following:* • uses of robotics in local contexts • **types of sensors** • user and autonomous control systems • uses and applications of end effectors • movement- and sensor-based responses • program flow • interpretation and use of schematics for **assembling** circuits • identification and applications of **components** • various **platforms** for robotics programming	**Robotics** **types of sensors:** bump, motion, sound, light, infrared **assembling:** for example, soldering (with fume extraction), breadboarding **components:** for example, diodes, LEDs, resistors, capacitors, transistors **platforms:** for example, VEX, VEX IQ, LEGO Mindstorms/NXT
		Textiles *Students are expected to know the following:* • sources of **textile materials** • hand and machine construction techniques for producing and/or repairing textile items • basic components of patterns and instructions • colour as an element of design • personal factors that influence textile choices, including culture and self-expression, and the impact of those choices on individual and cultural identity	**Textiles** **textile materials:** for example, leather, cedar, wool, cotton, felt, embroidery thread, yarn, grasses and reeds, pine needles, sinew, plastic, used items and fabrics (e.g., food wrappers, old clothing)
		Woodwork *Students are expected to know the following:* • historical and current contexts of woodworking • identification, characteristics, and properties of a variety of woods, both manufactured and natural • elements of plans and drawings • woodworking **techniques** • **traditional** and **non-traditional** joinery using **hand tools** and **power equipment** • options for **reuse** of wood and wood products	**Woodwork** **techniques:** for example, preparing rough lumber, choosing appropriate tool sizes, cutting, drilling, painting, using simple hardware and fasteners **traditional joinery:** for example, mitre joint, rabbet joint, dado joint, dowelling **non-traditional:** for example, metal connectors, screws and fasteners, biscuits **hand tools:** for example, cordless and corded drills, rotary tool, hammer, screwdriver, backsaw, ripsaw, coping saw, nail set, square, clamp and vise, chisel, marking gauge, carpenter square, jig saw **power equipment:** for example, band saw, scroll saw, drill press **reuse**: recycling and reclamation

Applied Design, Skills, and Technologies: Grade 9			
Big Ideas:			
Social, ethical, and sustainability considerations impact design.			
Complex tasks require the sequencing of skills.			
Complex tasks require different technologies and tools at different stages.			
Curricular Competencies:	Elaborations:	Content: *The curriculum is designed to be offered in modules or courses of various lengths. There are more Content learning standards for Grade 9, as schools often offer these as full courses. The requirement will be that students take a yearlong "course" in ADST. This "course" can be made up of one or more modules listed below. Schools may choose from among the modules provided in the provincial curriculum or develop new modules that use the Curricular Competencies of ADST 9 with locally developed content. Locally developed modules can be offered in addition to, or instead of, the modules in the provincial curriculum*.	Elaborations:
Students are expected to be able to do the following: **Applied Design** **Understanding context** • Engage in a period of research on and observation of the values and beliefs of other cultures and the diverse motivations and needs of different people, in order to understand the design issue, design barriers, and the opportunities **Defining** • Identify insights from research • Identify a design issue	**research:** seeking knowledge from other people as experts (e.g., Aboriginal elders) and from secondary sources **Defining:** setting parameters **constraints:** limiting factors such as task or user requirements, materials, expense, environmental impact, issues of appropriation, and knowledge that is considered sacred **Ideating:** forming ideas or concepts **sources of inspiration:** may include experiences; traditional cultural knowledge and approaches, including those of First Peoples; places, including the	**Drafting** *Students are expected to know the following:* • drafting technique, including dimensioning and standards • drafting styles, including perspective, mechanical, and architectural • **CADD/CAM**, **CNC** and 3D (three-dimensional) printing • function of models • **basic** code • digital **output devices** • **virtual creation** using CAD/CAM	**Drafting** **CADD:** computer-aided drafting and design **CAM:** computer-aided manufacturing **CNC:** computer numerical control **basic:** for example, for the purpose of editing to send to output devices **output devices:** for example, plotters, vinyl cutters, and 3D printers; CNC machines **virtual creation:** for example, layout and planning of a project, creating plans for a model

• Identify potential users • Identify relevant contextual factors in the design space • Identify criteria for success, intended impact, and any **constraints** **Ideating** • Take risks in generating ideas • Add to others' ideas in ways that enhance them • Screen ideas against criteria and constraints • Critically analyze and prioritize competing factors, including social, ethical, and sustainability considerations, to meet community needs for preferred futures • Choose an idea to pursue, keeping other potentially viable ideas open **Prototyping** • Identify and use **sources of inspiration** and information • Choose a form for prototyping • Develop a **plan** that includes key stages and resources • Evaluate a variety of materials for effective use and potential for reuse, recycling, and biodegradability • Prototype, making changes to tools, materials, and procedures as needed • Record iterations of prototyping **Testing** • Identify **sources of feedback** • Develop an appropriate test of the prototype • Conduct the test and collect and compile data • Evaluate data and decide on changes • Iterate the prototype or abandon the design idea **Making** • Identify and use appropriate tools, technologies, materials, and processes for production	land and its natural resources and analogous settings; and people, including users, experts, and thought leaders **plan:** pictorial drawings, sketches, flowcharts, etc. **sources of feedback:** may include peers; users; keepers of traditional cultural knowledge and approaches, including those of First Peoples; and other experts **share:** may include showing to others, use by others, giving away, or marketing and selling	**Electronics and Robotics** *Students are expected to know the following:* • uses of electronics and robotics • **components** of an electric circuit • ways in which various **electrical components** affect the path of electricity • **Ohm's Law** • **platforms** for PCB (Printed Circuit Board) production • basic robot behaviours using **input/output devices**, movement- and sensor-based responses, and microcontrollers • **mechanical devices** for the transfer of mechanical energy • mechanical advantage and power efficiency, including friction, force, and torque • robotics **coding** • various **platforms** for robotics programming	**Electronics and Robotics** **components:** power source, conductor, load **electrical components:** for example, diodes, LEDs, resistors, capacitors, transistors, ICs (integrated circuits), SCRs (silicon controlled rectifiers), regulators **Ohm's Law:** describes how voltage, current, and resistance are related: V=IR **platforms:** for example, Fritzing, Eagle, Diptrace, EZ Route **input/output devices:** for example, gyro sensors, bump, motion, sound, light, infrared **mechanical devices:** for example, gears, belts, pulleys, chains, sprockets, linear actuators, pneumatics, bearings, slides **coding:** for example, G-code, C++, Sketch **platforms:** for example, VEX, VEX IQ, LEGO Mindstorms/NXT, Arduino, EasyC, RobotC, Scratch for Arduino
		Entrepreneurship and Marketing *Students are expected to know the following:* • risks and benefits of entrepreneurship • the role of social entrepreneurship in First Nations communities • ways of decreasing production costs through training and technological advancement • flow of goods and services from producers to consumers • **identification** of a good or service that ensures brand recognition • marketing strategies using the 4 Ps: product, price, promotion, and placement • market segmentation by **demographic, geographic, psychographic**, and **purchasing pattern** • evolving consumer needs and wants • role of online technologies in expanding access to goods and services • **sources of financing** for a new venture or start-up business • **measurement** of financial success and failure	**Entrepreneurship and Marketing** **identification:** for example, business name, slogan, logo **demographic:** age, gender, occupation, and education of customers **geographic:** size and location of a market area **psychographic:** general personality and lifestyle preferences of a customer base **purchasing pattern:** buying behaviour of customers **sources of financing:** for example, banks, private lending firms, crowdfunding, government grants **measurement:** profit, loss, asset, liability; financial documents to represent health of a business

• Make a step-by-step plan for production and carry it out, making changes as needed • Use materials in ways that minimize waste **Sharing** • Decide on how and with whom to **share** their product and processes • Demonstrate their product to potential users • Provide a rationale for the selected solution, modifications, and procedures, using appropriate terminology • Critically reflect on their design thinking and processes • Critically evaluate the success of their product • Identify how their design ideas contribute to the individual, family, community, and/or environment • Identify new design issues • Evaluate their ability to work effectively both as individuals and collaboratively in a group, including their ability to share and maintain an efficient co-operative work space **Applied Skills** • Use safe working practices and demonstrate an awareness of precautionary and emergency safety procedures • Identify the skills and skill levels needed to complete a project • Evaluate their skills and skill levels, individually or as a group, in relation to specific projects, and develop and refine them as needed **Applied Technologies** • Choose, adapt, and if necessary learn about appropriate technologies to use for tasks • Evaluate tools and technologies that are present in their everyday lives • Identify the impact, including unintended negative consequences, of the choices they make about technology use • Identify how the land and natural resources influences First Peoples' design and		**Food Studies** *Students are expected to know the following:* • **pathogenic microbes** associated with food-borne illnesses • components of food preparation, including use and adaptations of ingredients, techniques, and equipment • **factors** that influence availability and choice of food in personal, local, and global contexts • **ethical issues** related to food systems • issues around **indigenous food sovereignty** **Information and Communications Technologies** *Students are expected to know the following:* • **text-based coding** • binary representation of various data types, including text, sound, pictures, video • **drag-and-drop mobile development** • programming **modular components** • development and collaboration in a **cloud-based environment** • design and function of networking hardware and topology, including wired and wireless network types routers, switches, hubs, **wireless transfer systems**, and client-server relationships • functions of operating systems, including mobile, open source, and proprietary systems • current and future **impacts** of evolving web standards and cloud-based technologies • **design for the web** • strategies for curating and managing personal digital content, including management, personalization, organization, maintenance, contribution, creation, and publishing of digital content • **relationships** between technology and social change	**Food Studies** **pathogenic microbes:** for example, Salmonella, E. Coli 0157:H7, Staphylococcus **factors:** for example, global food systems, balanced eating/nutrition, food waste, food marketing, food trends, ethics **ethical issues:** for example, environment, conditions, rights of workers and animals **indigenous food sovereignty:** right of Indigenous peoples to determine food and land-use policies with respect to the growing, gathering, hunting, and harvesting of food **Information and Communications Technologies** **text-based coding:** HTML, CSS, JavaScript **drag-and-drop mobile development:** for example, Vizwik **modular components:** for example, Arduino, Raspberry Pi, LEGO Mindstorms **cloud-based environment:** for example, Cloud 9, GitHub **wireless transfer systems:** for example, NFID, Bluetooth, mobile payments **impacts:** potential to support collaboration, sharing, and communication; data storage and privacy **design for the web:** digital creation and manipulation of videos and images for a web-based purpose **relationships:** for example, local and global impacts of evolving communication and mobile devices, socio-economic digital divide, technology and gender, social media and social movements, social media and politics, inequality of access, technology and democracy, information as a commodity **personal learning networks:** personalized digital instructional tools to share and authenticate learning **content consumption and creation:** web forums, tutorials, videos, digital resources, listservs, global communities, group communication and etiquette, online learning, MOOCS, open courseware, broadcasting

technologies • Identify how technology use can differ depending on culture, economics, access to resources, and social expectations • Identify personal, social, and environmental impacts of the use of technology • Make informed choices as consumers of technology		• strategies to manage and maintain **personal learning networks**, including **content consumption and creation**	
		Media Arts *Students are expected to know the following:* • digital media types and their distinguishing characteristics and uses, including video production, audio production, layout and design, and graphics and images • techniques for organizing ideas to structure information and story through media **conventions** and genres to create points of view in images, sounds, and text • media production skills, including editing and publishing, to shape the technical and symbolic elements of images, sounds, and text for specific purposes, meanings, and audiences • **standards-compliant technology** • ethical and regulatory issues • technical and symbolic elements that can be used to create representations influenced by story, genre, and values and points of view of particular audiences • specific features and purposes of media artworks from the present and the past to explore viewpoints, including those of First Peoples • specific purposes of media use in the social advocacy of First Peoples in Canada • influences of digital media in documenting, communicating, reporting, and self-expression	**Media Arts** **conventions:** traditional or culturally accepted ways of doing things based on audience expectations. Each media form has hundreds of conventions built up over time and widely accepted by audiences. **standards-compliant technology:** layout conventions, mark-up language, current web standards, or other digital media compliance requirements

		Metalwork *Students are expected to know the following:* • **basic metallurgy** • range of **uses** of metalwork • **welding** • fabrication **techniques and processes** using **hand tools** and **stationary equipment** • foundry processes, including creating patterns and moulds, and **casting** • recycling and repurposing of materials	**Metalwork** **basic metallurgy:** identification, characteristics, and properties of different metals, and characteristics of metal in a variety of formats and gauges **uses:** for example, art metal, jewellery, stained glass, tools, sheet metal boxes, medieval armour **welding:** for example, arc, oxygen-acetylene, and MIG welding **techniques and processes:** for example, plasma and gas cutting, machining (turning, milling, forming, knurling), boring **hand tools:** for example, drill, rotary tool, screwdriver, wrench, hacksaw, jeweller's saw, scribe, square, hammer, punch, clamp and vise, file, chisel, machinist square, shears, aviation snips, box and pan brake, rollers, anvil, socket, tap and die set, Whitney punch, Vernier caliper, micrometer **stationary equipment:** for example, sandblaster, band saw, drill press, grinder, sander, buffing wheel, lathe, horizontal band saw, Beverly shear, Whitney punch, benders, hydraulic press, spincaster, forge **casting:** for example, lost wax casting, sand casting, investment casting, spin casting
		Power Technology *Students are expected to know the following:* • energy transmission and applications • efficiency, including energy loss in the form of thermal energy • **thermodynamics** • types of fuels and methods of converting fuels to mechanical energy • alternative energy sources • **small engine systems** • **mechanical measurement devices** • power technology **hand tools** • effects of **forces** on devices • manuals as information sources	**Power Technology** **thermodynamics:** relationship between heat and other forms of energy **small engine systems:** for example, ignition, fuel system, combustion cycle **mechanical measurement devices:** for example, torque wrench, feeler gauge, telescopic, micrometer, Vernier caliper, Plastigauge **hand tools:** for example, wrench, socket, ratchet, ignition tools, hammer, chisel, punch, extractor, HeliCoil, ring compressor/expander, honing tool, hand valve grinding tool **forces:** for example, tension, torsion, torque, shear, bending, compression

		Textiles *Students are expected to know the following:* • natural and manufactured fibres, including their origins, characteristics, uses, and care • strategies for using and **modifying** simple patterns • **elements of design** used in the design of a textile item • **social factors** that influence textile choices and the impact of those choices on local communities • role of textiles in First Peoples' cultures	**Textiles** **modifying:** changing length or width of a pattern, adding embellishment, changing closure **elements of design:** colour, line, form, space, and texture **social factors:** financial, ethical, familial, cultural, spiritual, racial
		Woodwork *Students are expected to know the following:* • importance of woodwork in historical and cultural contexts, locally and throughout Canada • identification, characteristics, properties, and uses of wood from various tree species • techniques for adjusting plans and drawings • woodworking **techniques** and **traditional** and **non-traditional** joinery using a variety of tools and equipment, including **stationary power equipment** • the relationship between First Peoples' culturally modified trees and the sustainable use of wood • **issues** in the sustainable use of wood	**Woodwork** **techniques:** for example, shaping, laminating, turning, abrasives, adhesives, finishing **traditional:** for example, box joint, splined mitre, lapped joint **non-traditional:** for example, biscuits, brads **stationary power equipment:** for example, jointer, planer, lathe, router table, table saw, chop saw, band saw, thickness sander, disc/belt sander, spindle sander, mortise machine, drill press, scroll saw **issues:** rate of harvest; effects of logging and replanting on ecosystems