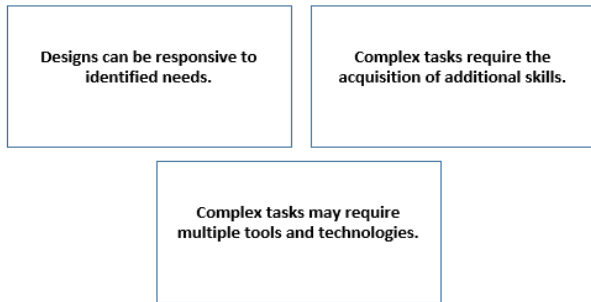


ADST Scope & Sequence

Grade 8 Big Ideas & Learning Standards



Available District Resources

Available Grade 8 Resources

Arduino Robots

mBots
(Mac / Win)

Basic Circuitry

Coding Apps

Grade 8 Content & Computational Thinking

CONTENT

The curriculum is designed to be offered in modules or courses of various lengths. Schools are required to provide students with the equivalent of a full-year “course” in Applied Design, Skills, and Technologies. 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 Applied Design, Skills, and Technologies 8 with locally developed content. Locally developed modules can be offered in addition to, or instead of, the modules in the provincial curriculum.

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**

Digital Citizenship

- Considerations towards Cyber Citizenship
- Environmental impact

Grade 8

Curricular Competencies

Students are expected to be able to do the following:

Applied Design

Understanding context

- **Empathize** with potential **users** to find issues and uncover needs and potential design opportunities

Defining

- Choose a design opportunity
- Identify key features or potential users and their requirements
- Identify criteria for success and any **constraints**

Ideating

- Generate potential ideas and 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

Curricular Competencies (continued)

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
- Demonstrate their product and describe their process, using appropriate terminology and providing reasons for their selected solution and modifications
- Evaluate their product against their criteria and explain how it contributes to the individual, family, community, and/or environment
- Reflect on their design thinking and processes, and 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
- Identify new design issues

Applied Skills

- Demonstrate an awareness of precautionary and emergency safety procedures in both physical and digital environments
- Identify and evaluate the skills and skill levels needed, individually or as a group, in relation to a specific task, and develop them as needed

Applied Technologies

- Select, and as needed learn about, appropriate tools and technologies to extend their capability to complete a task
- Identify the personal, social, and environmental impacts, including unintended negative consequences, of the choices they make about technology use
- Identify how the land, natural resources, and culture influence the development and use of tools and technologies

Available Grade 8 Resources

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Module examples:

Computers and Communications Devices

Students are expected to know the following:

- design and function of digital infrastructures, from 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
- **keyboarding techniques**

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**

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

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

Curricular Competencies – Elaborations

- **Empathize:** share the feelings and understand the needs of others to inform design
- **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
- **sources of information:** including seeking knowledge from other people as experts (e.g., First Peoples Elders), secondary sources, and collective pools of knowledge in communities and collaborative atmospheres
- **product:** for example, a physical product, a process, a system, a service, or a designed environment
- **iterations:** repetitions of a process with the aim of approaching a desired result
- **technologies:** things that extend human capabilities
- **share:** may include showing to others, use by others, giving away, or marketing and selling

Content – Elaborations

Computational Thinking

- **visual programming:** for example, Scratch, Alice, Greenfoot, BlueJ
- **text-based programming:** for example, HTML
- **programming modular components:** for example, Arduino, LEGO Mindstorms Digital Literacy

Computers and Communications Devices

- **wide area networks:** for example, global, satellite
- **Internet of Things:** Internet access across all technologies
- **keyboarding techniques:** for example, physical hand and foot placement, posture, development of touch typing skills, use of “home row” ASDFJKL techniques

Available Grade 8 Resources

Arduino Robots

mBots robot kits
(Mac / Win)

Basic Circuitry

Coding Apps

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 food use and how that use has changed over time

Media Arts

Students are expected to know the following:

- **digital and non-digital** media technologies, 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
- **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

Content – Elaborations (continued)

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

- **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

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

- **eating practices:** with whom, what, when, how, why, where food is consumed in a variety of situations (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

Available Grade 8 Resources

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(Mac / Win)

Basic Circuitry

Coding Apps

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

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

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

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**

Content – Elaborations (continued)

Media Arts

- **digital and non-digital:** for example, video production, layout and design, graphics and images, photography (digital and traditional), emerging media processes (performance art, collaborative work, sound art, network art, kinetic art, biotechnical art, robotic art, space art)
- **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:** composition, time, space, sound, movement, lighting

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, jeweler’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

- **potential:** stored energy of position
- **kinetic:** energy of motion
- **forces:** for example, tension, torsion, compression, shear, friction

Available Grade 8 Resources

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Basic Circuitry

Coding Apps

- options for **reuse** of wood and wood products

Content – Elaborations (continued)

Robotics

- **types of sensors:** bump, motion, sound, light, infrared
- **assembling:** for example, soldering (with fume extraction), bread boarding
- **components:** for example, diodes, LEDs, resistors, capacitors, transistors
- **platforms:** for example, VEX, VEX IQ, LEGO Mindstorms/NXT

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

- **techniques:** for example, preparing rough lumber, choosing appropriate tool sizes, cutting, drilling, painting, using simple hardware and fasteners
- **traditional:** 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