Board / Authority Authorized Course

Future Pathways Technology Sampler

School District/Independent School Authority Name: North Vancouver School District	**School District/Independent School Authority Number:** SD44
Developed by: Jennifer Kinakin, Simon Worley, Alysia Francis, Murray Bulger, Stephanie Reynolds, Scott Bentley, Luke Smeaton, Magali Chemali, Ella Meyer (UBC), Greg Hockley	**Date Developed:** December 10, 2024
School Name: All SD44 Secondary school	**Principal's Name:** Greg Hockley
Superintendent Approval Date (for School Districts only)**:**	**Superintendent Signature** (for School District only)**:**
Board/Authority Approval Date:	**Board/Authority Chair Signature:**
Course Name: Future Pathways Technology Sampler 11	**Grade Level of Course:** 11
Number of Course Credits: 4	**Number of Hours of Instruction:** 120

Board/Authority prerequisite(s): None

Special Training, Facilities or Equipment Required:
Computer lab and/or student personal technology devices will be helpful

Course Synopsis:

This course provides students with an engaging opportunity to explore the dynamic world of in-demand high technology industries. Participants will discover their passions and identify key 21st century skills necessary to shape their future career paths. The course emphasizes the development of essential competencies critical for thriving in tomorrow's evolving job market. Through inquiry-based project learning and active exploration, students will delve deeply into areas that could ignite personal passions and apply their learning in meaningful and practical ways to gain real-world insights and experiences.

The Future Pathways Technology Sampler is designed as a flexible and engaging 'sampler' style course. The curriculum begins and is anchored throughout with the 'core' module, which establishes the foundational framework for the course. Educators are then encouraged to select three of the six 'optional' modules to complete the program. These optional modules cover a wide range of in-demand high technology industries, allowing for a tailored learning experience that aligns with local contexts and student interests.

The course consists of the **Core Module plus THREE** of the following six modules**:**

1. **Agritech – How We Eat**
2. **Financial Tech - How We Invest**
3. **Digital Connections - How We Communicate**
4. **Entertainment Industry – How We Play**
5. **Hardware and Software – How We Compute and Innovate**
6. **Connect BC – How We Live**

To maintain focus and depth, it is recommended to limit the selection to three optional modules in a four-credit course. While there is significant thematic overlap among the modules, this integration allows educators to draw meaningful connections across topics. Educators are encouraged to adapt and incorporate elements from the curriculum as they see fit, ensuring the course remains relevant and impactful for their specific teaching goals.

Goals and Rationale:

Many of the careers secondary school students aspire to today will evolve or transform by the time they enter the workforce. Some jobs available to students when they graduate may not even exist in today's context. To prepare students for a rapidly changing and somewhat uncertain future, we must equip them with the skills and knowledge needed to bridge the present with emerging opportunities. Students are eager to explore industries poised to play a significant role in their futures. This course is designed to empower students to investigate current in-demand technology sectors while considering how these industries may grow and adapt in the years ahead. Students who complete this course will ideally obtain a more fulsome understanding of their own potential future pathways and interests.

Indigenous Worldviews and Perspectives:

Following the First Peoples Principles of Learning, this course supports learning in that:

- **Learning involves recognizing the consequences of one's actions.** This principle ties to understanding how technology influences cultures, economies, and ecosystems and how society shapes technological progress. Students reflect on the societal impacts of technology and consider their role in responsible innovation.
- **Learning involves patience and time** – Students are encouraged to develop in stages and reflect upon their exploration. Students are encouraged to evaluate the potential as well as the challenges before committing to any one pathway for themselves.
- **Learning is holistic, reflexive, reflective, and experiential.** This is an experience-based course with students learning how to use the tools/programs by self-directing and reflecting on their own learning as it relates to themselves. Synthesis is valued over analysis. Through hands-on projects and collaborative problem-solving, students engage in holistic and reflective learning. By integrating Indigenous knowledge systems, they develop a deeper understanding of community, relationships, and innovation in technology.
- **Learning about technology involves generational roles and responsibilities**. Students explore ethical decision-making and sustainability, recognizing their role as stewards of the environment and technology for future generations. Indigenous approaches to technology and stewardship provide a foundational perspective on sustainable development. Mentorship and collaboration is encouraged through verbal communication and dialogue, often with senior students and community specialists.
- Learning about future career pathways in technology recognizes the **importance of Indigenous knowledge.** By aligning personal strengths with career opportunities and exploring emerging sectors, students learn the value of diverse perspectives, including **Indigenous ways of knowing**, to innovate and adapt to a changing world.
- **Learning requires exploration of one's identity** – Reflective activities have the ultimate learning goal of having students determine how and what they have experienced is relevant and can be valuable to them going forward.
- **Learning ultimately supports the wellbeing of the self and the community** – Projects are often student and community centered, and students use their new skills to collaborate on projects. Students direct their own learning and develop personally meaningful projects. Assessments are relevant to the student and their work, and after reflection, can be reviewed to evolve towards relevance and excellence.
- **Learning is embedded in memory, history, and story** – Personally driven stories drive all student work and are vital for student motivations and success.

BIG IDEAS

Career pathway opportunities in technology are fluid, diverse and interconnected.

When designing tomorrow's technology, it is essential to be grounded in ethics and sustainability.

Building skills across in-demand technology fields fuels creative solutions.

Effective process skills are key to inquiry, project design and management.

Change occurs in cycles that drive growth, adaptation, and innovation, reflecting the interconnected patterns of technology, society, and the environment.

Learning Standards

Curricular Competencies	Content
CORE MODULE: *Students are expected to be able **to do** the following:* **Explore and Analyze** • investigate technology sectors in relation to **emerging careers** and global challenges. • analyze **societal and environmental** and cultural impacts of technology. • explore essential **skills for success** in the technology field. **Assess, Adapt, and Iterate** • research industry trends, job opportunities, and technological advancements. • apply career-related skills **to problem solve real-world** challenges. • evaluate how **Indigenous worldviews** inform sustainability and innovation.	**CORE MODULE:** *Students are expected **to know** the following:* Career and Industry Awareness • **qualifications**, **education pathways** and certifications; major tech employers and roles in BC's tech industry. Professional and Career Readiness • **project management fundamentals, Digital literacy**, career research techniques and job application essentials, workplace communication, collaboration, and networking strategies, connect **strengths and interests.**

Connect and Reflect

- build connections by **networking** with industry professionals and community members.
- reflect on the **role of technology** on life, work and society.
- connect **personal strengths and interests** to careers in technology.

Create and Demonstrate (apply)

- present findings on specific tech sector careers, including job requirements vs. needed skills.
- apply learning through a culminating **inquiry** or innovation project.
- develop and apply project management skills
- recognize the **value the creative process** when developing a product/project

Integrate

- consider ethical, environmental and cultural impacts, including **Indigenous perspectives**, across tech industries
- develop a **career action plan** that outlines post-secondary and industry pathways

AGRITECH – HOW WE EAT

*Students are expected to be able **to do** the following:*

Explore and Analyze

- the historical development of food systems.

Assess, Adapt and Iterate

- agricultural technologies for sustainability, considering soil health, biodiversity, and water resources.
- how land, resources, and culture shape agricultural technologies, along with their benefits and costs.

Technology's Purpose

- Impact of technology on present and future lives, product design vs. functional use across industries.

Social, Ethical and Cultural Contexts

- Data privacy, digital security and legal implications, environmental sustainability in tech development, Indigenous knowledge systems and contributions to technology innovation.

Personal Development and Portfolio Building

- **reflective learning** practices for continuous improvement, creation of personal portfolios showcasing projects, skills and career goals and **professionalism**.

AGRITECH – HOW WE EAT

*Students are expected **to know** the following:*

- **History of Food Systems:** Agriculture evolution from traditional to modern.
- **Environmental Impacts:** Effects on ecosystems and technological solutions.
- **Indigenous Perspectives:** Intercropping, agroforestry, sustainable land use.
- **Current Technologies:** Drones, robotics, AI, data analytics.

Connect and Reflect • on the environmental and ethical implications of agricultural practices. **Create and Demonstrate (apply)** • responsible use of materials, energy, and resources in agricultural projects. **Integrate** • ethical and sustainable principles into the development, implementation, and evaluation of agricultural technologies.	• **Sustainable Practices:** Crop rotation, vertical farming, closed-loop systems. • **Ethics and Responsibility:** Access, data privacy, social impacts. • **Technological Tools:** Hardware, software, advanced tools. • **Career Pathways:** Roles in data science, engineering, sustainability.
FINANCIAL TECH – HOW WE INVEST *Students are expected to be able **to do** the following:* **Explore and Analyze** • how emerging **financial systems and technologies**, like blockchain, 'robo-advisors', and digital banking, are transforming the way individuals and organizations manage and invest money. • **career opportunities** in financial technology fields, highlighting roles such as data analysts, blockchain developers, and financial planners adapting to tech-driven innovation. **Assess, Adapt and Iterate** • **ethical and social responsibility,** how evolving financial technologies address global financial inclusion, providing access to underserved communities, and meeting societal and economic needs. • strategies and tools that enhance ethical practices**, inclusivity and access**, and transparency within financial technologies. **Connect and Reflect** • on the influence of **Indigenous knowledge and perspectives** in developing sustainable, community-centered financial systems and practices.	**FINANCIAL TECH – HOW WE INVEST** *Students are expected **to know** the following:* **Financial systems and technologies:** Banking, digital currencies, and financial tools **E-commerce and retail technology:** Online transactions, digital payments, and AI-driven customer experiences **Financial literacy:** Technology tools support managing finances. **Stocks and Cryptocurrency:** Tech tools used for trading and investment strategies **Ethics and social responsibility:** Data privacy, algorithmic bias, and social responsibility in fintech **Dynamic nature of technology and careers:** AI, machine learning, big data, and emerging career paths in fintech

- on **personal financial habits**, values, and how technology can help achieve financial goals while considering digital security, ethical implications, and biases.

Create and Demonstrate (apply)

- **practical financial plans** and investment strategies using digital tools to simulate real-world financial decision-making.
- practical applications of financial technologies that prioritize accessibility, ethical responsibility, and sustainability.

Integrate

- **sustainable practices** in the development and use of financial technologies, focusing on long-term impact on people and the planet.
- **Indigenous perspectives** and traditional approaches in creating equitable and sustainable financial systems.

Sustainability and Green Tech: Green investing, carbon offsetting, and promoting eco-friendly projects.

Indigenous perspective on financial technology: Community-based lending.

DIGITAL CONNECTIONS – HOW WE COMMUNICATE

*Students are expected to be able **to do** the following:*

Explore and Analyze

- how **emerging technologies**, like AI, are transforming communication practices, enabling new forms of collaboration, and fostering innovation across industries.
- **career opportunities** in digital media and communication fields, highlighting roles emerging from technological innovation.

Assess, Adapt and Iterate

- how the **evolution of communication technologies** has fostered connections across diverse communities, bridging geographic, cultural, and ability-related barriers to meet societal needs.

DIGITAL CONNECTIONS – HOW WE COMMUNICATE

*Students are expected **to know** the following:*

- elements and principles of media design and their role in effective communication and audience engagement.
- **common terminology** used in media and digital communication
- impact of visual culture and its role in shaping societal values and communication through social and digital media
- traditional and contemporary First Peoples worldviews, stories, practices, and history, as expressed through Media Design

• solutions enhancing **inclusivity, accessibility, and engagement** in digital communication. **Connect and Reflect** • on the influence of Indigenous knowledge and perspectives in creating meaningful **media projects** and **storytelling approaches**. • on how personal voice, values, and stories influence **digital footprint**, while considering awareness of digital citizenship, ethical communication, and potential biases. **Create and Demonstrate (apply)** • **design principles** applied to media projects expressing personal voice, values, and fostering connections. • engaging, impactful **digital projects** considering environmental and societal impacts. **Integrate** • sustainable approaches to the creation and implementation of media and digital communication solutions	• media production through various stages of project development, leveraging **AI tools** to enhance creativity, streamline processes, and adapt or innovate the project's direction. • ethical and Social Considerations with **bias and echo chambers** • key characteristics and artistic styles in digital media and communication to explore multiple viewpoints, including an emphasis on integrating and respecting First Peoples perspectives in Canada through digital **storytelling**, design, and content creation.
ENTERTAINMENT INDUSTRY – HOW WE PLAY *Students are expected to be able **to do** the following:* **Explore and Analyze** • **coding** in industry-standard software within the areas of animation, modeling, and visual effects. • the role and decision making in the use of past and emerging technologies in special effects and real time visual. • and experiment with **motion capture** by employing accessible tools such as smartphone apps or DIY systems for game and film applications.	**ENTERTAINMENT INDUSTRY – HOW WE PLAY** *Students are expected **to know** the following:* • the main technical and creative **entertainment sectors** in the film and interactive design industries • awareness of how and where the entertainment industry leverages the use of recent technologies • the use of **pipelines** in the development of entertain products such as films and games.

- environmental and **societal impacts of media and digital communication t**echnologies
- and engage with the roles of emerging technologies such as AI, to understand how these technologies are **transforming communication, collaboration and innovation**

Assess, Adapt, and Iterate

- the use of various planning tools such as pipelines on a student developed product such as a film animation, visual effect, game or design. Iterate based on the assessment.

Connect and Reflect

- upon a student created product using a design cycle reflective tool such as **Gibb's reflective style**
- with pathways and professional opportunities in technology fields in the industry.

Create and Demonstrate (apply)

- **a pitch or proposal for a product in the entertainment industry** applying knowledge of storytelling.
- an understanding of media production skills through the creation of the product.

Integrate:

- understanding of cultural and ethical, and legal issues into personal projects.

- **educational pathways** that would lead to employment in the game entertainment industry
- **fundamentals of storytelling** and **First Peoples' storytelling**
- awareness of story and image development strategies in film and interactive design
- common terminology used in entertainment and interactive designs
- **modern Tools**: software and hardware used in modern film and interactive design
- awareness of the **elements and principles of design**
- **awareness of the variety of materials**, **processes**, **and techniques of media arts**
- awareness of media **production skills**:
  - **pre-production**
  - **production**
  - **post-production**
- **visual culture** Influence in in the entertainment industries
- **ethical, moral, and legal Issues in the entertainment industries** associated with media arts technology
- **cultural appropriation, moral rights, and plagiarism**

HARDWARE AND SOFTWARE – HOW WE COMPUTE AND INNOVATE

*Students are expected to be able **to do** the following:*

Explore and Analyze

- **integration of hardware and software**: Examine how high-tech systems create innovative solutions for everyday challenges.
- **AI and automation**: Evaluate the transformative impact of AI and automation on industries.
- **sustainability in hardware design**: Investigate the role of advanced hardware in promoting sustainability and supporting green technologies.

Assess, Adapt and Iterate

- **energy efficiency**: Critique the energy consumption of high-tech systems and explore strategies to reduce their environmental impact, including sustainable design and energy-saving technologies.
- how hardware and software systems can be adapted to meet the needs of diverse users, including individuals with disabilities, to enhance accessibility and inclusivity.
- **ethical and Social Responsibility**: Explore challenges and environmental impact and evaluate case studies on ethical issues.

Connect and Reflect

- on Indigenous knowledge and values regarding environmental stewardship and resource management and sustainability, considering how these perspectives can inform the development of sustainable technology solutions.

HARDWARE AND SOFTWARE – HOW WE COMPUTE AND INNOVATE

*Students are expected **to know** the following:*

- **High Tech hardware and software systems:** Robotics components, autonomous vehicle technologies, quantum computing principles, and AI applications.

- **Information Technology, Cybersecurity, and Cloud Storage:** IT systems architecture, cybersecurity techniques, including encryption and cloud storage.

- **Energy Usage and Sustainability:** Solar power and green tech innovations.

- **Ethics and Social Responsibility:** Privacy issues in AI and algorithmic biases.

- **Indigenous Perspectives on Technology and Sustainability:** Indigenous knowledge of ecosystems and land stewardship.

• **on the personal use of technology** reflecting on the impact of hardware and software systems in daily life. Consider ethical implications, energy consumption, and opportunities to align personal technology use with sustainable practices. **Create and Demonstrate (apply)** • **solution design:** Design and prototype hardware-software solutions addressing real-world challenges, such as energy efficiency, accessibility, or environmental sustainability. • **green tech projects**: Create projects demonstrating the use of green technologies to highlight the role of technology in sustainability. **Integrate** • **sustainable practices**: Develop sustainable approaches to the lifecycle of hardware and software, from design to disposal, focusing on reducing environmental footprints and promoting recycling and reuse. • **Indigenous values of design**: Incorporate Indigenous perspectives into project designs, emphasizing respect for natural resources and long-term environmental health.	

CONNECT B.C. – HOW WE LIVE

*Students are expected to be able **to do** the following:*

Explore and Analyze

- **existing engineering, energy production, and natural resource management practices** in British Columbia.
- **environmental implications, efficiency, and current usage of technology.**

Analyze, Adapt, and Iterate

- **social impact of existing practices using technology.**
- **evaluate energy usage and sustainability of existing systems.**
- **new technology integration into existing robust systems.**
- **iterate possible solutions to identified areas of improvement.**
- implement engineering design cycle

Connect and Reflect

- **on the intersection between urban development, natural resource management**, and various fields of engineering and processes.
- and identify a variety of roles that contribute to successful projects while reflecting on their own interests and learning.

Create and Demonstrate

- effective communication of overlap of current systems in rural and urban areas
- model engineering systems and project management strategies.

Integrate

- ethical and accessible design
- sustainability: social, environmental, financial of engineering projects.
- traditional ways of knowing into understanding of how we live in BC.

CONNECT B.C. – HOW WE LIVE

*Students are expected **to know** the following:*

- **Project Management:** Workflows and team structures; engineering design cycle; creating workplans and timelines; delegation and task division.

- **Building and City Design:** Industry uses of technology; differences between new build and infrastructure maintenance; green building technology; integration of technology into neighborhoods; transport and connection between communities.

- **Energy Production, Distribution, and Consumption:** BC's power production landscape; energy channels from production to consumption; benefits and limitations of power production methods.

- **Robotics and Automation:** Applications in engineering; safety and security considerations; new technologies in daily life.

- **Indigenous Perspectives:** Natural resource management methods; building techniques, materials, and energy use.

- **Ethics:** Accessibility in technology; considerations in development and maintenance.

Curricular Competencies - Elaborations

CORE MODULE

Explore and Analyze

- **emerging careers:** Research in-demand tech jobs and explore the factors driving the creation of these roles. Discuss how lifelong learning fosters personal and technical skill development and identify various career pathways within the tech sector. Incorporate guest speakers to provide real-world insights.
- **societal and environmental impacts of technology:** Investigate both positive and negative effects of technology through case studies or current events. Analyze the ecological footprint of technologies like smartphones, data centers, and electric vehicles, and evaluate the trade-offs between technological advancement and environmental sustainability.
- **skills for success:** Use self-assessment tools (e.g., career inventories, skills checklists) to evaluate strengths and interests. Explore the new **Skills for Success** model (Canada.ca) to understand the competencies needed for the current and future labor market and how transferable skills can be applied across various careers.

Adapt, Assess and Iterate

- **problem solve real-world challenges:** Apply knowledge and skills to identify and solve "mock" real-world challenges, including ethical and sustainable tech issues. Foster critical thinking, problem solving, and collaboration while using feedback to enhance both understanding and project work.
- **Indigenous world views:** Analyze the intersection of technological development and cultural preservation through case studies of Indigenous-led tech projects (e.g., solar-powered housing for remote communities). Address challenges related to environmental or social issues while incorporating Indigenous knowledge systems, such as sustainable water purification technologies.

Connect and Reflect

- **networking:** build connections with others in the tech field, including peers, mentors, and professionals, to deepen understanding of the industry and enhance future collaboration opportunities.
- **role of technology:** Analyze how technology influences communication, economy, and culture, and understand its role in shaping modern life and future trends. Adapt technology solutions to meet evolving needs, fostering flexibility and innovation in problem solving.
- **personal strengths and interests:** identify aspects of technology that most interest students (e.g., coding, digital design, cybersecurity), and assess student strengths (e.g., problem solving, teamwork, communicating complex ideas).

Create and Demonstrate

- **inquiry:** conduct thorough research and inquiry to explore specific topics within the tech field, using a variety of sources and methods to deepen understanding and generate informed conclusions.
- **value the creative process:** Emphasize the importance of the process in project design, focusing on refinement and growth throughout the development cycle. Identify key concepts like innovation, ethics, and sustainability, and apply them to real-world tech scenarios. This will help students' bridge theoretical knowledge with practical applications in the tech industry.

Integrate

- **indigenous perspectives** on technology**:** Emphasize a holistic, interconnected approach to technology development, rooted in respect for the environment, community, and cultural knowledge systems. Highlight principles like sustainability and community well-being as key drivers of Indigenous-led innovation.
- **career action plan**: Students document their career interests, outline personalized career pathways, and summarize projects, reflecting on their learning journey and the next steps in their development

FINANCIAL TECH – HOW WE INVEST

Explore and Analyze

- **financial systems and technologies**: Analyze how mobile banking apps like Tangerine, digital payment systems such as PayPal or Stripe, and emerging technologies like blockchain and cryptocurrency (e.g., Bitcoin or Ethereum) are transforming personal and business finance. Evaluate benefits such as convenience, transparency, and global access, alongside challenges like cybersecurity risks, algorithmic bias, and environmental concerns related to crypto mining.
- **career opportunities**: Explore fintech careers, such as blockchain developers or data analysts for skill-building and industry insights.

Assess, Adapt and Iterate

- **ethical and social responsibility**: Investigate privacy and data protection challenges in financial technology, such as how platforms like Venmo handle user data. Analyze issues like algorithmic bias in AI-driven financial tools, using reports from organizations like EFF (Electronic Frontier Foundation).
- **inclusivity and access**: Assess how technologies such as M-Pesa (mobile banking for underserved communities) contribute to financial inclusion and suggest improvements for broader accessibility.

Connect and Reflect

- **Indigenous knowledge and perspectives**: Examine community-based lending systems and investments focused on ecological and social well-being. For example, discuss how traditional values can inspire modern fintech practices, using resources like Indigenous Clean Energy or examples of community-driven funds.
- reflect on **personal financial habits** and goals, leveraging tools like Mint to track budgets and analyze spending. Consider how technology can enhance financial literacy and decision-making while addressing ethical concerns.

Create and Demonstrate (apply)

- **practical financial plans**: Use apps like Google Sheets, Excel, or budgeting software such as YNAB (You Need a Budget) to create digital budgets and investment strategies. Incorporate real-world scenarios to simulate decision-making.

Integrate

- **sustainable practice**: Propose ways financial technologies can reduce their environmental footprint, such as promoting eco-friendly transactions or offsetting energy-intensive processes in cryptocurrency. Explore examples like Green Bitcoin Mining or banks offering sustainable investment portfolios.
- **Indigenous perspectives** in Financial Systems: Incorporate Indigenous principles into projects by designing systems that prioritize long-term ecological and social well-being. Use storytelling tools like StoryMapJS to present how traditional wisdom can inspire modern, ethical investment practices.

DIGITAL CONNECTIONS – HOW WE COMMUNICATE

Explore and Analyze

- Investigate how **emerging technologies** such as AI chatbots, virtual reality (VR), and augmented reality (AR) and their role in changing how people communicate. Explore how tools like ChatGPT or Microsoft Copilot are being used in education and workplaces for collaboration, content creation, and workflow improvement. Discuss both the opportunities and ethical challenges of AI-driven communication, such as misinformation or bias in content creation.
- Map out **career opportunities**, including new roles such as social media strategist, AI ethics consultant, or VR content developer. Explore case studies of professionals working in these fields to understand daily responsibilities and required skills. Reflect on how students' own digital literacy and creative skills align with these career paths. Discuss the educational pathways and certifications needed for these roles (e.g., coding bootcamps, university programs in media design).

Assess, Adapt, and Iterate

- Explore examples of **evolving communication technologies,** such as translation tools (GPT 4-0 Real-Time Voice Translation, DeepL,etc.) that enable cross-cultural communication.
    - Analyze how apps such as WhatsApp or Signal connect diasporic communities globally.
    - Discuss accessibility features like screen readers, live captions, or voice assistants and their impact on inclusion.
    - Debate how technology can either bridge or widen digital divides due to unequal access.
    - Design and prototype communication tools or campaigns that are accessible to diverse audiences, considering aspects like language simplicity, visual clarity, and accessibility standards (e.g., WCAG).
    - Explore the role of Universal Design for Learning (UDL) in making digital communication tools accessible to all.

Connect and Reflect

- Study examples of Indigenous-led **media projects**, such as short films, digital art, or apps designed for language revitalization (e.g., FirstVoices).
- Reflect on how traditional **storytelling approaches**, like oral histories, can inspire modern media projects. Discuss the importance of co-creation with Indigenous communities and understand that some knowledge is sacred and only shared with permission and/or in certain situations.
- Have students audit their own **digital footprints** and reflect on how their online activities align with their values. Analyze case studies of influencers or campaigns that balance authenticity with ethical communication. Explore biases in algorithms and their impact on digital engagement, such as filter bubbles or echo chambers.

Create and Demonstrate (Apply)

- Review core **design principles** (e.g., contrast, alignment, balance, hierarchy) and how to apply them in media projects.
    - Encourage students to create a personal portfolio, blog, or **digital projects** that reflects their identity and engages their intended audience.
    - Use tools like Canva or Adobe Express for hands-on practice in digital design.
    - Assign projects like creating an infographic or video campaign about an environmental issue, emphasizing the carbon footprint of digital technologies.
    - Discuss how digital campaigns can advocate for social change, such as raising awareness about mental health or promoting diversity in media.

ENTERTAINMENT INDUSTRY – HOW WE PLAY

- **coding** enhances understanding of industry-standard software for tasks such as animation, modeling, compositing, and visual effects in tools like Maya, Nuke, and Houdini. Explore architectural visualization by integrating Revit models into game engines for VR/AR experiences.
- **motion capture** techniques using tools like Unreal Engine or MotionBuilder, leveraging accessible technology such as smartphone apps or DIY systems for game and film production.
- **societal impacts of media and digital communication technologies**: explore the bias based on gender, culture, race and political perspectives. Do the stories we tell represent the communities that exist in Canada?
- how AI is used in **transforming communication, collaboration and innovation**: AI can be used effectively to write, develop and tell stories. Experiment with AI using software such as Unreal Engine, Maya and other film editing programs to recognize how technology can be used to complete repetitive and heavy lifting tasks.
- **Gibb's Reflective Style**: Use Gibb's reflective cycle to connect to the project cycle and creative process. Focus on synthesis as opposed to analysis. Identify what went well and what did not go well and connect it to future value that would be of benefit to you on future design projects.
- Create **a pitch or proposal for a product in the entertainment industry** such as short film/documentary, an essay on AI in film technology, an environmental design for a game or film production, or a script and storyboard for a film or game.

HARDWARE AND SOFTWARE – HOW WE BUILD AND INNOVATE

Explore and Analyze

- **integration of hardware and software**: like IoT (Internet of Things), robotics, and cloud computing integrate hardware and software. Examine how robotics, autonomous vehicles, and quantum computing integrate with AI, data management, and cloud computing to perform complex tasks. Tools like Raspberry Pi or Arduino can demonstrate real-world integration.
- **AI and automation**: Evaluate how High-Tech systems such as healthcare, manufacturing, and transportation, as well as the emerging career opportunities in hardware and software development are impacted by AI and Automation. Analyze the impact of AI and robotics on industries like healthcare, transportation, and manufacturing, as well as the evolving career paths and skills required. Platforms like Coursera can provide insights into emerging career opportunities.

- **sustainability in hardware design**: Investigate the role of advanced hardware, such as energy-efficient processors and recyclable components, in promoting sustainability and supporting green technologies. Develop sustainable tech projects, such as solar-powered devices or energy-efficient systems, using Solar Design Software for modeling and testing.

Assess, Adapt and Iterate

- **energy efficiency**: Critique the energy demands of quantum computing, robotics, and AI systems, and propose ways to reduce environmental impact using tools like Internet of Things (IoT) energy monitoring apps.
- **ethical and social responsibility**: Explore challenges such as AI bias, data privacy, and environmental impact. Use tools like AI Fairness 360 to evaluate case studies on ethical issues and propose solutions.

Connect and Reflect

- on the **personal use of technology** Consider how personal use of advanced hardware and software impacts privacy, ethics, and sustainability. Tools like Carbon Footprint Calculators can help analyze individual impact.

Create and Demonstrate (apply)

- **solution design**: Use platforms like Fusion 360 to design and prototype hardware-software solutions addressing real-world challenges like accessibility or resource efficiency.
- **green tech projects**: such as solar-powered devices or energy-efficient computing systems.

Integrate

- **sustainability practices**: Propose methods to reduce waste and promote energy efficiency in technology. Use strategies like EcoMapping to evaluate the environmental footprint of tech solutions.
- **Indigenous values in design**: Incorporate principles of resource stewardship and environmental health into tech projects, emphasizing respect for natural resources and community well-being.

CONNECT B.C. – HOW WE LIVE

Explore and Analyze

- **existing engineering, energy production, and natural resource management practices in BC.** What are the key industries that support how we live? How do they operate? What is direct day-to-day technology (water, roads, and infrastructure) vs abstracted industries (mining, forestry, etc.)?

- **environmental implications, efficiency, and current usage of technology**.
    - Industry standard practices, timelines, management systems, etc.
    - current impacts (social, environ, etc.)
    - ways technology is being used in these fields

Analyze, Adapt, and Iterate

- **social impact of existing practices using technology.** Is it accessible? Equitable? What barriers does it lower? What does it heighten?
- **evaluate energy usage and sustainability of existing systems.** Look at sum total effects of projects (i.e., a mine doesn't only produce minerals, it takes X many diesel vehicles and employs Y many people, etc.)
- **new technology integration into existing robust systems.** How do we keep key systems stable when bringing in new ideas?
- **iterate possible solutions to identified areas of improvement.** Room for project work on this module

Connect and Reflect

- on the **intersection between urban development, natural resource management, and various fields of engineering and processes.** Consider broader connections between different parts of populated areas. For instance: how does transport fit into city planning? Are there intersections between hydro, power, and mining? Can sustainability in building materials positively impact on forestry AND construction?

Content – Elaborations

CORE MODULE

- **qualifications:** Explore required skills for various tech roles (e.g., software developer, data analyst, IT support) using resources like *WorkBC*. Analyze case studies to understand how skills apply across tech careers.
- **education pathways:** Guide students in exploring tech sectors and career pathways through resources like *EducationPlannerBC*.
- **project management strategies:** Introduce models like Agile, Waterfall, and Kanban. Use project management tools (e.g., Trello, Asana, Jira) to enhance organizational skills. Emphasize the process, not just the final product.
- **digital literacy**: Teach navigation of online information, data security, and privacy.
- **strengths and interests:** Use tools like Myers-Briggs, Holland Codes, or True Colours to assess personal strengths and interests in tech.
- **reflective learning:** Encourage students to create personalized career roadmaps, journal their progress, and reflect on how projects enhance their skills and career readiness. Showcase final inquiry projects.
- **professionalism:** Ongoing conversations and activities that target marketable/employable skills (e.g. accountability, cultural considerations). Ethical considerations that introduce real-world examples of ethical dilemmas and ethical frameworks for decision-making in tech (e.g., the debate over facial recognition technology, or the environmental impact of mining for minerals used in electronics).

AGRITECH – HOW WE EAT

History of Food Systems: Agriculture Evolution from Traditional to Modern

- Early human diet: Early humans were hunter-gatherers, consuming a varied diet of wild plants, berries, honey, and wild game, shaped by their environment and climate.
- Agriculture beginnings: Approximately 10,000 years ago, agriculture enabled the cultivation of grains, potatoes, and dairy. Cereals like wheat, rice, and maize were developed independently across regions.
- The Green Revolution: Marked a pivotal point in global agriculture with innovations that boosted productivity but faced criticism for environmental degradation and challenges for rural farmers.

Environmental Impacts: Effects on Ecosystems and Technological Solutions

- Key environmental impacts: Climate Change: Greenhouse gas emissions from agriculture contribute significantly to global warming. Soil Degradation: Nutrient depletion and erosion affect soil quality, exacerbated by climate factors like wind and salinization. Energy Use: Agriculture accounts for approximately 17% of global energy consumption.

- Technological solutions:
  - Sustainable farming practices, such as organic farming and permaculture.
  - Water conservation strategies to ensure clean water availability.
  - Advanced crop management, including cover cropping and optimizing sowing practices.
  - Closed-loop systems to recycle resources and minimize waste.

Indigenous Perspectives: Intercropping, Agroforestry, and Sustainable Land Use

- Indigenous farming methods, such as intercropping, agroforestry, and crop rotation, exemplify sustainable practices that optimize local resources.
- These methods offer valuable insights for modern agritech solutions, aligning with environmental and cultural sustainability.

Current technologies: Drones, Robotics, AI, and Data Analytics

- Examples of Innovations:
  - Floating cattle farms to optimize livestock production in limited spaces.
  - Drones for monitoring crops and herding animals efficiently.
  - Vertical farming for maximizing output in urban areas.
  - Energy capture from agricultural waste to enhance sustainability.
- Applications:
  - AI for real-time monitoring of crop health, animal care, and irrigation systems.
  - Data analytics for actionable insights to improve yield and profitability.

Sustainable Practices: Crop Rotation, Vertical Farming, and Closed-Loop Systems

- **Key practices**:
  - Crop rotation to maintain soil fertility and reduce pest outbreaks.
  - Vertical farming to minimize land use while maximizing production.
  - Closed-loop systems that recycle resources and minimize environmental impact.
- These practices align with the goals of creating a resilient global food system that meets nutritional, social, and economic sustainability standards.

Ethics and responsibility: Access, Data Privacy, and Social Impacts

- Address equitable access to technology and its benefits, particularly for small-scale and marginalized farmers.
- Ensure transparency and security in the collection and use of agricultural data.
- Assess social impacts, such as job displacement and cultural shifts due to automation and modernization.

Technological tools: Hardware, Software, and Advanced tools

- Examples include robotics for automated planting and harvesting, software for precision agriculture, and advanced hardware for environmental monitoring.
- Integration of AI and IoT (Internet of Things) devices for comprehensive farm management solutions.

Career pathways: Roles in Data Science, Engineering, and Sustainability

- Highlight opportunities in agritech-related careers, such as agricultural data scientists, environmental engineers, and sustainability specialists.
- Emphasize the growing demand for expertise in integrating technology with sustainable agricultural practices.

FINANCIAL TECH – HOW WE INVEST

Financial systems and technologies

- Basic infrastructure of financial systems, including traditional banking, online banking, digital wallets, and blockchain technology.
- How financial technologies are used for payments, transactions, savings, and investments.
- The use of mobile apps, digital currencies, and financial management tools that enhance user experiences in personal and business finance.

E-commerce and retail technology

- How e-commerce platforms and retail tech are integrated into the financial system, particularly for online transactions, digital payment systems (e.g., PayPal, Square, Venmo), and subscription models.
- How AI is being used in e-commerce to improve customer experiences and enhance online shopping, including personalized product recommendations, fraud prevention, and inventory management.

Financial literacy

- The fundamental concepts of financial literacy, such as managing personal finances, investing, saving, and understanding interest rates.
- How technology tools can support individuals in managing their finances, including budgeting apps, 'robo-advisors', and stock-trading platforms.

Stocks and Cryptocurrency

- The basics of stock trading, the stock market, and how tech tools are used for trading and analysis (e.g., apps like Robinhood, or platforms like E*TRADE).
- The mechanics of cryptocurrency, blockchain technology, and how these digital currencies are transforming financial transactions and investment strategies.
- The risks and rewards of cryptocurrency and its potential as an alternative to traditional financial systems.

Ethics and social responsibility

- The ethical implications of financial technologies, including data privacy, algorithmic bias, and the transparency of financial transactions.
- The social responsibility in fintech, including ensuring financial accessibility for underserved populations, the role of fintech in democratizing finance, and the implications of automated decision-making in lending or investing.

Dynamic nature of technology and careers

- The ongoing development in financial technologies, including the role of AI, machine learning, and big data analytics in shaping the future of finance.
- Emerging career paths in the financial tech industry, such as blockchain developers, financial analysts using AI tools, and cybersecurity professionals in the fintech space.

Sustainability and Green Tech

- How fintech can contribute to sustainability by providing tools for sustainable investing, green bonds, and funding eco-friendly projects.
  The role of fintech in addressing climate change, such as through platforms that enable carbon offset investments or promote transparency in carbon emissions tracking.

Indigenous perspectives on financial technology

- Indigenous views on financial management, community-based lending, and investment strategies that prioritize ecological stewardship and community well-being.
- How Indigenous perspectives can reshape financial technologies, especially in the areas of sustainability, land stewardship, and responsible resource management.

DIGITAL CONNECTIONS – HOW WE COMMUNICATE

- **common terminology** refers to the tools, platforms, and systems used to transmit, exchange, and receive information. These have evolved rapidly in the digital era, encompassing both hardware and software. Examples of key terminology include:
  - *Viral*: Rapidly spreading content across digital platforms.
  - *Deepfake*: Synthetic media created using AI to manipulate audio or video.
  - *Algorithm*: A set of rules or calculations that govern digital processes, such as content recommendations.
  - *Digital Literacy*: The ability to use, understand, and evaluate digital technologies and media effectively.
  - *Workflow*: The sequence of steps or processes in creating and managing digital projects.
  - *Avatar*: A digital representation or identity of a user in online platforms.
  - *Hashtag*: A metadata tag used to group and discover content by topics.
  - *Influencer*: An individual with a significant online presence who impacts audience opinions or behaviors.

- *Threaded Conversation*: A way to organize and follow discussions in digital communication platforms.
- *Content Moderation*: The practice of monitoring and managing user-generated content to ensure platform guidelines are followed.
- *Metadata*: Descriptive information about data, such as time stamps, authorship, or file size.
- *User Interface (UI):* The design and layout of digital platforms, enabling user interaction.
- *Engagement Metrics*: Data that measures user interaction, such as likes, shares, and comments.
- *Digital Footprint:* The trail of data left by a user's online activities.
- *Filter Bubble*: The limiting of information exposure based on personalized algorithms.
- *Streaming:* The real-time transmission of digital content, such as video or audio.
- *AI-Powered Platforms*: Technologies like ChatGPT, Microsoft Copilot, and Google Gemini, which assist with tasks such as study help, creativity, workflow automation, and content creation, while raising discussions around ethics and bias.

- **AI tools:** Generative AI chatbots like ChatGPT, Microsoft Copilot and Google Gemini are used for study help, creativity, and content creation. Personalization tools in platforms like Spotify and YouTube Music drive user preferences.
- **bias** in Media and Technology: Bias refers to a predisposition or inclination that affects neutrality. It can manifest in various ways across media, technology, and social interactions.
- Types of Bias:
  - Cognitive Bias: Mental shortcuts that influence how individuals process information, such as confirmation bias.
  - Algorithmic Bias: When algorithms favor certain types of content, reinforcing existing prejudices or preferences.
  - Cultural Bias: Reflecting dominant cultural norms or values, which may marginalize or misrepresent minority groups.
- Ethical considerations:
  - How to identify and challenge biased representations in media and technology.
  - The role of designers and developers in minimizing bias in AI and algorithms.
  - Encouraging diversity in content creation and representation.
- **echo chambers** occur when individuals are exposed primarily to information and opinions that align with their existing beliefs, often amplified by algorithms and social networks.
- Collaborative creation: Digital projects and **storytelling** often involve collaboration with Indigenous communities to ensure their voices are authentically represented. This process emphasizes mutual respect and co-creation rather than appropriation. Empowering Indigenous voices: platforms can be designed to amplify the perspectives of First Peoples, allowing for self-representation in the digital space.

ENTERTAINMENT INDUSTRY – HOW WE PLAY

- **entertainment sectors:** technical management and creative roles in film and interactive Design. This area covers the various technical and creative roles involved in producing films and interactive media, such as video games. What are the key technical roles in film production (e.g., director of photography, sound engineer)? What creative roles are essential in game design (e.g., game designer, concept artist)? For example: technical role: A director of photography (DP) manages the camera and lighting crews to achieve the desired visual style. creative role: a game designer creates the rules, story, and structure of a game.
- **pipelines**: Processes used for developing films and games. Pipelines refer to the step-by-step processes involved in creating films and games, from initial concept to final product. What are the stages of the film production pipeline? How does the game development pipeline differ from film production? For example: film pipeline: pre-production, production, post-production. Game pipeline: concept, design, development, testing, release.
- **educational pathways**: Programs leading to careers in entertainment and design. Educational pathways refer to the academic and training programs that prepare students for careers in the entertainment and design industries. What are the best programs for aspiring filmmakers and game designers? How do internships and apprenticeships contribute to career development? For example: Film school: programs like those at the Capilano University and Vancouver Film School. Game design programs: degrees offered by institutions like Think Tank Training Facility and SIAT (S.F.U.)
- **fundamentals of storytelling:** Storytelling fundamentals cover the essential elements and techniques used to craft compelling narratives. What are the key elements of a good story (e.g., plot, character, setting)? How do visual and interactive elements enhance storytelling? For example: Film: The hero's journey structure in "Star Wars." games: branching narratives in "The Witcher" series.
- **First Peoples storytelling**: insights from traditional and contemporary stories, practices, and history. This area highlights the contributions of Indigenous Peoples to media design and the importance of including their perspectives in storytelling. How can traditional stories and practices inform modern media design? What are the benefits of including Indigenous perspectives in storytelling? For example, in film, incorporating Indigenous storytelling techniques in narrative films. In games, designing games that reflect Indigenous cultures and histories.
- **modern tools:** Principles, software, and hardware used in film and design encompass the software and hardware used in the creation of films and games. What are the industry-standard tools for film editing and game development? How do these tools enhance the creative process? For example, in software, Adobe Premiere Pro for film editing, and in unity for game development. Hardware: High-performance computers, VR headsets.

- **elements and principles of design**. Design elements refer to the fundamental components and principles that guide the creation of visual media. What are the basic elements of design (e.g., line, shape, color)? How do principles like balance and contrast influence design? For example, in film, the use of color palettes to set the mood. In games, level design that guides player movement.
- **awareness of the variety of materials**, **processes**, **and techniques of media arts.** Media arts techniques involve the various materials and methods used to create visual and interactive media. What materials are commonly used in media arts? How do different techniques affect the final product? Such as digital media tools and traditional art supplies. Techniques like digital painting, 3D modeling, and animation.
- **production skills:** Production skills encompass the various stages and skills required to produce films and games. What are the key tasks in pre-production? How do production and post-production processes differ? For example: **pre-production**: Scriptwriting, storyboarding, casting. **production**: Filming, directing, capturing performances. **post-production**: Editing, sound design, visual effects.
- **visual culture** influence on entertainment industries. examines how visual media shapes and is shaped by the entertainment industry. How does visual culture influence trends in film and game design? What role do visual aesthetics play in audience engagement? For example, in film, the influence of art movements on film styles. In games, the impact of cultural references on game design. Visual culture examines how visual media influences societal values, norms, and communication. How do films and games reflect and shape cultural values? What role does visual media play in social change? For example, in film, movies like "Black Panther" that highlight cultural diversity and representation. In games: like "The Last of Us" that explore complex human emotions and relationships.
- **ethical, moral and legal issues in the entertainment industries.** This area covers the ethical, moral, and legal issues that arise in the creation and distribution of entertainment media. What are the common ethical dilemmas in film and game production? How does bias influence content and storytelling? For example, ethical Issues, such as representation, consent, and copyright infringement. In terms of bias: Gender stereotypes, cultural misrepresentation. Moreover, the ethical considerations and technological advancements in the entertainment industry. What are the ethical implications of using AI in creative processes? How do new technologies like virtual reality (VR) and augmented reality (AR) enhance storytelling? In film, using AI for scriptwriting or visual effects, and in VR/AR using immersive experiences in games and interactive media.
- **cultural appropriation, moral rights and plagiarism:** Cultural appropriation involves the use of elements from one culture by members of another culture, often without permission or understanding. What constitutes cultural appropriation in media? How can creators ethically incorporate cultural elements? For example, in film the misuse of Indigenous symbols in costume design. An in games, appropriating cultural myths and stories.

HARDWARE AND SOFTWARE – HOW WE COMPUTE AND INNOVATE

- **High-Tech Hardware and Software Systems**
  - Robotics: Learn about robotic components such as sensors (e.g., LIDAR for navigation), actuators (used for movement), and controllers (such as Raspberry Pi). Explore applications of robotics, such as Boston Dynamics' Spot robot for search and rescue missions.
  - Autonomous Vehicles: Study the technologies behind self-driving cars, such as Tesla's Autopilot system that uses cameras and AI to navigate. Understand the role of real-time data processing and machine learning in vehicle decision-making.
  - Quantum Computing: Understand the basics of quantum computing, including quantum bits (qubits), superposition, and entanglement. For example, IBM's quantum computers use qubits to perform complex calculations far beyond the capacity of classical computers, with potential applications in cryptography, material science, and drug discovery.
  - AI and Automation: Explore how AI, such as neural networks or deep learning, is integrated into systems like IBM's Watson for healthcare, where it assists in diagnosing medical conditions.
- **Information Technology, Cybersecurity, and Cloud Storage**
  - Information Technology (IT): Learn about IT systems architecture, including the role of servers, databases, and network infrastructure. Understand how cloud services like Amazon Web Services (AWS) enable scalable computing power and storage for businesses and consumers.
  - Cybersecurity: Study techniques for securing digital systems, such as encryption protocols (e.g., AES for data encryption), multi-factor authentication (MFA) methods, and ethical hacking using penetration testing tools like Kali Linux. Explore real-world examples like the 2017 WannaCry ransomware attack and its impact on global cybersecurity.
  - Cloud Storage and Data Management: Understand the structure of cloud storage systems like Google Drive, Dropbox, and Microsoft OneDrive, focusing on their use of data centers and cloud storage architectures. Study the management of large-scale data systems, such as how big data platforms process massive datasets for real-time analytics.
- **Energy Usage and Sustainability**
  - Solar Power: Study how solar panels work by converting sunlight into electricity using photovoltaic (PV) cells and examine the use of solar power in large-scale systems, such as Tesla's Solar Roof or solar farms that power entire cities.
  - Green Tech: Learn about energy-efficient computing technologies, including low-power processors like ARM-based chips used in mobile devices and energy-efficient data centers such as Google's Project Sunroof, which uses AI to optimize solar energy use. Explore how these technologies help reduce the carbon footprint of industry.

  - Energy efficiency: Investigate how high-tech systems can be optimized for energy efficiency, for example, the use of edge computing to reduce energy consumption in cloud-based operations or AI algorithms used in smart grid systems to optimize energy distribution.
- **Ethics and Social Responsibility**
  - Ethical considerations in technology: Examine ethical issues, such as AI's impact on privacy with tools like facial recognition systems (e.g., Clearview AI) and algorithmic biases in hiring systems. Discuss the environmental and ethical concerns surrounding resource extraction for tech hardware (e.g., conflict minerals in electronics).
  - Social responsibility: explore the role of tech companies in promoting accessibility and inclusivity, such as Microsoft's commitment to accessibility in devices like the Xbox Adaptive Controller, or initiatives like Google's AI for Social Good, which uses AI to solve humanitarian issues.
- **Indigenous Perspectives on Technology and Sustainability**
  - Indigenous Knowledge Systems: Examine how Indigenous knowledge of ecosystems and natural resource management can inform sustainable technology solutions, such as community-based energy systems or traditional ecological knowledge for managing land and water resources.
  - Integrating Indigenous Ways of Knowing: Study how Indigenous approaches to land stewardship can influence the development of technologies that prioritize environmental sustainability, such as the role of Indigenous land management practices in preventing wildfires or restoring biodiversity.

CONNECT B.C. – HOW WE LIVE

- **Project Management:** Workflows and team structures; engineering design cycle; creating workplans and timelines; delegation and task division. Not only understanding the ways these systems are used in industry, but also how to utilize them in their own projects.
- **Building and City Design**: Industry uses of technology; differences between new build and infrastructure maintenance; green building technology; integration of technology into neighborhoods; transport and connection between communities. Look at not only isolated units, but how broader developed areas are connected to each other, and unique infrastructure requirements for rural or highly populated areas.
- **Energy Production, Distribution, and Consumption**: BC's power production landscape; energy channels from production to consumption; benefits and limitations of power production methods. New developments in methods of energy production.
- **Robotics and Automation**: Applications in engineering; safety and security considerations; new technologies in daily life. Automated processes in different industries (mining, factory settings, workflow, etc.). Discussion of where automation or robotics could be a benefit to current industries.

- **Indigenous Perspectives:** Natural resource management methods; building techniques, materials, and energy use. Stewardship and complete usage of materials, waste minimization, etc.
- **Ethics:** Accessibility in technology; universal design principles, considerations in development and maintenance. Safety and sustainability, ease of access, quality of builds vs cost of build.

Recommended Instructional Components:

- Project-based learning (Inquiry)
- Self-directed learning
- Direct-instruction and workshops
- Community outreach or guest speakers
- Demonstrations
- Modeling
- Peer guidance and teaching
- Reflective learning

Recommended Assessment Components:

- Project pitches and proposals
- Oral presentations
- Self-assessment
- Project submissions both self-assessed and summative assessment by teacher
- Reflective processes such as a Learning log

Learning Resources:

- The *Future Pathways Technology Sampler Resource guide* is available with further information as well as resource and lesson ideas