



Students will explore the role of robotics in BBTs



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Introduction

This lesson incorporates multi BBT areas and focuses on the emerging technologies of each of the broad based technology areas.

[Click this link to access the new curriculum document](#)

BBT Covered in the Activity

Communications Technology
Computer Technology
Construction Technology
Green Industries
Hairstyling and Aesthetics
Health Care
Hospitality and Tourism
Manufacturing Technology
Transportation

Project Outline

Students will explore the role of robotics in many sectors/BBTs and their effect on the labour force and humanity

Estimated number of hours: 5 (4 x 75 minutes)

Student Activities

Sample Reading List for Robotics within Emerging Technologies

Bentley, P. (2020). Robots: What you need to know about the past, present and future of robotics. BBC Science Focus. Retrieved from <https://www.sciencefocus.com/future-technology/robots>

Communications Technology -

Automate UK. (n.d.). Robot Communications Methods. Retrieved from

<https://www.automate-uk.com/our-associations/bara/expert-advice/robots-explained/robot-communication-methods/>

Computer Technology -

CyberWeld. (2023). Robotics in the Computing and Electronics Industry. Retrieved from

<https://www.cyberweld.co.uk/robotics-in-the-computing-and-electronics-industry>

Construction Technology -

Barrett, K. (2024). A New World of Construction with AI & Robotics. Construction

Connect. Retrieved from <https://www.constructconnect.com/blog/construction-robotics>

Green Industries -

Bernier, C. (2023). Harvesting Robots: Automated Farming in 2023. HowToRobot. Retrieved from

<https://howtorobot.com/expert-insight/harvesting-robots#:~:text=Mobile%20and%20articulated%20robots%20can,even%20harvesting%20in%20some%20cases.>

Hairstyling and Aesthetics -

Portuguez, E. (2021). The future of beauty treatments is...robots?! Should we be stressed robots may come for our lashes, hair and more? WC. Retrieved from

<https://wellconnected.murad.com/the-future-of-beauty-treatments-isrobots-should-we-be-stressed-that-robots-may-be-coming-for-your-lashes-hair-and-more-or-is-this-positive-progress/>

Health Care -

Mayo Clinic. (2024). Robotic Surgery. Retrieved from

<https://www.mayoclinic.org/tests-procedures/robotic-surgery/about/pac-20394974b>

Hospitality and Tourism -

Tanksley, T. (n.d.). Robots in Food Service: Everything you need to know. Richtech Robotics. Retrieved from

<https://www.richtechrobotics.com/blog/robots-in-food-service#:~:text=Robots%20for%20Food%20Preparation.and%20produce%20more%20uniform%20results.>

Manufacturing Technology -

Wasim, H. (2023). Robots in the Manufacturing Industry. Types and Applications. Wevolver.

Retrieved from <https://www.wevolver.com/article/manufacturing-robots>

Technological Design -

Design Boom Magazine. (n.d.) Robots. Retrieved from <https://www.designboom.com/tag/robots/>

Transportation Technology-

Donlon, M. (2022). Robots are primed to replace auto mechanics (or are they?).

Electronics 360. Retrieved from

<https://electronics360.globalspec.com/article/18552/robots-are-primed-to-replace-auto-mechanics-or-are-they>

1. Complete “TAS Robotics within Innovations and Emerging Technologies Reflection 2024”
2. See Rubric below.

Planning Notes

A sample reading list is provided. Teachers will edit the list and references as desired and based on student ability and interest.

If the learning environment allows for cross-curricular projects, these can occur with:

- Senior (Grade 11 and 12) Tech Courses such as Computer Technology, Health Care, Manufacturing Technology, and Tech Design, as robotics are mentioned specifically in the curricula
- SNC1W (Grade 9 De-streamed Science) for coding

Overall Expectations Covered

Design Process and Related Skills

Students engage in an [engineering design process](#) throughout this strand

Overall Expectations

A1: Initiating and Planning: demonstrate an understanding of fundamental technological concepts and related skills by initiating and planning projects.

B1: Fundamentals of Technological Development: demonstrate an understanding of how various needs and underlying social, economic and environmental factors drive the evolution of technology.

B2: Impacts of Technology: analyze impacts of various technologies on individuals, society, the economy, and the environment

Specific Expectations

- A1.2 :apply an understanding of fundamental technological concepts, design considerations, and science, technology, engineering, and mathematics (STEM) concepts as appropriate in developing projects involving the creation of products and/or services
- B1.1 Assess interrelationships between user needs and the development of various technological solutions
- B1.2 analyze how the development and application of technologies are impacted by legal, ethical, social, economic, and environmental considerations
- B1.3 investigate and describe contributions to technological innovations made by Canadians, including women, and members of diverse groups and communities in Canada, including First Nations, Métis, and Inuit
- B2.1 assess short-term and long-term impacts of various technological innovations on individuals and society, including the impact on their everyday life, and propose ways to mitigate negative impacts and enhance positive ones
- B2.2 assess local and global impacts of various technological innovations on the environment and the economy, including the labour market
- B2.3 evaluate how positive and negative impacts of various technologies can influence technological evolution, including emerging technologies

Skilled Trades and Apprenticeship Opportunities

See the following websites:

First Robotics Canada. (n.d.). Careers in Skilled Trades. Retrieved from <https://archive.firstroboticscanada.org/skilled-trades/>

Skills Canada. (n.d.). Mobile Robotics. Retrieved from https://www.skillscompetencescanada.com/en/skill_area/mobile-robotics/

Engineering Design Process

The engineering design process will allow students to demonstrate their learning through a design process connected to the broad based technology classes.

This [engineering design process](#) has been modified from the [Ministry of Educations](#) model and as part of the expectations this step-by-step guide was developed to help the educator meet those expectations This [engineering design process](#) is to use as the basis of the activity below. Students will go through the process of Initiating and Planning, Designing and Performing, and Analysing and Refining a project based on a real world problem.

Any engineering design process can be used. Connect with your board to implement the engineering design process that is currently being used in your district.

See also:

Science Buddies. (2024). 4 Ways to Teach Engineering Design. Retrieved from <https://www.sciencebuddies.org/blog/teach-engineering-design-process>

Fundamental Technological Concepts included in this project:

Control	The means by which a device or process is activated or regulated. This includes automation, which involves using technology to make a device or process run on its own.
Function	The use for which a product, process, or service is developed.

Universal Design for Learning

No two students or classes will learn in the same way. “Universal Design for Learning (UDL) is a framework that avoids a ‘one-size fits all approach’ to learning materials. It encourages using multiple ways of engagement, representation and action and expression can meet the needs of a larger number of learners.” Adapt this resource so that it fits your learners. For example, you may need to adjust the sample reading list so that it works for your given class.

Government of Canada. (2024). Universal Design for Learning (UDL). Retrieved from <https://a11y.canada.ca/en/universal-design-for-learning-udl/>

Indigenous ways of knowing, doing and learning

This document was written with resources from the place this was written and as educators we need to consider the resources and traditions of the place the teachings are taking place. Please use these resources in this section as a guide. Please reach out to your schools liaison or representation of the Indigenous teachings for your region.

The author has suggested an activity that honours the place from where it was written.

Please consult your school boards First Nation, Metis and Inuit curriculum and / or cultural support team to inform content or activities relevant to communities in your area

Potential for Community Partnership

Contact the Robotics Team for your school or a school in your Board. See also First Robotics Canada - <https://firstroboticscanada.org/> First Robotics teams have community partnerships.

Innovations and Emerging Technologies

This assignment fits within this heading. See “TAS Robotics within Innovations and Emerging Technologies Reflection 2024”

Career Opportunities

1. See “TAS Robotics within Innovations and Emerging Technologies Reflection 2024.” Note that “Robotics” is a very broad field so students will need to narrow their focus within BBTs to search available jobs.
2. Robotics is mentioned specifically within the Senior (Grade 11 and 12) Tech Courses such as Computer Technology, Health Care, Manufacturing Technology, and Tech Design. If able to do cross-curricular work with one of these classes, career opportunities can be explored in tandem.

Assessment and Evaluation - Rubric

Knowledge and Understanding – Subject-specific content acquired in each course (knowledge), and the comprehension of its meaning and significance (understanding)				
Categories	50–59% (Level 1)	60–69% (Level 2)	70–79% (Level 3)	80–100% (Level 4)
	The student:			
Knowledge of content (<i>e.g., facts; use and function of robotics technical terminology</i>)	demonstrates limited knowledge of robotics	demonstrates some knowledge of robotics	demonstrates considerable knowledge of robotics	demonstrates thorough knowledge of robotics
Thinking – The use of critical and creative thinking skills and/or processes				
Categories	50–59% (Level 1)	60–69% (Level 2)	70–79% (Level 3)	80–100% (Level 4)
	The student:			

Use of critical/creative thinking processes <i>(e.g., engineering design, problem-solving)</i>	uses critical/creative thinking processes with limited effectiveness	uses critical/creative thinking processes with some effectiveness	uses critical/creative thinking processes with considerable effectiveness	uses critical/creative thinking processes with a high degree of effectiveness
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Communication – The conveying of meaning through various forms

Categories	50–59% (Level 1)	60–69% (Level 2)	70–79% (Level 3)	80–100% (Level 4)
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The student:

Expression and organization of ideas and information <i>(e.g., clarity, logic, coherence) in written form, (e.g. technical descriptions, report)</i>	expresses and organizes ideas and information with limited effectiveness	expresses and organizes ideas and information with some effectiveness	expresses and organizes ideas and information with considerable effectiveness	expresses and organizes ideas and information with a high degree of effectiveness
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<p>Use of conventions <i>(e.g., standards, symbols, units of measurement, acronyms), industry-related vocabulary, and terminology of the discipline in oral, non-verbal, visual, and/or written forms, including digital and media forms</i></p>	<p>uses conventions, vocabulary, and terminology with limited effectiveness</p>	<p>uses conventions, vocabulary, and terminology with some effectiveness</p>	<p>uses conventions, vocabulary, and terminology with considerable effectiveness</p>	<p>uses conventions, vocabulary, and terminology with a high degree of effectiveness</p>
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Experiential Learning

The technological education teacher can consult the cooperative education teacher and guidance counselor about arranging a job shadow or attaching a cooperative education credit. “Cooperative education places additional responsibilities on students; consequently, it is generally offered to students in Grades 11 and 12. However, when it is deemed to be in the best interest of a student in Grade 9 or 10, that student may also participate in cooperative education. In order to participate in cooperative education, students must be at least fourteen years of age.” (Ontario Ministry of Education, Cooperative Education, 2018, p. 47).

Reflection of Learning

See “TAS Robotics within Innovations and Emerging Technologies Reflection 2024”

Health and Safety Considerations

There are limited health and safety considerations because this project is of a “researching and understanding the problem” nature within the Engineering Design Process.