# Grade 8: Automated for the Future (Understanding Structures and Mechanisms)

| Science and Technology Curriculum Connections | Mathematics Curriculum Connections |
|---|---|
| **Lesson 1: The Impacts of Automated Systems**<br><br>**1.1** assess the social, economic, and environmental impacts of automating systems<br><br>**2.2** investigate the work done in a variety of everyday activities and record the findings quantitatively<br><br>**2.7** use a variety of forms (e.g., oral, written, graphic, multimedia) to communicate with different audiences and for a variety of purposes (e.g., using appropriate mathematical conventions, create a graph to represent changes in mechanical advantage when certain factors in a mechanism are manipulated<br><br>**3.1** identify various types of systems (e.g., mechanical systems, body systems, optical systems, mass transit systems, Aboriginal clan systems, health care systems)<br><br>**3.2** identify the purpose, inputs, and outputs of various systems (e.g., a garden – purpose: to grow things; input: seeds, water, fertilizer; output: flowers, food)<br><br>**3.3** identify the various processes and components of a system (e.g., robot, front-end loader/backhoe, heating system, transportation system, health care system) that all it to perform its function efficiently and safely | |

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| **Lesson 2: Inquiry-based Centres**<br><br>**2.1** follow established safety procedures for working with apparatus, tools, materials, and electrical systems (e.g., tie hair back before working with drills, saws, and sanders)<br><br>**2.4** use technological problem-solving skills to investigate a system (e.g., an optical system, a mechanical system, an electrical system) that performs a function or meets a need<br><br>**2.6** use appropriate science and technology vocabulary, including *mechanical advantage, input, output, friction, gravity, forces* and *efficiency* in oral and written communication<br><br>**2.7** use a variety of forms (e.g., oral, written, graphic, multimedia) to communicate with different audiences and for a variety of purposes (e.g., using appropriate mathematical conventions, create a graph to represent changes in mechanical advantage when certain factors in a mechanism are manipulated<br><br>**3.2** identify the purpose, inputs, and outputs of various systems (e.g., a garden – purpose: to grow things; input: seeds, water, fertilizer; output: flowers, food) | **Lesson 2: Inquiry-based Centres**<br><br>**Data Management and Probability**<br>- collect data by conducting a survey or an experiment to do with themselves, their environment, issues in their school or community or content from another subject and record observations or measurement<br><br>- collect and organize categorical, discrete, or continuous primary data and secondary data and display the data in charts, tables, and graphs and scales, that suit the range and distribution of the data using a variety of tools<br><br>- select an appropriate type of graph to represent a set of data, graph the data using technology, and justify the choice of graph |

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| **Lesson 3: Building Systems – Design and Technology Challenge**<br><br>**1.2** assess the impact on individuals, society, and the environment of alternative ways of meeting needs that are currently met by existing systems, taking different points of view into consideration<br><br>**2.4** use technological problem-solving skills to investigate a system (e.g., an optical system, a mechanical system, an electrical system) that performs a function or meets a need<br><br>**2.6** use appropriate science and technology vocabulary, including mechanical advantage, input, output, friction, gravity, forces and efficiency in oral and written communication<br><br>**3.3** identify the various processes and components of a system (e.g., robot, front-end loader/backhoe, heating system, transportation system, health care system) that allow it to perform its function efficiently and safely | |

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| **Lesson 4: Cool Coding Systems**<br><br>**1.1** assess the social, economic, and environmental impacts of automating systems<br><br>**2.5** investigate the information (e.g., owner's manual for a car, weather advisories for a region, pest forecasts/warnings for a crop/region) and support (e.g., a technical support line for computers) provided to consumers/clients to ensure that a system functions safely and efficiently<br><br>**2.7** use a variety of forms (e.g., oral, written, graphic, multimedia) to communicate with different audiences and for a variety of purposes (e.g., using appropriate mathematical conventions, create a graph to represent changes in mechanical advantage when certain factors in a mechanism are manipulated<br><br>**3.2** identify the purpose, inputs, and outputs of various systems (e.g., a garden – purpose: to grow things; input: seeds, water, fertilizer; output: flowers, food) | **Lesson 4: Cool Coding Systems**<br><br>**Number Sense and Numeration:**<br>- express repeated multiplication using exponential notion<br><br>- solve multi-step problems arising from real-life contexts and involving whole numbers and decimals, using a variety of tools |

# Grade 8: Automated for the Future (Understanding Structures and Mechanisms)

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| | **Lesson 5: Circle Measurements**<br><br>**Number Sense and Numeration**<br>- use estimation when solving problems involving operations with whole numbers, decimals, percents, integers, and fractions, to help judge the reasonableness of a solution<br><br>**Measurement**<br>- measure the circumference, radius, and diameter of circular objects, using concrete materials<br><br>- solve problems involving the estimation and calculation of the circumference and area of a circle |

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|---|---|
| **Lesson 6: Circle Relationships**<br><br>**2.2** investigate the work done in a variety of everyday activities and record the findings quantitatively<br><br>**2.4** use technical problem-solving skills to investigate a system that performs a function or meets a need | **Lesson 6: Circle Relationships**<br><br>**Number Sense and Numeration**<br>- solve multi-step problems arising from real-life contexts involving whole numbers and decimals, using a variety of tools (e.g., graphs, calculators) and strategies (e.g., estimation, algorithms)<br><br>**Measurement**<br>- determine, through investigation using a variety of tools (e.g., cans and string, dynamic geometry software) and strategies, the relationships for calculating the circumference and the area of a circle, and generalize the formulas<br><br>- solve problems involving the estimation and calculation of the circumference and area of a circle |

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| Science and Technology Curriculum Connections | Mathematics Curriculum Connections |
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| **Lesson 7: GPS and Circle Connections**<br><br>**1.1** assess the social, economic, and environmental impacts of automating systems<br><br>**1.2** assess the impact on individuals, society, and the environment of alternative ways of meeting needs that are currently met by existing systems, taking different points of view into consideration<br><br>**2.4** use technological problem-solving skills to investigate a system that performs a function or meets a need | **Lesson 7: GPS and Circle Connections**<br><br>**Number Sense and Numeration**<br>- solve multi-step problems arising from real-life contexts involving whole numbers and decimals, using a variety of tools (e.g., graphs, calculators) and strategies (e.g., estimation, algorithms)<br><br>- use estimation when solving problems involving operations with whole numbers, decimals, percents, integers, and fractions, to help judge the reasonableness of a solution<br><br>**Measurement**<br>- determine, through investigation using a variety of tools (e.g., cans and string, dynamic geometry software) and strategies, the relationships for calculating the circumference and the area of a circle, and generalize the formulas<br><br>- solve problems involving the estimation and calculation of the circumference and area of a circle |