

Mighty Mining Machines

Northwest Territories	
Grade 4	
Pulleys and Gears	
<u>General Curriculum Outcomes:</u>	<p>Demonstrate an understanding of the characteristics of pulleys and gears.</p> <p>Design and make pulley systems and gear systems, to investigate how motion is transferred from one system to another.</p> <p>Identify ways in which different systems function, and appropriate criteria to be considered when designing and making such systems.</p>
<u>Specific Curriculum Outcomes:</u>	<p>Describe, using their observations, the functions of pulley systems and gear systems (e.g., they make changes in direction, speed, and force possible).</p> <p>Demonstrate an awareness of the concept of mechanical advantage by using a variety of pulleys and gears.</p> <p>Manipulate pliable and rigid materials (e.g., modeling clay, straws, string, wood) as required by a specific design task.</p> <p>Identify common devices and systems that incorporate pulleys (e.g., cloth lines, flag poles, cranes) and/or gears (e.g., bicycles, hand drills, wind-up clocks/</p>
Grade 5	
Forces Acting on Structures and Mechanisms	
<u>General Curriculum Outcomes:</u>	<p>Design and make load-bearing structures and different mechanisms, and investigate the forces acting on them.</p> <p>Evaluate the design of systems that include structures and mechanisms, and identify modifications to improve their effectiveness.</p>
<u>Specific Curriculum Outcomes:</u>	<p>Formulate questions about and identify needs and problems related to structures and mechanisms in the outdoor environment, and explore possible answers and solutions (e.g., construct a bridge that must support a given load across a given distance; determine which surface of a cantilever bridge or beam is under tension and which is under compression).</p> <p>Make a mechanical system that performs a specific function (e.g., lifting a heavy load; retrieving an object from a position that cannot be reached by hand).</p>

	Identify modifications intended to improve the performance, aesthetic appeal and impact on the environment of a product they designed.
Grade 6	
Motion	
<u>General Curriculum Outcomes:</u>	Design and make mechanical devices, and investigate how mechanisms change one type of motion into another and transfer energy from one form to another. Identify modifications to improve the design and method of production of systems that have mechanisms that move in different ways.
<u>Specific Curriculum Outcomes:</u>	Formulate questions about and identify needs and problems related to structures and mechanisms in the environment, and explore possible answers and solutions (e.g., describe how a system, such as a simple plumbing system, could be modified to meet different needs). Describe how different devices and systems have been used by different cultures to meet similar needs (e.g., irrigation systems for farms, temporary shelters, bicycles, wagons and carts).
Grade 8	
Mechanical Systems	
<u>Specific Outcomes:</u>	<ol style="list-style-type: none"> 1. Illustrate the development of science and technology by describing, comparing and interpreting mechanical devices that have been improved over time <ul style="list-style-type: none"> • illustrate how a common need has been met in different ways over time (e.g., development of different kinds of lifting devices) 2. Analyze machines by describing the structures and functions of the overall system, the subsystems and the component parts <ul style="list-style-type: none"> • analyze a mechanical device, by: describing the overall function of the device, describing the contribution of individual components or subsystems to the overall function of the device, identifying components that operate as simple machines • identify linkages and power transmissions in a mechanical device, and describe their general function (e.g., identify the purpose and general function of belt drives and gear systems within a mechanical device) 4. Analyze the social and environmental contexts of science and technology, as they apply to the development of mechanical devices <ul style="list-style-type: none"> • evaluate the design and function of a mechanical device in relation to its efficiency and effectiveness, and identify its impacts on humans and the environment • develop and apply a set of criteria for evaluating a given mechanical device, and defend those criteria in terms of relevance to social and environmental needs

- illustrate how technological development is influenced by advances in science, and by changes in society and the environment

General Outcomes

Skills Outcomes:

Work collaboratively on problems; and use appropriate language and formats to communicate ideas, procedures and results

- work cooperatively with team members to develop and carry out a plan, and troubleshoot problems as they arise

Attitude Outcomes:

- Show interest in science-related questions and issues, and pursue personal interests and career possibilities within science-related fields
- Work collaboratively in carrying out investigations and in generating and evaluating ideas
- Show concern for safety in planning, carrying out and reviewing activities