

## CURRICULUM CONNECTIONS

This section is for educators who would like more specific information about which curriculum outcomes in the **Grade 8 Mechanical Systems** unit are met by the activities in the Mega Machines crate.

The Mega Machines crate addresses the following outcomes for Science, Technology and Society (STS) and Knowledge:

1. Illustrate the development of science and technology by describing, comparing and interpreting mechanical devices that have been improved over time.
2. Analyze machines by describing the structures and functions of the overall system, the subsystems and the component parts
3. Investigate and describe the transmission of force and energy between parts of a mechanical system.

## ACTIVITY

Outcomes for Science, Technology, and Society (STS) and Knowledge

Activity 1 –  
Gears

*Outcome 2:*

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.

*Outcome 3:*

Analyze mechanical devices to determine speed ratios.

Modify a model mechanical system to provide for different turning ratios between a driving and driven shaft.

Compare theoretical and actual values of force ratios, and propose explanations for discrepancies.

Identify work input and work output in joules for a simple machine or mechanical system (e.g., use a device to lift a measured mass an identified distance, then calculate the work output)

<p>Activity 2 – Levers</p>	<p><i>Outcome 2:</i> 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.</p> <p><i>Outcome 3:</i> Analyze mechanical devices to determine force ratios. Identify work input and work output in joules for a simple machine or mechanical system.</p>
<p>Activity 3 – Pulleys</p>	<p><i>Outcome 2:</i> 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.</p> <p><i>Outcome 3:</i> Compare theoretical and actual values of force ratios, and propose explanations for discrepancies. Identify work input and work output in joules for a simple machine or mechanical system.</p>
<p>Activity 4 – Pascal's Law</p>	<p><i>Outcome 2:</i> Analyze a mechanical device, by: –describing the overall function of the device. Identify power transmissions in a mechanical device, and describe their general function.</p> <p><i>Outcome 3:</i> Analyze mechanical devices to determine force ratios. Compare theoretical and actual values of force ratios, and propose explanations for discrepancies.</p>

<p>Activity 5 – Hydraulics</p>	<p><i>Outcome 2:</i> Identify linkages and power transmissions in a mechanical device, and describe their general function.</p> <p><i>Outcome 3:</i> Analyze mechanical devices to determine force ratios. Modify a model mechanical system to achieve a given force ratio. Compare theoretical and actual values of force ratios, and propose explanations for discrepancies. Identify work input and work output in joules for a simple machine or mechanical system (e.g., use a device to lift a measured mass an identified distance, then calculate the work output).</p>
<p>Activity 6 – Inclined Planes</p>	<p><i>Outcome 2:</i> 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.</p> <p><i>Outcome 3:</i> Identify work input and work output in joules for a simple machine or mechanical system.</p>
<p>Activity 7 – TechnOLOGY Timeline</p>	<p><i>Outcome 1:</i> Investigate and provide examples of mechanical devices used in the past to meet particular needs. Illustrate how a common need has been met in different ways over time. Illustrate how trial and error and scientific knowledge both play a role in technological development.</p>