



Machines, Energy, Forces and Motion

The activities in this teacher’s guide were created by the Center for Inquiry-Based Learning (CIBL) to accompany the materials in the Machines, Energy, Forces & Motion STEM kit. The Machines, Energy, Forces & Motion STEM kit was specifically designed to meet the North Carolina Essential Science Standards for grade 7 physical science. These materials and activities are available only with prior professional development. The goal is to help students deepen their understanding of underlying concepts through concrete experiences.

This pilot version is under development, and CIBL welcomes any feedback you are willing to provide. We may be contacted through the CIBL web site on the “contact us” tab at <http://ciblearning.org>. If you have questions, feel free to call 919 294-9881.

This teacher’s guide is available online at: <http://ciblearning.org/teacher-resources/lesson-materials/> password: mefm7sci

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Correlation to the NC
Essential
Science Standard

- 7.P.1 Understand motion, the effects of forces on motion and the graphical representations of motion.**
- 7.P.1.1 Explain how the motion of an object can be described by its position, direction of motion, and speed with respect to some other object.
 - 7.P.1.2 Explain the effects of balanced and unbalanced forces acting on an object (including friction, gravity and magnets).
 - 7.P.1.3 Illustrate the motion of an object using a graph to show a change in position over a period of time.
 - 7.P.1.4 Interpret distance versus time graphs for constant speed and variable motion.

**7P.2 Understand forms of energy, energy transfer and transformation and conservation in mechanical systems.**

- 7.P.2.1 Explain how kinetic and potential energy contribute to the mechanical energy of an object.
- 7.P.2.2 Explain how energy can be transformed from one form to another (specifically potential energy and kinetic energy) using a model or diagram of a moving object (roller coaster, pendulum, or cars on ramps as examples).
- 7.P.2.3 Recognize that energy can be transferred from one system to another when two objects push or pull on each other over a distance (work) and electrical circuits require a complete loop through which an electrical current can pass.
- 7.P.2.4 Explain how simple machines such as inclined planes, pulleys, levers and wheel and axels are used to create mechanical advantage and increase efficiency.

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