

Wheels & Levers

General Learner Expectations

Students will:

4-6 Demonstrate a practical understanding of wheels, gears and levers by constructing devices in which energy is transferred to produce motion.

Specific Learner Expectations

Students will:

1. Explain how rollers can be used to move an object, and demonstrate the use of rollers in a practical situation.
2. Compare the wheel and the roller, and identify examples where each are used.
3. Construct devices that use wheels and axles, and demonstrate and describe their use in:
 - model vehicles
 - pulley systems
 - gear systems.
4. Construct and explain the operation of a drive system that uses one or more of the following:
 - wheel-to-wheel contact
 - a belt or elastic
 - a chain
 - cogs or gears.
5. Construct and explain the operation of a drive system that transfers motion from one shaft to a second shaft, where the second shaft is:
 - parallel to the first
 - at a 90° angle to the first.
6. Students who have achieved this expectation will be aware of changes in speed and direction that result from different ways of linking components. Introduction of gear ratios, however, is not recommended at this grade level. Students will have an opportunity to develop the concept of ratio as part of their junior high mathematics program.
7. Demonstrate ways to use a lever that:
 - applies a small force to create a large force
 - applies a small movement to create a large movement.
8. Predict how changes in the size of a lever or the position of the fulcrum will affect the forces and movements involved.
9. Construct models of levers; and explain how levers are involved in such devices as: teetertotters, scissors, pliers, pry bars, tongs, nutcrackers, fishing rods, wheelbarrows.