Lesson 8 Experimenting gear ratios and wheel sizes for cars

Note: This lesson was not tested. It may take two class sessions.

Objectives: Students will experiment with gearboxes with different gear ratios and with three sizes of wheels so that they can make an informed decision about how to design their cars.

Materials: For each group:

- Three gearboxes, each with a different gear ratio and attached to a chassis
- Three sets of wheels, each set a different size. Back wheels have brackets for attaching to axles; front wheels have dowels for axles.
- Wood planks to use as test tracks for cars. Books for raising one side of the wood plank to make various slopes.

Sponge:

Initial Discussion: Discuss the differences between the different gearboxes and predict how the gear ratios will effect the performance of the cars. Predict the effects of the different sized wheels.

Project: Build cars by interchanging gearboxes and different sized wheels. Test each car on a flat and a sloped surface (measure the slope of the surface). Note speed and ability to climb slope.

Record results of testing for different combinations of gearboxes and wheel sizes.

Vocabulary: slope – an inclined surface. Measure the slope by comparing the vertical distance to the horizontal distance.

Final Discussion: Which gearbox/wheel size combination was the fastest? Which gearbox/wheel size combination allowed the car to go up the greatest slope? Which combination would you choose for your car and why? Write this into your design journal.