

Lesson 9 Building a small car I: Building the gearbox

Note: The Tamiya 3-Speed Crank Axle Gearbox is a good, economical choice. Good prices are available at <http://www.hobbylinc.com>

Objectives: Students will learn how to follow detailed instructions for building a complex device, both from a written instruction manual and from adults in the room.

Materials: For class:

- ∞ Sample gear boxes, batteries, alligator clips
- ∞ Several screw drivers
- ∞ Goggles
- ∞ Wire strippers
- ∞ Grease
- ∞ Other tools, such as needle-nosed pliers, box cutter
- ∞ Extra wire

For each student:

- ∞ Gear box kit
- ∞ Tray for small parts
- ∞ Index card
- ∞ Small and large ziplock bag
- ∞ Battery
- ∞ Battery clip
- ∞ 2 alligator clips
- ∞ Switch
- ∞ Pencil
- ∞ Notebook

Initial

Discussion: Show students the three assembled gear boxes. The medium speed is recommended, but students can make the faster or slower if they prefer. Remind students that the faster the wheels turn, the less torque they have.

Students will keep a design journal of this project. Priority for choosing materials will be based on quality of notebook entries. (Students will have materials to choose from the following class, so be sure to write in notebooks today!)

Project: Students build gear boxes. Guide students through each step, and have students work along with the class. Students will need to share screw drivers and will need to wear goggles when using tools.

When gear boxes are complete, students test them using their battery, battery clips, and alligator clips.

If students are waiting, or if they have completed their gear boxes, they should write in their notebooks on the following topics:

- ∞ Describe the process of putting together the gear box.
- ∞ What did you learn while putting together the gear box?

Vocabulary: Allen wrench, hex wrench, set screw, grub screw

Final
Discussion:

Clean up: Students put small parts in small ziplock bags, completed gear box and small bag into large ziplock bag. Write name on index card and include it in the ziplock bag.

Alligator clips are collected, but all other parts that will be part of the car go into the ziplock bags.

Home

Connection: Take box from gear box home and show parents. Describe what you did in class and what you will be doing over the next few classes.