

OVERVIEW

DRAGSTER (Code: DRAG)

DESCRIPTION

The *DRAGSTER* is a simple motorised vehicle, for students to design and construct. It is powered by a small electric motor, and students are able to select the vehicle's gearing, dependent upon the speed and acceleration required.

The vehicle has been designed to provide an easy introduction to electro-mechanical devices. It is also intended that a number of *DRAGSTERs* can be used to compete in a class environment. This puts the additional requirement on students to look into the effects of gearing on speed and acceleration, and to consider these factors in their vehicle design.



LEVEL: HOURS TO CONSTRUCT: SKILL DEVELOPMENT:

Intermediate

- 10 14 hours
- Planning and Design
- Manufacturing
- Soldering
- Mechanical
- Electrical
- Record keeping
- Investigation and Testing



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OVERVIEW – Dragster

WHAT'S IN THE KIT?

TECHNOLOGY

SCORPIO

- □ All the mechanical and electrical components required to make the DRAGSTER work including the motor, battery holder, wheels, gears and switch.
- □ A detailed teaching unit with a complete parts list, design suggestions, general construction guidelines and suggestions for testing and racing the cars.

WHAT ELSE IS NEEDED?

The following items are required and are available from Scorpio Technology, but need to be ordered separately (item codes in brackets):

- □ 2 x Battery AA BATTALK40 - 40 pack)
- □ Multi strand hook-up wire in a variety of colours
- □ Fishing line for racing
- □ Hot alue
 - OR
- □ Double-sided adhesive tape
- □ Single-sided adhesive tape
- □ We recommend the following spares when buying class sets of kits to replace parts damaged or lost by students:
 - Steel rod and Plastic guide tube
 - Wheels 52mm chrome
 - Wheels 30mm chrome
 - All pinion and spur gears GEAR12/1.9, GEAR50/10/2.4, GEAR60/10/2.4)

The following material is to be supplied by the student / teacher:

□ Material for the platform (PVC or acrylic sheet, plywood, corflute, etc.)

TOOLS REQUIRED

The following tools are required. Several are available from Scorpio Technology, and can be ordered separately if required:

REQUIRED TOOLS	ORDERING CODE
Assorted hand tools (depending on materials used)	-
Hammer	HAMMERCP/HAMMERCL
Ruler and pen	-
Craft knife	CRKNF
Soldering Iron and Soldering iron stand:	SOLDIRN
 a good quality soldering iron, with a fine tip 	SOLDIRNSTD
or	
Soldering station	SOLDSTN
Solder: – 0.71mm 60/40 solder is recommended	SOLD500
Wire strippers	WIRESTR

(BATTAA – 4 pack or

(WIREHU10) (FLINE) (GLUESTK)

(TAPESS)

(SRGTW – 5 of each in a pack)





(TAPEDS)

(W52C2 – pack of 40)

(GEAR8/1.9, GEAR10/1.9,

(W30C – pack of 40)



Side cutters	SIDECUT or SIDECUTM
Drill bit – 2.3mm	DB2.3
Mini bolt cutters	BOLTCUTM
Hot glue gun (unless using double & single sided tape)	GLUEGUN
Glue sticks – 11mm – Pack of 5 (if using hot glue gun)	GLUESTK
Flat smooth cut file (for de-burring steel rod ends)	-
Sandpaper- 180 – 220 grit	-

ABOUT THE PROJECT

The major features of this project are the planning, design, construction and assembly stages of a vehicle.

DESIGN PHASE

□ Create your own unique *DRAGSTER* design based on our drawings. Focus on component relationships, rather than dimensions. This provides scope for students to individualise their *DRAGSTER* design and increase their engagement in the project.

During the **Design phase**, students will need to:

- Evaluate the suitability of various materials, such as PVC, acrylic, plywood or balsa wood
- □ Determine which gears will be used from the selection of spur and pinion gears provided
- Evaluate available technologies that can be used, for example:
 - 3D printer
 - laser cutter (which allows more interesting shapes than usual)
 - vacuum former
- $\hfill\square$ Take into account weight distribution and ease of operation
- □ Consider the practical aspects of construction and assembly. For example, clearance for the wheels

MAKING / CONSTRUCTION

Once the Design process has been completed, the students will be able to start **building their design**. They will:

- □ Make and assemble the *DRAGSTER* platform they have designed
- \Box Make the axles and attach wheels
- □ Attach motor, switch, wheel assembly on to the platform
- □ Wire up and solder the battery holder, motor and switch
- □ Test and adjust the *DRAGSTER*
- □ Troubleshoot any problems!



DOES THE TEACHING UNIT INCLUDE ANY THEORY?

The Teaching unit has a THEORY section that covers:

- □ Speed and Acceleration
- □ How to calculate
 - average speed
 - average acceleration
- □ Using Crocodile Technology software to investigate:
 - \circ Gears
 - Circuit of the racing vehicle
 - \circ $\;$ The effect of weight on the operation of the motor

For more information and ideas, go to our website: <u>https://www.scorpiotechnology.com.au/kits-in-action</u>

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