Engineer Level 1 and 2

Years P4, P5 and P6

Engineer Level 1 P4, P5 and P6 pupils	
Primary Engineer Level 1 is targeted at primary schools where pupils have not been able to access secondary type resources or facilities. It is aimed at primary pupils who have used **'standard' primary equipment** to design and make their vehicle. A primary school can enter pupils into the competition at level 1 or 2 The children are to design an electrically powered vehicle that will be able to perform a range of functions to include climbing an incline with its canopy/lid included, move in a straight line (3m) forwards and in reverse.	
Design:	
Research- vehicles	5
Research- mechanisms & electrics	5
Research- materials	5
Design ideas	10
Working drawings	10
Evaluation and recording changes	15
Total marks available for Design:	50
Making:	
Quality of chassis	10
Quality of mechanisms	10
Quality of electrics	10
Quality of switch	10
Quality of finished model	20
Straight line performance	30
Ramp performance	20
Total marks available for Making:	110
Total marks available:	160

Engineer Level 2 P4, P5 and P6 pupils	
Primary Engineer Level 2 is targeted at primary schools where pupils have been able to access secondary type resources or facilities. It is aimed at primary pupils who have used **'nonstandard' primary equipment** to design and make their vehicle. A primary school can enter pupils into the competition at level 1 or 2 The children are to design an electrically powered vehicle that will be able to perform a range of functions to include climbing an incline with its canopy/lid included, move in a straight line (3m) forwards and in reverse and undertake a speed test.	
Design:	
Research- vehicles	5
Research- mechanisms & electrics	5
Research- materials	5
Design ideas	10
Working drawings	10
Evaluation and recording changes	15
Total marks available for Design:	50
Making:	
Quality of chassis	10
Quality of mechanisms	10
Quality of electrics	10
Quality of switch	10
Quality of finished model	20
Straight line performance	30
Ramp performance	20
Speed performance	20
Total marks available for Making:	130
Total marks available:	180

Challenge Brief:
Engineer Level 1 and 2

Pupils or teachers can select which level a team is entered based on their use or not of non-standard primary equipment such as laser cutters.

Level 1 Using Standard Primary Equipment	**Level 2** Using Non-Standard Primary Equipment
Working in pairs, children are to design and make a wheeled vehicle that could negotiate different terrains, requiring different design considerations. The vehicle should have a removable top to expose the mechanisms. The vehicle must climb a smooth MDF ramp that will be set at increasingly sharper angles, move in a straight line over 3m – both forwards and in reverse and discuss their design with judges.	Working in pairs, children are to design and make a wheeled vehicle that could negotiate different terrains, requiring different design considerations. The vehicle should have a removable top to expose the mechanisms. The vehicle must climb a smooth MDF ramp that will be set at increasingly sharper angles, move in a straight line over 3m – both forwards and in reverse, take a speed test over 5m and discuss their design with judges.
Level 1 and 2: The vehicle is to have one 3.0v electric motor powered by 2 AA batteries and have a forward and reverse switch. Construction kit parts or 'commercial' gear boxes are not permitted. The vehicle body must be able to be detached. **The vehicles must have been made by the pupils**.	
Vehicle Performance	
Each vehicle will climb a ramp (inclined surface) **either forwards or in reverse** to determine how steep an angle it can successfully climb, travel over a 3m distance to determine its ability to travel in a straight line, and at **level 2** undertake a speed test from a standing start over 5m.	
Level 2 only: Vehicles may be adapted to suit the different challenges but any 'spare parts' must be designed to fit to the vehicle as part of its design.	
Level 1 Primary Equipment	**Level 2 Non-Standard Primary Equipment**
e.g. A Robo / Stika Cutter (card cutter) may be part of the primary school provision.	e.g. CNC Controlled Equipment.
Marking – Design and Making	
Marks will be awarded for Level 1:	**Marks will be awarded for Level 2:**
Design: Design ideas, final design, talking about their own and others work	**Design**: research, design ideas, final drawings, evaluations and recording changes.
Making: use of tools and materials, quality of the finished model, distance up an inclined ramp, closeness to travelling in a straight line, forward and reverse switch and talking through the design with the judges.	**Making**: use of tools and materials, quality of the finished model, distance up an inclined ramp, closeness to travelling in a straight line, forward and reverse switch, speed test and talking through the design with the judges.
Judging	
Presentation: pupils will be invited to discuss their model with the judges.	
At all levels of competition the judge's decisions are final. At each stage of the competition (primary, secondary and regional), pupils are allowed to take their entry back to school to evaluate and develop their designing and making. Pupils must provide evidence for judges of their developmental work –this should be all the pupils own work.	