FORMULA SCHOOLS
Kick Starting Engineering Excellence

Chassis Design

Target Areas

KS 3 or 4
Resistant Materials
Material properties and processing

GCSE Engineering
Unit 1
Specifications and Engineering drawings
Unit 2
Production planning, Choosing materials, Using processes
Health and Safety
Unit 3
Investigating Products
Key Skills
Communication, Number, IT

Task:
To design a chassis for your Formula Schools entry.

Introduction
The Chassis is one of the most fundamental elements of a vehicle. It is the structure that holds in place all other components. It gives a Vehicle its shape size and form. Other fundamental aspects are the Influence it has on performance and handling

Research Section
What different forms of chassis have evolved over time?
Produce a time line showing the evolution of chassis design from simple ladder types to advanced composites used in Formula One
For each list the typical materials, forming systems, jointing processes and the main advantages and disadvantages of each.

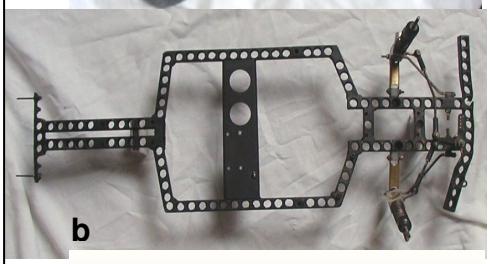
What are the key design elements a chassis must posses?
Strength
Combinations of Rigidity and flexibility
Resistance to fatigue
Ease of manufacture
For each of the above say why they are important, add more if you can.

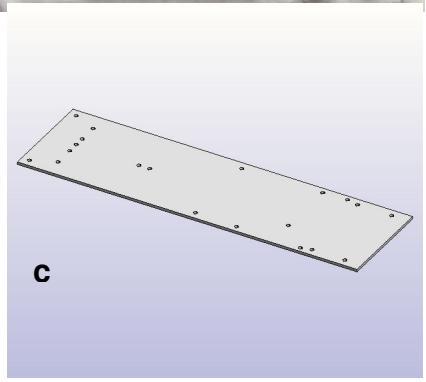
Design section
Collect all the information you will need to enable you to start designing your chassis and draft a specification.
Scale and size required
Major component locations and fixing methods
Bodyshell requirements
Material availability
Processing availability

Initial design
Produce a few freehand isometric sketches of ideas then progress to dimensioned drawings appropriate to your design. Remember these must include all necessary information for someone else to manufacture your chassis to the correct dimensions and tolerances and using the appropriate materials and manufacturing systems.
For example you may want sheet aluminium which machines well but can be folded to give rigidity. It will need to have mounting holes for all the components in the correct places. You may specify that it has an anodised finish to a particular colour.
Produce full working drawings using the most appropriate system with either manual or a CAD package.

Manufacturing Section
Produce test pieces for any processing skills such as jointing systems, eg riveting, tapping, brazing, welding, folding etc.
Produce a sequence of operations for manufacturing from cutting materials to deburing and applying a surface finish.
For most designs this will involve cutting, folding drilling/milling, jointing.
If your design is produced from polymers, and or composite production show clearly the stages in producing a mould and then the component.

Health and safety
Carry out a risk assessment for one of the processes you plan to use.
Consider: Materials, tools, environment, training, protective equipment and systems, action in case of problems.





a Carbon Fibre Chassis

b Welded steel drilled to give a lighter structure

c Sheet aluminium designed using ProDesktop