

## Stub Axle Design

### Task:

To design the stub axles for your Formula Schools car.

### Introduction

Stub axles make the car steer. They allow the front wheels to rotate from side to side to make the car go around corners.

### Research Section

What factors influence the design of the stub axles? Including other components that will fit into the stub axle.

List materials considered and joining methods for those materials.

What type of front suspension are you using? Will that front suspension change the stub axle design? What stops the stub axles from spinning with the wheels? How are you going to make them? How do car manufacturers solve the problems?

What are the key design elements the stub axle had to have?

Strength

Wear or friction

Ease of manufacture

For each question give your reasons for the choices you have made.

### Design Section

Draft a specification for the stub axles using all the research material you have gathered. Scale or size your components for the car you are building.

Material availability for the stub axle and king pin arrangement.

Processing availability and order of manufacture.

The initial design should be done in conjunction with the King Pin design to get the central hole the correct diameter. Sketch out different designs on a page and evaluate each one from the list of questions you have identified in the research section. The stock material has to be considered at each stage of the design. What finish are you going to apply to the finished component? Would corrosion be an issue?

Produce full working drawing for the component by hand or using a CAD system.

### Manufacturing Section

Produce a list of the sequence of operations to turn the stock material into the stub axle.

If you are going to cast the component then a pattern has first to be made.

Using specified stock material use appropriate machine to drill the hole for the king pin and check the internal diameter. Turn the stub axle using appropriate machine so that the diameter is the same or smaller than the internal diameter of the wheel.

Check component against the supplied wheel.

### Health and safety

Carry out a risk assessment on the main process you plan to use to produce the stub axle. Consider the following; materials, machine, tools, environment, training, protective equipment, and action if a problem occurs.

### 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

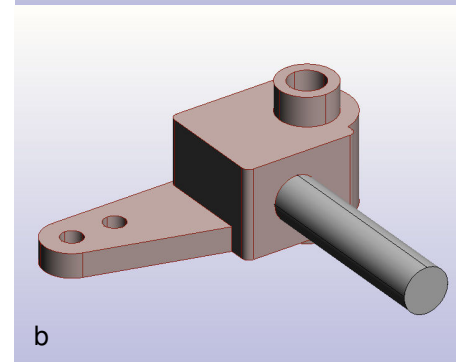
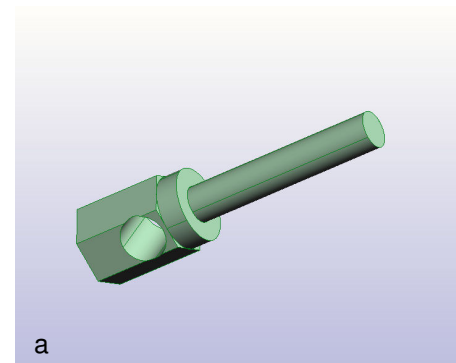
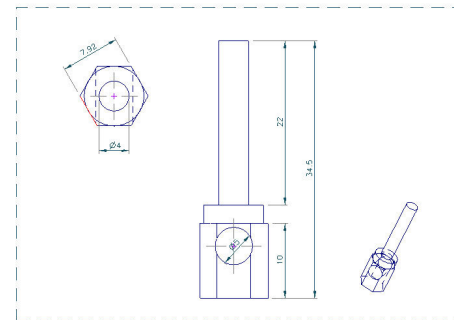
Health and Safety

##### Unit 3

Key Skills

Communication, Number, IT

### Working drawing



**a** Stub axle

**b** Assembly with stub housing