



# GCSE Design & Technology

SEAFORD COLLEGE

HEAD OF DESIGN & TECHNOLOGY – MR D SHAW



# Why should you choose Design & Technology?

- GCSE Design and Technology will prepare students to participate confidently and successfully in an increasingly technological world.
- Students will gain awareness and learn from wider influences on Design and Technology including historical, social, cultural, environmental and economic factors.
- Students will get the opportunity to work creatively when designing and making and apply technical and practical expertise.

# Course Aims and Content



Initial projects focus on developing, designing and give students the opportunity to work with new materials & equipment

The aim of the course is to build on the student's experiences at Key Stage 3 in preparation for their GCSE controlled assessment and examination.



# Assessment & Expectations of students

## Two units overall - Exam and Coursework in Year 11

Skills required :

- Enjoy Design & Technology – designing, making products, learning about processes and CAD/CAM
- A good drawing ability or the willingness to develop drawing skills
- To work to a high standard and manage their own time

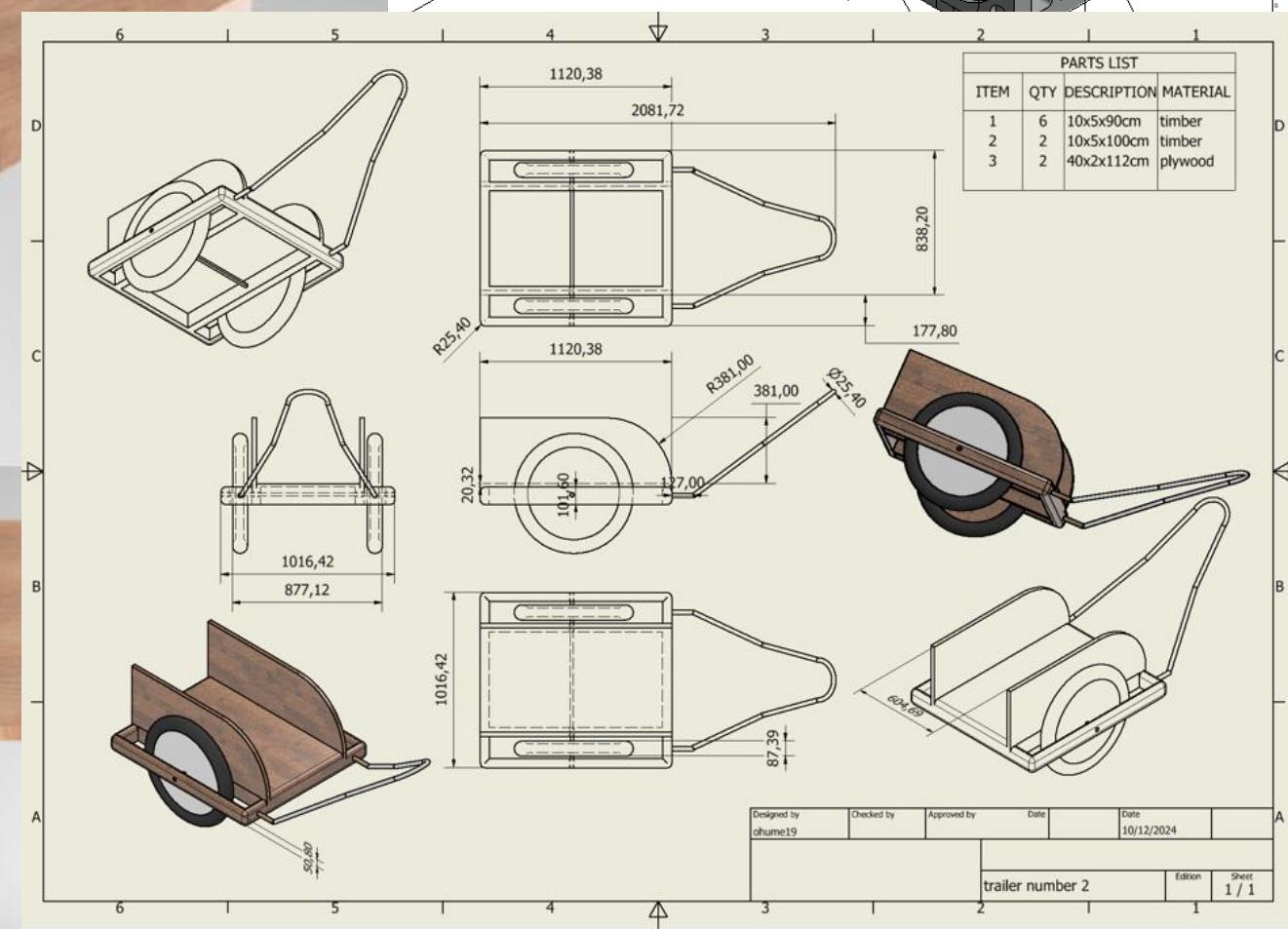
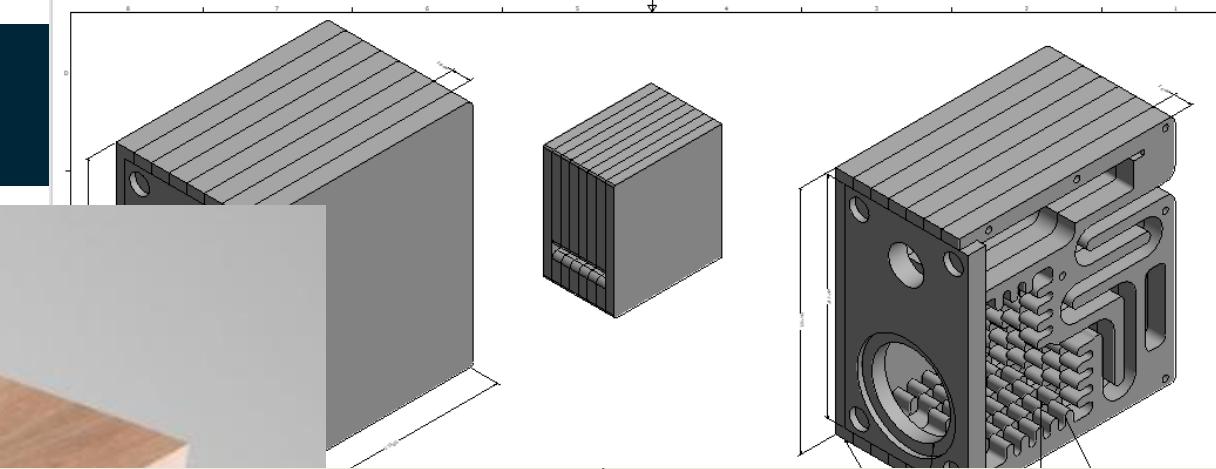
Coursework consists of a finished product and a portfolio 50%

Examination at the end of the course 50%

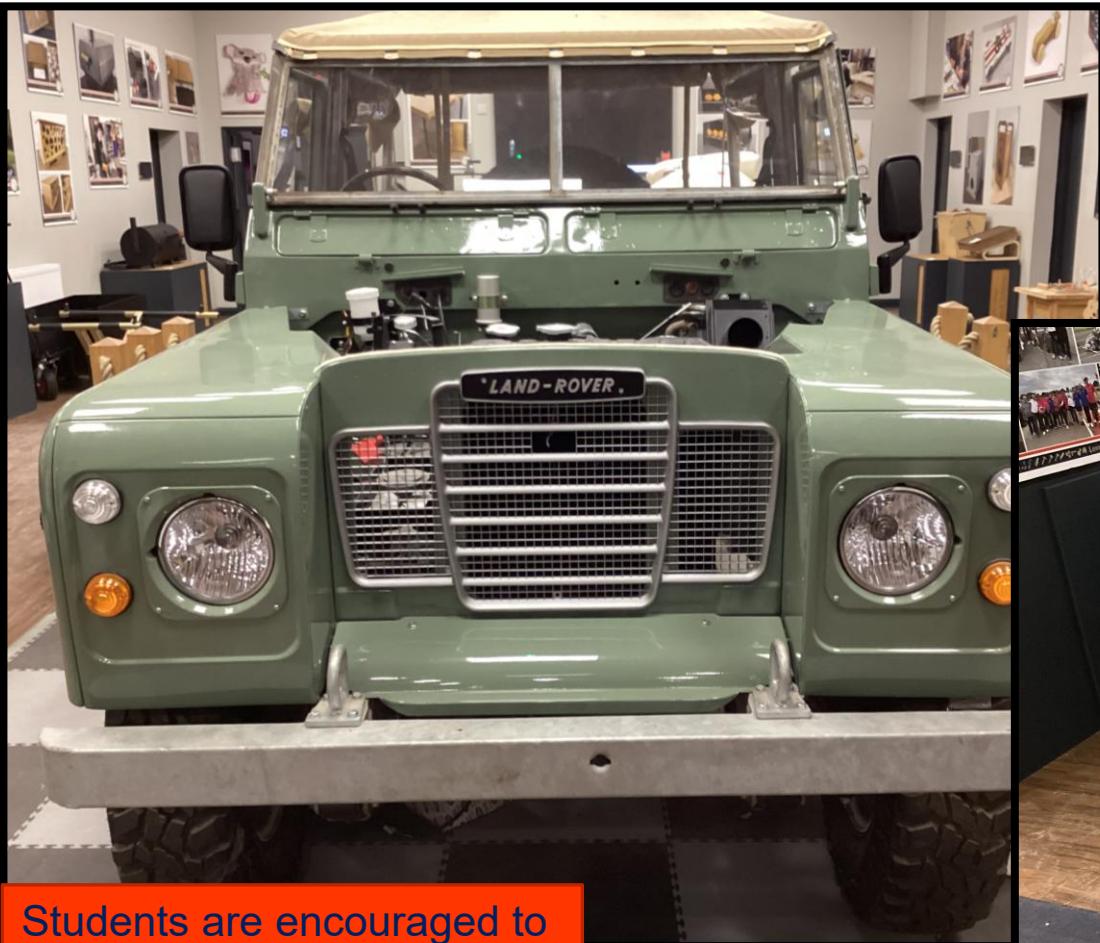
Dedicated text book & revision guides



# CAD & 3D Printing



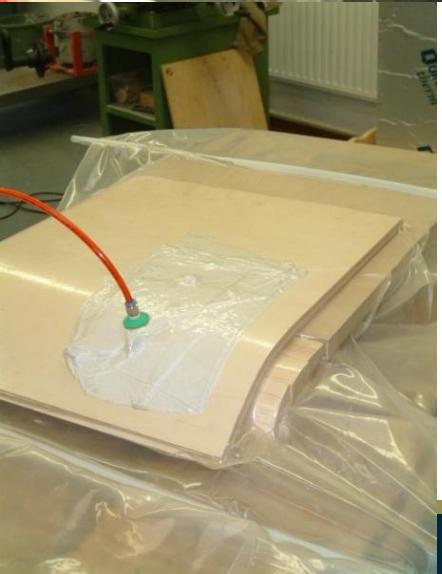
# Get Involved!



Students are encouraged to get involved and participate in extra-curricular activities such as Greenpower, Land Rover Restoration and other competitions.



# Resistant Materials Skills



# Controlled Assessment

- Students must select a controlled task from those set by AQA late in the summer term.
- Controlled conditions.
- 30-35 hours / 50% of marks
- Students can choose from 5 set contexts

- **A high profile event**
- **Addressing the needs of the elderly**
- **The contemporary home**
- **Children's learning and development**
- **The world of travel and tourism**

The image shows a document titled 'GCSE Design and Technology' from AQA. The document is a draft specimen material for Unit 2, specifically the NEA - design and make task. It details the assessment criteria, including what is assessed (a single 'design and make' activity), release date (1st June in the academic year prior to submission), time (30-35 hours), and evidence (a written or electronic design portfolio with photographic evidence of final prototype(s), up to 20 pages). It also specifies that the assessment is to be carried out under supervised conditions. A large 'DRAFT' watermark is visible across the document.

**AQA**  
DRAFT – SPECIMEN MATERIAL

**GCSE Design and Technology**

Unit 2  
NEA – design and make task

**What's assessed?**  
Students will undertake a single 'design and make' activity, which will arise from investigating one of five Contextual Challenges set by AQA.

**Release date:** 1<sup>st</sup> June in the academic year prior to submission

**Time:** 30-35 hours

**Evidence:** Written or electronic design portfolio with photographic evidence of final prototype(s). Max 20 pages.

This assessment is to be carried out under supervised conditions.

**Sample contextual challenges:**

- A high profile event
- Addressing the needs of the elderly
- The contemporary home
- Children's learning and development
- The world of travel and tourism



# Generating Designs:

My client really like this design because of the shape. Having this dome shape not only looks good but it will increase the sound quality because it has a round enclosure. I think that this design will be a hit all for my clients needs.

I will manufacture the enclosure of this design on a 3d printer.

Using a 3d printer and a composite filament will allow me to get a very unique design.

This design will feature a Dayton audio Neodymium tweeter.

This design will feature a Dayton audio 4 inch driver.

This design will be made out of a composite of wood and PLA filament.

This design will feature a Dayton audio Neodymium tweeter.

The rough dimensions of this set of speakers will be: height: 25cm, length: 15cm, width: 12cm.

This design will feature a red gloss paint work for the main enclosure.

The enclosure of my design will be made out of a composite of wood and PLA filament.

**This is Speaker design 2**

**Client comments:** This is a really unique design and we like the shape but we are just not sure it will fit in with our décor.

## Evaluation:

This design my clients like but think it might not fit in with their décor of their living room. They like the shape of it and think that the speaker looks very good. They also think that this design has met all the design requirements as it is easy to clean. I also think this design is a bit to small to go next to my client's tv cabinet. They think that it will continue to think this design because of its color and size

Specification:	Has it been completed?
Sustainability	No because the design is not sustainable.
Materials and components	No because the design is not made from MDF.
Quality	No because the design will be 3d printed
Aesthetics	No because the design will not blend in with my clients décor.
User needs	Yes I think I have met the design requirements.
Performance Requirements	No because the design does not fit in with my clients décor.
Form and function	No because the design is not 60cm tall so I will need to make stands for the speakers to sit on.

## Advantages:

The process I will use to make this target is 3d printing. I will use a 3d printer pictured above this will mean I can get it

## Disadvantages:

A disadvantage of this target will be the cost of the 3d printer, this means steel lasts a long amount of time but other materials such as wood which would rot so my users

The back of this target is a curve so the bullets are kept in the shooting target because the bullets are not ricocheted out of the target into the garden or at the user which would be

This shooting target will be a good target for my users, this means steel lasts a long amount of time but other materials such as wood which would rot so my users

**Name: Tom. Slater**

**Candidate No: 21**

**Design 4**

This shows where the bolts would connect to the target so the mechanism would be stable and can so perform its job properly.

These pictures are examples of bolts that I could use

This drawing shows a mechanism. I have designed this, so the targets are able to reset when my users shoot the targets down

These bolts are made from alloy steel, so they are a high strength metal meaning they will last for a very long time

This is a bullet catcher and stops the bullets from bouncing out from hitting the targets

This is what Tania wanted because she wanted the garden to stay cleaner and a nicer place to be in.

I have designed this roof to be able to stop the bullets hitting the roof when the bullets hit it so the bullets just deflect down into the bullet holder

This is something that Pier wanted because he said that he would be able to reuse the bullets, so I don't have to buy more

This is a bullet holder which allows the bullets to be stored all in one place so the user can easily pick them up and re-use the bullets

This is a metal box that I made in the workshop for the designs and materials for the target. This give me a really good representation of what this bullet holder would be like

This is a metal bender I used to make this

Then when the mechanism in the target the bullet block can keep its position

This is a hole in the back of the target so the bullets can roll through the hole into the bullet holder

This is a block in the target can and be shot until the user shoots it down

This is a metal lever joint, allowing the target to go backwards and forwards so the bullet block could knock the target down

This bullet would stay inside the hole so the target would be held in position

The bottom of this target is angled so the bullets will always roll down into the bullet holder

This target is angled down so when the target then it will bounce down and stay in the target with help from the bullet catcher. This is what Tania wanted.

I could make this out of plastic because it doesn't need to be strong and plastic is easy to bend. This is how you bend plastic:

This metal block will support my target, so it stays upright till my users shoot them down

**Advantages**

- This target is resetting which is what my users wanted.
- The target has bullet holder which is another thing my users wanted.
- The target has many things to maintain the bullets in it

**Disadvantages**

- The target may be heavy so it could be hard for my users to carry it around the garden.
- The target would need to be light enough so the bb bullet to down

Kristian Fairston Candidate Number: 2031

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1

**The back of this target is a curve so the bullets are kept in the shooting target because the bullets are not ricocheted out of the target into the garden or at the user which would be dangerous**

These targets are different sizes which is what my users wanted so there are different so some of the targets are more difficult to shoot down. Also this means that my user is more likely to get better at triathlon shooting meaning that Piers could be more successful in this high-profile activity or occasion.

This lever is attached to the mechanism so when the user pulls the rope which would be attached to the lever than the lever would be lifted up which turns the mechanism towards the user which in turn lifts the targets

This is extra material which sticks out of the targets bottom cylinder like a triangle so when the target is reset then the target can rest on them so it stays upright.

**This shooting target will be made from steel sheets, this means steel lasts a longer amount of time than other materials such as wood which would rot so my users can use this target for longer amount of time.**

**First CAD design of the shooting target**

This curve at the back of the target means that the bullets are deflected down into the bullet holder; so the bullets don't bounce back into the garden or at the user

These are metal tubes that are shaped like horseshoes. This means that when the targets are shot down, they fall onto the tubes so when the user pulls the rope the targets can be readjust to their original position. *So my user can keep on shooting at the targets.*

This is how I would bend the metal tubing to produce the shape of a horsehoe. This is called a tube bender machine

**Positive user feedback**

- Piers said, "I think the mechanism has work very well enabling the targets to be reset which is what I wanted so I don't have to put the targets back up when ever I shoot them down."
- Tanja said, "I think the shape of the shooting target is good and would mean the bullets would not be able to bounce out meaning that the garden would be a nice place because there would be no bullets littering the garden."

**Negative user feedback**

- Tanja said, "I think that the part of the actual target which holds the targets head upright is too long because the bullets may potentially bounce out from the head of the target being so high up."
- Piers said, "I think this target looks quite heavy so I would not be able to carry to some areas of the garden."

**Improvements for the target**

- I will make the stands for the targets shorter to make sure the bullets stay in the target.
- I will make a bend on the top piece of metal so the metal will be stronger and so not have the possibility of bending.
- I will use thin pieces of metal when I can so the target will be lighter for my user to carry around the garden.

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24

boost the grain of the wood making it very visible. There are also many practical reasons why we finish wood such as making it waterproof and protecting it from moisture.

**Timber I am going to use:** The Timber that I am going to use for the front panel is American Walnut. I will experiment and find out the best finish I can use to finish the front panel of my speakers. I got 5 pieces of American walnut and applied 4 different finishes and left one block of wood with no finish I did this to determine the best finish for my design.

**This is a Lap Joint.** There is 3 ways I can create this joint. 1. is to use a table saw and create a channel. 2 is to use a table router with a straight bit to create a channel.

**This is a Miter joint** There is 3 ways I can create this joint. 1. I can use a 45 degree router bit and rout the edge. 2. I can use a band saw and then make the blade set at a 45 degree angle. 3.1 can use the jointer planer and set the guard to 45 degrees. This is what I did for my test piece above.

**Above is the Bees Wax finish.** I applied this by getting a rag and placing a dollop on the rag. I then rubbed it into the wood. And let it be. The finish is in my opinion is the best joint it is not too glossy and not to unfinished it is perfect. This is clearly my client favorite finish and it is my favorite finish as well. This is the finish that I will use in my final design.

**Mr. Long showed me a technique to make the wood really smooth.** He told me to use water with very different grits of sand paper and in between doing this rub water with a damp cloth into the wood. This will allow to be get a very nice smooth finish before applying the final finish.

**Conclusion:**  
From this page I have identified that for my final design I will use bees wax to finish the front panel of my speakers and I will use a miter cut joint for the main enclosure. This will provide a good finish for the walnut front panel and will also provide a strong structure for the enclosure.

Name: Tom Slater

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Seaford College: 65159

Students must take photographs of their work as it progresses



# Students must record manufacturing progress as a diary, with annotated photographs showing the 'journey' they have been on.

## Realising Design:



I cut my final design out using the CNC router with a 6mm bit. This gave me an even consistent pattern which would be impossible to make by hand.



After all the parts had been cut on the CNC router. I used a file and some 180grit sandpaper to finish the edges and get rid of excess material.



After all the parts had been filed and sanded, I placed them in groups so that I could identify which panels I need to glue together in order to get the pattern.



After all the parts had been placed into groups, I then glued them in groups of 3 at a time. This ensured that there was no panels that were inaccurately placed.



I then started placing a 6mm dowel through all the holes, so all the panels line up. I then hammered all the panels and placed glue in between the panels of 3.



After drilling some 1/2" holes in the enclosure I then sanded the enclosure with 180grit sandpaper.



After sanding the edges. I used a file to file the inside of the enclosure to create a slot so the crossover would fit tightly. This will mean that it fits snug and with be a tight fit.



After sanding the edges flush, I used some filler and hardener and applied it to the top and back of the enclosure. I tried to make the coat as even as possible.



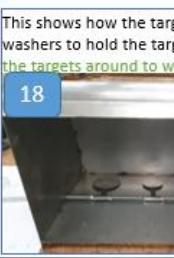
I then used a very coarse sandpaper, 180-grit and lightly sanded the top and back with a sanding block until the enclosure was no longer bumpy.



I then worked my way up the grits to get an even smooth finish. I used 180-300-400-800-1200 and this allowed me to get a very smooth finish.



After sanding the enclosure smooth. I used a grey primer and layered the paint up. I had to let it dry in-between coat and make sure there was no drippage.



In between drying I sandpaper remove also had to spray does no

Name: Tom. Slater Candidate No: 2101 Seaford College: 65159

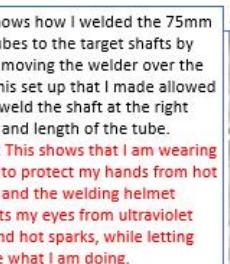
**Health and Safety:** I had to watch the CNC router cut all the panels out to ensure everything was safe and it made no mistakes. Whilst doing this I wore eye protection to protect my eyes from fragments of MDF that could fly up. I also wore ear defenders as the CNC router was very loud and could damage my ears. Whilst sanding I wore a dust mask to stop me inhaling all the dust from the filler.

### Sage 3: Finishing the interior on the shooting target

### Photographic diary of each stage of the shooting target build

#### Welding

15



This shows how I welded the 75mm long tubes to the target shafts by slowly moving the welder over the join. This set up that I made allowed me to weld the shaft at the right height and length of the tube.

**Safety:** This shows that I am wearing gloves to protect my hands from hot sparks and the welding helmet protects my eyes from ultraviolet light and hot sparks, while letting me see what I am doing.

#### Finished welding targets

16



#### Angle grinding

This shows me angle grinding the join of the shaft, tube and the circular target. To make a cleaner and smoother finish. I am using a clamp to stop the target from moving.

**Safety:** Goggles stop the fragments of metal and sparks from going into my eyes.



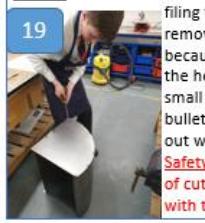
This shows how the targets will sit in the shooting target. I am using nuts and washers to hold the targets in place. This also means that my users can move the targets around to what they want.

18



#### Filing

19



This shows me filing the bullet removing hole because I made the hole too small for the bullets to drop out with the drill.

**Safety:** Be careful of cutting myself with the file.

#### Metal sheet cutter

20



This shows me using a sheet metal cutter. This is useful because it allowed me to cut a straight line. Also because it has a long lever it has a high mechanical advantage, so it made it easy for me to pull and cut the metal at 90 degrees.

**Safety:** To be careful of cutting your fingers off.

**Spray painting**  
This shows me spray painting the targets three different colors of white, blue and red. This enables my users to be able to see the targets easily and means the shooting target look more aesthetically pleasing.

21



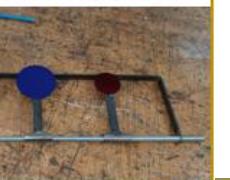
**Metal bending and drilling**  
This shows me using the metal bender by putting the target re-setter in and then lifting handle to make right angles in the metal. Then I drilled a 5mm hole so the threaded pole could fit through.

**Safety:** Goggles when drilling and not to get my fingers trapped in the metal bender.



### My finished interior of the shooting target

This shows the mechanism of the target. This would work by the lever on the left being pulled by a rope, then the re-setting arm would pull the targets to their original position.



# Examination 50%

0 8

5  
What change in motion takes place in the mechanism in **Figure 1** when the crank handle is turned?

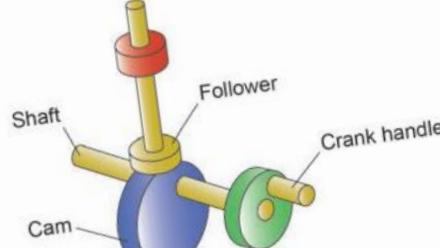


Figure 1

- A Linear to reciprocating
- B Oscillating to rotary
- C Reciprocating to linear
- D Rotary to reciprocating

2 1

Study the picture in **Figure 3** and the specification below.  
**Figure 3**



Specification for playground equipment

- For use by children age 4-12.
- Designed for external use.
- Recessed/flush fitting construction.
- All fittings are tamper proof.
- Use of weatherproof materials.
- Suitable for installation on a flat surface.
- Use of non-slip surfaces.
- Tough, durable and wear resistant finish.
- Parts designed to be bolted together.

2 1. 1

Analyse and evaluate the playground equipment.

Examination includes a range of questions that ramp up in complexity to include multiple choice, designing and discussion type questions.

2 2

The step ladder in **Figure 4** has 12 steps. Each step is 275 mm long, 100 mm wide and 25 mm thick.

Figure 4



2 2. 1

Each step should be 275 mm long.

The manufacturing tolerance is  $+/-0.5\%$

Calculate the maximum and minimum length of each step to two decimal places.

[2 marks]

Design Technology

Design & Technology

Head of Department: Mr D Shaw  
Teachers of Design and Technology: A Prince-Jones, P Harter, M Richards  
Technician: Mr K Long

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GCSE  
KS3  
Resources  
Video Resources  
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Year 11

Ensure that you use your textbook, notes, guides below and the 'past examinations' to help you revise. The photographs section below is split into your teacher and individual areas. There is a general section for 'extras'. Use these photographs in conjunction with your own 'snaps' to demonstrate the stages of production for use in the 'Make' PowerPoint.

Design Powerpoint  
Examinations  
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Photographs Coursework  
KEEP CALM AND DO SOME Revision Guides / Sheets

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Revision Guides / Sheets

Use the resources to revise for your GCSE (and AS/A2) examinations. Make notes in a format that works for **you!**

Use the top ten tips to help you revise from the following site (there is no need to sign up)  
<https://www.examtime.com/gcse/revision-tips/>

EXAM TIPS

board works!  
RESISTANT MATERIALS  
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Boardworks 2  
Carbon Nanotubes  
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Smart Materials

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Energy Trumps Energy Themes Focus on Fairground Rides Key Stage 1 Design Technology

- Students and parents have access to revision and key coursework documents using the Firefly platform
- Preps and deadlines will also be listed on the site





# Future pathways

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D&T opens up a variety of careers in areas such as:-

Engineering

Product Design

Building and Construction

Architecture

Interior Design

(To name a few.....)

# Any questions?

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If you have any questions regarding the content of the course please contact me using  
[dshaw@seaford.org](mailto:dshaw@seaford.org)