BERWICKSHIRE HIGH SCHOOL
DESIGN & TECHNOLOGIES FACULTY
DESIGN & TECHNOLOGY CURRICULUM: S1-3

S1 DESIGN & TECHNOLOGY

Developing hand and machine tool skills

- Bird Feeder
- Bookends

Sketching and Illustration Techniques

- One Point Perspective

S2 DESIGN & TECHNOLOGY

Desk Top Publishing

- Basics of Principles & Elements and Desktop Publishing (DTP) Terms: Glossary & Magazine Analysis & Page Creation

Developing hand and machine tool skills

- Pinball Game
- Wooden Stool

Computer Aided Modelling

- Basics of Computer Aided Modelling

Sketching and Illustration Techniques

- Basics of Skills in applying Manual or Electronic Sketching Techniques
- Basics of applying Manual or Electronic Illustration Techniques
  BRITISH STANDARDS CONVENTIONS

S3 DESIGN & TECHNOLOGY

Desk Top Publishing

- Basics of Principles & Elements and DTP Terms: Glossary & Magazine Analysis & Page Creation

Developing hand and machine tool skills

- Clock
- Ear bud winder and Engineers Square

Computer Aided Modelling

- Basics of Computer Aided Modelling

S1 Design & Technology

Sequencing Order: 1
Level: 3 (TCH 3-10a)

Topic:	**Develop hand and machine tool skills.**	
Sub-Topic:	**Manufacture a Bird Feeder**	
Overview:	Use tools and equipment to manufacture products. Apply safe working practices when creating a product. Extract dimensions from a drawing and transfer these onto materials to create a product. Understand material properties for construction.	
Term	**Knowledge & Skills**	**Experiences**
	Workshop Safety Understanding workshop safety, how to stay safe and the responsibility of each student. Emphasise the tools to be used in manufacturing the Birdfeeder. Emphasise all safety precautions required when using these tools and machines.	Watch the PowerPoint. Take part in discussion. Watch demonstrations. Produce a small birdfeeder. Evaluate progress.

	Identify and wear Workshop Personal Protective Equipment (PPE): safety goggles, apron and appropriate footwear, long hair tied back, ties and loose clothing removed or secured. **Manufacture:** Sand all pieces with glass paper to make sure all splinters are removed before beginning. **Making the Sides.** Mark out the slope on the side using a rule and engineers' square. Emphasise the need to mark all the way round. (So that it does not matter what way up the work is.) Mark out the centre of the wood...use engineers square and rule. Use a tenon saw and a sawing board to saw the piece in two. Band face raw edges smooth and square. Important safety rules for using the bandfacer. 1.Only one person to use the bandfacer at a time. 2.Only one person in the machine box at any time. 3. Guard must be in a suitable position for the work being carried out. 4.Hand should be well away from the abrasive belt. **Making the Back**	Have the opportunity to practice basic hand tool skills.

	Measure out of the hole for hanging up. Engineers Square and rule. Drill on Pillar Drill. Emphasise the need to hold securely and follow Health and safety. Important safety rules when using the Pillar Drill. 1. One person to use the Pillar Drill at a time. 2. Make sure the drill bit is secure in the Jacobs chuck. 3. Make sure the table is secure. 4. Make sure the chuck key is removed 5. Long hair is tied up. 6. Use a machine vice where necessary or keep a tight hold. Mark out for the pins to attach to sides...use finger gauge. Put the 12mm pins until they are just poking through the other side. **Assemble Sides to Back.** Glue sides and finish off pins. Use a crosspein or warrington hammer. Wipe of the excess glue with a damp paper towel. Make sure you attach the sides the correct way round. Use a nail punch to pop the pins below the surface. **Making the Base** Drill a hole in the centre of one edge to attach the perch (dowel). Mark the place by drawing in the diagonals. (Do not glue in the dowel at this stage.) **Assemble Base to rest.**	

	Mark out base for pins to attach to sides and back. Glue and pin.(make sure you get this the right way round...or the perch will be on the wrong side.) Use cross pein/warrington hammer. **Attach Seed Catcher** Staple the plastic onto the front...remembering to leave a small gap at the bottom for the seed to be pecked. Two staples each side and finish'home'(flush with surface) with the crosspein/warrington hammer. **Making the Roof** Decide if roof will be landscape or portrait. Mark out for 'fixer'. Use finger gauge. Glue in place and secure in vice for 10 mins. Put two 15mm pins in from the inside to help secure. **Making the Veranda** Cut a strip of material for the front...use sawing board and tenon saw. Bandface to perfect size. Use 20mm pins and put pins in, again until they are just poking through (one at each end but not too close to edge or you will split the wood.) Use crosspein/warrington hammer.	

	Glue strip and hit pins 'home'. Use nail push to pop pin heads below the surface. Repeat process with two smaller pieces at sides. (Remember to leave a gap so the rainwater can escape.) **Securing the Lid** About halfway across and 25mm from the top use engineers' square and rule to draw a cross. Drill with a hand drill a small hole (on both sides). Screw a small screw into both holes...be careful not to put the screw all the way in so that an elastic band can be used across top to secure lid. **Make sure all the pencil marks are removed with glass paper before getting marked.**	

Sequencing Order: 2
Level: 3 (TCH 3-10a)

Topic	**Perspective Sketching**	
Sub-Topic	**1-point perspective**	
Overview:	One point perspective shows how things appear to get smaller as they get further away, converging towards a single 'vanishing point' on the horizon line. It is a method of sketching objects on a flat piece of paper to make them look three-dimensional and realistic.	
Term	**Knowledge & Skills**	**Experiences**
	Sketching shapes: cubes, letters. 1-Point Perspective sketching: Horizon Line, Vanishing Point, Parallel Lines, Vertical Lines, Horizontal Lines, Construction Lines, Outlines, Squares, Rectangles, polygons. Everyday objects; furniture, microwave ovens, building blocks. Town scape: stacked, cut, and angular forms, overlapping shapes. Rendering & Shading: Wood Grain, Shiny surfaces, Spheres, Pyramids Garden shed and base, landscape features such as shrubs, grass, pots, tools, walls, pond and flowers. Rendering & Shading: glass windows, roof texture, wood grain. Layout: Background, Feature Text	Take part in discussions. Create sketches in One Point Perspective. Complete the One Point Perspective Test

Sequencing Order: 3
Level: 3 (TCH 3-10a)

Topic	**Continue to develop hand and machine tool skills, sketching designs, CAD modelling and evaluation.**	
Sub-Topic	**Bookends**	
Overview	Using tools and equipment to manufacture Bookends from Pine and man-made board. Designing a customised insert to enhance the appearance of the bookends. Apply safe working practices when creating product. Extract dimensions from a drawing and transfer these onto materials to create a product. Understand material properties for construction. Assemble product using glue and pressure. Using finishes such as paint and varnish.	
Term	**Knowledge and skills**	**Experiences**
	Sketching Designs and Evaluation Designs, sketching, producing several versions of hand drawn sketches. Render sketches to visualise the finished product. Evaluate each design, refine and modify as appropriate. Design which best suits the brief chosen, justification of design being most appropriate to the brief. **Using Autodesk Inventor** **Being able to identify and use the following Computer Aided Modelling (CAD) Commands, Generic Terms & Features:** • Creating a Part • Assembly of Parts • Adding Textures, Materials & Colours • Rendering & Lighting	Create freehand sketches.

	• Creating Production Drawings **Creating a Part: Need to be able to identify and use the following in CAD software.** • Modelling Tree • Pan, Rotate, Work plane, offset. • 2D & 3D Sketching: 2D Sketch, Profile, Sketch Plane, Sketch tools: Line, Circle, Arc, Rectangle, Trim, Copy, Zoom, Scale, Pattern Fill, Chamfer, Fillet. • 3D Modelling; Extrude, Revolve, Extrude Subtract, • 3D Modelling Edits; Fillet, Chamfer **Assembly of Parts: Need to be able to identify and use the following in CAD software.** • Align, Mate, Orientate, Centre Axis **Adding Textures, Materials & Colours: Need to be able to choose and use the following in CAD software.** • Suitable & Realistic Textures, Materials & Colours for 3D Model **Rendering & Lighting: Need to be able to choose and use the following in CAD software.** • Global Illumination • Reflection • Shadows • Rendering (& Transparent Background) **Creating Production Drawings: Need to be able to identify and use the following in CAD software.** • Creating a Drawing Template with Title Block	

	• Creating three views; Elevation, End Elevation, Plan • Dimensioning • Creating additional views; Pictorial. • Use British Standard Conventions **Workshop Safety** Understanding workshop safety, how to stay safe and the responsibility of each student. Emphasise the tools to be used in manufacturing the Bookends. Emphasise all safety precautions required when using these tools and machines. Identify and wear Workshop Personal Protective Equipment (PPE): safety goggles, apron and appropriate footwear, long hair tied back, ties and loose clothing removed or secured. **Manufacture** Sand all pieces with glass paper to make sure all splinters are removed before beginning. **Making the Lap Joint.** Mark out the Lap on the face using a rule and engineers' square. Emphasise the need to mark face, top edge and both sides. Mark cut using marking knife and engineers' square Use tenon saw and a sawing board to saw the lap joint.	

	Hand File out the joint square if required Band face raw edges smooth and square. Important safety rules for using the bandfacer. 1.Only one person to use the bandfacer at a time. 2.Only one person in the machine box at any time. 3. Guard must be in a suitable position for the work being carried out. 4.Hand should be well away from the abrasive belt. Mark out half-length on both workpieces using Rule and Engineers Square Mark cut using marking knife and engineers' square Use tenon saw and a sawing board to saw the workpieces in half. Band face raw edges smooth and square. Glue Lap joint and hold in bench tail vice until set. Emphasise 90-degree square and rebate aligned. **Finishing** Varnish, two coats, rubbing down in-between **Insert (Web)** Cut shape, glass paper smooth and decorate insert as per design using the most suitable tools for manufacture.	

	Assembly Join Insert and bookend base together in the rebate with PVA glue Apply further finish as required…paint, varnish applied objects.	

S2 Design & Technology

Sequencing Order: 1
Level: 3 (TCH 3 - 11a)

Topic:	**Desk Top Publishing (DTP)**	
Sub-Topic:	**Basics of Principles & Elements and Desktop Publishing (DTP) Terms: Glossary & Magazine Analysis & Page Creation**	
Overview:	Understanding given Principles & Elements and DTP terms. Analysing given / chosen magazine pages to identify the stated Principles and Elements and DTP terms. Create redesigned page in ~ InDesign. Justify and Evaluate Final Product	
Term	**Knowledge & Skills**	**Experiences**
	Being able to identify the following DTP Terms / Features for a variety of Visual Media Layouts. • **Dominance:** Size, Weight/Mass, Value, Colour. • **Emphasis;** Drop shadow, Drop Capital, Initial, Heading/Title, Sub Heading, Flash Bar, Transparency, Line, Pull Quote. • **Font Styles:** Script, Fun, Futuristic, Modern, Heavy, Light. • **Typeface: Serif, Sans Serif.** • **Text Styles:** Italics, Bold, Justification (Left, Right, Centred, Justified), Reverse Text, Text Wrap, Flow Text along a Path. • **Orientation:** Portrait, Landscape. • **Graphic:** Photo, Image, Sketch, Caption, Crop, Bleed, Tilt, Rotate. • **Columns:** Grid Structure, Margin, Gutter, Rule, Header & Footer, Folio, Text, Graphic, Alignment, Indents. • **Impact** • **Other:** Harmony, Vertical, Horizontal, Diagonal, Floating Items, Colour Fills, Fill Effects, Textures, Text Hierarchy. **Being able to identify the following Elements on a variety of Visual Media Layouts.** • **Line** • **Shape**	Take part in a discussion around DTP terms/Features. Have the opportunity to annotate magazine pages with DTP terms/Features. Produce a re-design of a magazine page.

	• **Size** • **Texture** • **Colour** **Being able to use those Elements to create the following Principles for a variety of Visual Media Layouts.** • **White space** • **Balance:** Symmetrical, Asymmetrical, Radial. • **Contrast:** Colour, Size, Shape, Line, Font, Text Style. • **Alignment** • **Unity** • **Depth** • **Rhythm** **Using the following features in InDesign and Illustrator Desk Top Publishing (DTP) Software for "Print Ready"* Visual Media Layouts:** • Document Labelling & Filing • Document Setup • Page setup • Grid Structure • Use & labelling of Layers • Use of DTP Features • CMYK / RGB / Pantone ***Refers to Web Media as well as Print Media**	

Sequencing Order: 2
Level: 3 (TCH 3-09a and TCH 3-10a)

Topic:	**Developing hand and machine tool skills**	
Sub-Topic:	**Pinball Game**	
Overview:	Create a Pinball Game. Emphasise the need to develop good hand tool and machine tool skills. Emphasise need of health and safety in workshop. Talk about not just getting a finished product but getting a really good product.	
Term	**Knowledge & Skills**	**Experiences**
	Working with Acrylic: Cross filing and draw filing the edges of the acrylic, using a hand file. Polishing edges of acrylic, using wet and dry paper...rough 320 grit and smooth 600 grit. Drilling the Acrylic on the Pillar drill for attaching to top edge of base. Bending acrylic in Vacuum Forming machine, so that it drapes around edge, prior to fixing. Using a pillar drill to make piolet holes to fix acrylic to base. Screwing the acrylic onto the base using screw cups, screws and a screwdriver. **Working with Multiply:** Mark out the base using a compass, rule and engineers square. Cut the shape cutting a combination of a Tenon saw and coping saw. Smooth to shape on the bandfacer. Decide on a design for the face. Mark out the scoring zones with engineers square and rule. Use the pillar drill for drilling scoring zones. Use 20mm panel pins to complete the scoring zones. Mark out the slot, on the small piece of multiply, for small piece of acrylic using engineers square and marking gauge. Mark out hole for 'Pinger' using engineers square. Cut slot using coping saw.	Watch demonstrations. Evaluate Progress. Produce a Pinball game. Have the opportunity to develop good hand tool skills.

	Drill hole dia 10.5mm using pillar drill and machine vice. Use PVA glue to attach small piece of multiply and base together. It can set in the bench vice. **Working with Metal:** Aluminium chosen as it doesn't rust and is light weight, for making the 'Pinger'. Dia 10 thread the end of the bar M10, use a M10 die and die stock, cutting compound. (You need about 10mm threaded at one end) Drilling (the opposite end) on the pillar drill for the small handle piece to fit through. Flare the end of the small piece with a hammer and metal block. Thread through hole and flare the other end. This can be called assembly.	

Sequencing Order: 3
Level: 3 (TCH 3 - 11a)

Topic:	**Computer Aided Modelling (CAD)**	
Sub-Topic:	**Basics of Computer Aided Modelling (CAD)**	
Overview:	Understanding Computer Aided Modelling (CAD) to be able to create a variety of CAD Models in Inventor.	
Term	**Knowledge & Skills**	**Experiences**
	Being able to identify and use the following Computer Aided Modelling (CAD) Commands, Generic Terms & Features: • Creating a Part • Assembly of Parts • Adding Textures, Materials & Colours • Rendering & Lighting • Creating Production Drawings **Creating a Part: Need to be able to identify and use the following in CAD software.** • Modelling Tree • Pan, Rotate, Work plane, offset. • 2D & 3D Sketching: 2D Sketch, Profile, Sketch Plane, Sketch tools: Line, Circle, Arc, Rectangle, Trim, Copy, Zoom, Scale, Pattern Fill, Chamfer, Fillet. • 3D Modelling; Extrude, Revolve, Extrude Subtract, Loft • 3D Modelling Edits; Shell, Fillet, Chamfer, Array (Rectangular, Box & Radial), Mirror **Assembly of Parts: Need to be able to identify and use the following in CAD software.** • Align, Mate, Orientate, Centre Axis **Adding Textures, Materials & Colours: Need to be able to choose and use the following in CAD software.**	Watch demonstrations. Produce the parts of the Stool on Inventor. Produce the assembled model of the Stool. Produce the Production Drawings. Have the opportunity to personalise stool top.

	• Suitable & Realistic Textures, Materials & Colours for 3D Model **Rendering & Lighting: Need to be able to choose and use the following in CAD software.** • Global Illumination • Reflection • Shadows • Rendering (& Transparent Background) **Creating Production Drawings: Need to be able to identify and use the following in CAD software.** • Creating a Drawing Template with Title Block • Creating three views; Elevation, End Elevation, Plan • Creating additional views; Section, Detail & Pictorial. • Creating an Exploded view with parts list and labels • Use British Standard Conventions	

Sequencing Order: 4
Level: 3 (TCH 3-10a)

Topic:	**Developing hand and machine tool skills**	
Sub-Topic:	**Wooden Stool**	
Overview:	Create a wooden stool. Emphasise the need to continue to develop good hand tool and machine tool skills. Emphasise need of health and safety in workshop. Increase the need for accuracy.	
Term	**Knowledge & Skills**	**Experiences**
	Working with wood: Make sure all material is safe-splinter free-using glass paper. Start on short rails, mark out for rebate/lap joint using rule, engineers square and marking gauge. Both short ends should be marked out together, to make them the same. Mark waste wood with pencil, (this shows where to cut) before using marking knife to mark down saw line. Saw down line with a sawing board (bench hook)and tenon saw at both ends before sawing down the thickness of the joint again at both ends. Repeat cutting on second short rail. Long rails…remember to factor in the thickness of the rebate, on the short rails. Mark out the rebates/lap joint using rule, engineers square and marking gauge. Mark both long rails together to make them the same. Mark waste as above and cut as above. Join legs to short rail-(dry without glue) using rule and engineers square mark where the screw holes are going to be on short rail.(2 at each end) Drill on Pillar Drill /Pedestal Drill. Countersink holes with hand countersink bit or on Pillar Drill with slightly larger drill. Pilot hole on legs with either a small drill in a hand drill or a bradawl.	Watch demonstrations. Evaluate progress. Have the opportunity to personalise aspects of the stool. Produce the Stool.

	Use a screwdriver, screw cup and screw to attach short rail to leg. Use the bench vice to hold the work steady. Repeat until you have two short frames.(Short rails with the legs attached) Use engineers square to check for square. Leg to rail. Unscrew and glue if square. (PVA glue) Follow through the same procedure to attach long rails to short frames. Remember to offset screws. Dry without glue first. Check frame for square before gluing. Use checking the diagonal method. Glue if square. Use square fillet (square shaped wood) to increase surface area on frame for top. Cut into 4 pieces and use PVA glue and masking tape to secure to frame.(1 piece on each rail) Cut and decorate top as desired using the most suitable tools for manufacture. Sand smooth using glass paper. Attach top and legs together using quick release clamps without glue to check fit. Apply glue and re clamp. Finish as required…paint, varnish etc.	

Sequencing Order: 5
Level: 3 (TCH 3 - 11a)

Topic:	**Sketching & Illustration Techniques**	
Sub-Topic:	**Basics of Skills in applying Manual or Electronic Sketching Techniques** **Basics of applying Manual or Electronic Illustration Techniques** **British Standards Conventions**	
Overview:	Understanding given Sketching & Illustration Techniques, mixed media and British Standard Conventions and how / where to use them to create effective and informative graphic communications	
Term	**Knowledge & Skills**	**Experiences**
	Developing Skills in Applying Manual or Electronic Sketching Techniques in the following: • Proportion & Scale • Line Quality: Construction, Dimension & Outline • One Point & Two Point Perspective: Horizon line, Vanishing Point (s) • Orthographic Views: Elevation, Plan, End Elevation, Section & Detail. • Use of Geometric Forms to represent real life objects **Be able to produce Geometric Forms And Shapes to represent real life objects:** • Squares • Rectangles • Circles • Hexagons • Cylinders • Single or Partial Cuts to above shapes/ forms • Parts based on above shapes / forms (components) • Assembled parts of above.	Watch demonstrations. Have the opportunity to practice freehand sketching techniques. Produce full Orthographic sketching layouts. Evaluate progress.

	Be able to select 2D, 3D and Pictorial views to produce the following: • Orthographic projection using Third Angle Projection of above forms & shapes and everyday objects. • Surface Developments • Sectional Views • Assembly Drawings • Exploded Isometric Views: minimum of three parts & layout • Pictorial Views: One Point & Two Point Perspective, • Pictorial Views: Isometric & Oblique **Developing Skills in Applying Manual or Electronic Illustration Techniques in the following:** • Light • Shade • Shadow • Reflection • Tone • Gradient • Material • Texture • Layout **Be able to know, understand, identify and apply Drawing Standards, Protocols and Conventions, with regard to the following:** • Line Types: Outline, Projection, Dimension, Centre, Hidden Detail, Cutting Plane & Fold • Dimensioning: Linear, Parallel, Radial, Diameter, Square, Across Flats, Across Corners. • Building Construction Symbols & Conventions • Drawing Symbols & Conventions • Section & Hatching Conventions	

	• Third Angle Projection Symbol & System • Scale	

S3 Design & Technology

Sequencing Order: 1
Level: 4 (TCH 4-09a and TCH 4-10a)

Topic:	**Continuing to develop hand and machine tool skills with Wood.**	
Sub-Topic:	**Clock**	
Overview:	Create a wooden clock. Emphasise the need to continue to develop good hand tool and machine tool skills. Emphasise need of health and safety in workshop. Increase the need for accuracy.	
Term	**Knowledge & Skills**	**Experiences**
	Working with wood: Make sure all material is safe-splinter free-using glass paper. **CARCASE** Start on sides. Mark out both sides together…to get a matching pair. Mark out lap/rebate joint at top….using engineers square, rule and marking gauge. Mark waste wood with pencil. Use marking knife to score line before cutting. Use tenon saw and sawing board/bench hook and saw down joint thickness. Use bench vice to support and saw down joint depth….this will remove the waste. Do the same at the other side. Mark position for 'shelf'. Use engineers square and rule. This will be a stopped housing. Measure on stop at front and then mark depth of joint at back…use a marking gauge. Use the 'dog' system to hold wood securely to bench. Use marking knife before cutting joint. Make sure waste wood is marked. Removed a small amount of the waste at the stopped end with a bevelled edge	Watch demonstrations. Produce the practice joints for the clock. Produce the clock. Have the opportunity to personalise aspects of the clock. Evaluate progress. Carry out the fitting of a clock movement.

	chisel to allow the tenon saw to cut neatly without marking the material. Important 3 main safety rules for using chisels…these must be adhered to at all times. 1. Always make sure your work is secure ('dogs', bench vice or clamp) 2. Never chisel towards yourself. (always turn your work round) 3. Both hands behind the cutting edge at all times. (Using a mallet with one hand means this must happen) Saw down edge of joint with a tenon saw. Use bevel edged chisel, to remove most of the waste. Flatten base of joint with a hand router. Use this housing to mark the **stop** part of the joint. Cut the stop with the tenon saw, secure work in vice. Adjust and fit joint where necessary. Mark curves, at base of clock (a roll of masking tape is useful for this). Cut curves with a coping saw, secure in bench vice. Smooth curves to line on bandfacer. Important safety rules for using the bandfacer. 1.Only one person to use the bandfacer at a time. 2.Only one person in the machine box at any time. 3. Guard must be in a suitable position for the work being carried out. 4.Hand should be well away from the abrasive belt. Use glass paper to finish curves.	

	Cut and attach fillet to secure face. Tenon saw, sawing board/bench hook, bandfacer, PVA glue and masking tape. Try clock carcase DRY. (DRY Clamp) Emphasise why we do this…we need to check all the parts fit together and we need to check that it is square…use a Try Square/Engineers Square, rod and Sash Cramps/Quick release clamps. Use PVA to glue once happy with dry clamp. Emphasise the clamps keep pressure on the joints and need to be left on for a period of time. (At least a few hours!) CARCASE COMPLETE. Make the face fit the space designed for it. Use a finger gauge and the bandfacer until it neatly just falls in. Draw in the diagonals to mark the centre…on the face. Drill in centre on Pillar Drill to suit the movement spindle. Important safety rules when using the Pillar Drill. 1. One person to use the Pillar Drill at a time. 2. Make sure the drill bit is secure in the Jacobs chuck. 3. Make sure the table is secure. 4. Make sure the chuck key is removed 5. Long hair is tied up. 6. Use a machine vice where necessary or keep a tight hold.	

	If the face is to be painted it should be done at this stage. Sand down well with rough glass paper, then finer to produce an even, smooth finish to apply the paint. Poster paints are best as they are bright and cheerful. A small amount of glue can be added to the paint to make it stick better to the face and produce a nice gloss finish. Use PVA glue to stick face onto clock carcase. Design top piece. Cut top piece using coping saw. Finish using suitable files and glass paper. Attach to clock carcase. The clock manufacture is now complete but needs a good clean up before a finish can be applied. Emphasise the need to spend time at this stage, and it will take time, getting all the pencil marks off….use rough glass paper to do this. Follow the direct of the grain (or it will scratch). Follow this a smoother paper to make sure that the surface is flat and smooth. A damp paper towel should be used to remove the dust and raise the grain of the wood. Water based varnish…apply a thin coat in the direct of the grain. Apply with a brush…only a very small amount on the brush….wash the brush with water….allow to dry. Use very smooth/fine glass paper…flour paper to rub down gently before applying another thin coat of varnish…this smooths down the surface. Clean the brush and allow to dry. Fit the clock movement.	

Sequencing Order: 2
Level: 4 (TCH 4 - 11a)

Topic:	**Desk Top Publishing (DTP)**	
Sub-Topic:	**Basics of Principles & Elements and DTP Terms: Glossary & Magazine Analysis & Page Creation**	
Overview:	Understanding given Principles & Elements and DTP terms. Analysing given / chosen magazine pages to identify the stated Principles and Elements and DTP terms. Create redesigned page in ~ Illustrator. Justify and Evaluate Final Product.	
Term	**Knowledge & Skills**	**Experiences**
	Being able to identify the following DTP Terms / Features for, and develop skills to be able to apply to, a variety of Visual Media Layouts. • **Dominance:** Size, Weight/Mass, Value, Colour. • **Emphasis;** Drop shadow, Drop Capital, Initial, Heading/Title, Sub Heading, Flash Bar, Transparency, Line, Pull Quote. • **Font Styles:** Script, Fun, Futuristic, Modern, Heavy, Light. • **Typeface: Serif, Sans Serif.** • **Text Styles:** Italics, Bold, Justification (Left, Right, Centred, Justified), Reverse Text, Text Wrap, Flow Text along a Path. • **Orientation:** Portrait, Landscape. • **Graphic:** Photo, Image, Sketch, Caption, Crop, Bleed, Tilt, Rotate. • **Columns:** Grid Structure, Margin, Gutter, Rule, Header & Footer, Folio, Text, Graphic, Alignment, Indents. • **Impact** • **Other:** Harmony, Vertical, Horizontal, Diagonal, Floating Items, Colour Fills, Fill Effects, Textures, Text Hierarchy. **Being able to identify the following Elements on a variety of Visual Media Layouts.** • Line • Shape • Size • Texture • Value	Take part in a discussion around DTP terms/Features. Have the opportunity to annotate magazine pages with DTP terms/Features. Produce a re-design of a magazine page. Create own design Magazine page

	• Colour • Mass/weight **Being able to use those Elements to create the following Principles for a variety of Visual Media Layouts.** • **White space** • **Balance:** Symmetrical, Asymmetrical, Radial. • **Contrast:** Colour, Size, Shape, Line, Font, Text Style. • **Alignment** • **Unity** • **Depth** • **Rhythm** Using the following features in InDesign and Illustrator Desk Top Publishing (DTP) Software for "Print Ready"* Visual Media Layouts: • Document Labelling & Filing • Document Setup • Page setup • Grid Structure • Use & labelling of Layers • Use of DTP Features • CMYK / RGB / Pantone ***Refers to Web Media as well as Print Media**	

Sequencing Order: 3
Level: 4 (TCH4-09a, TCH 4-10a)

Topic:	**Developing good hand tool and machine tool skills with Metal.**	
Sub-Topic:	**Ear bud winder and Engineers Square**	
Overview:	Create an Earbud winder and an Engineers Square. Emphasise the need to develop good hand tool and machine tool skills on metal. Emphasise need of health and safety in workshop. Increase the need for accuracy. (Good marking out is mandatory in this project.) Students will work between the Ear bud Winder and the Engineers Square to ease 'bottle necks' and aid with good classroom management.	
Term	**Knowledge & Skills**	**Experiences**
	Ear bud Winder: Make sure material is safe to handle…file and emery cloth. Square metal with a file…use engineers square to check for square. Use rule, odd leg calipers, scriber, engineers square and spring bow dividers to mark out shape. Centre Punch holes, with centre punch and Ballpein Hammer. Drill holes on Pillar Drill. Use machine vice to hold material. Important safety rules when using the Pillar Drill. 1. One person to use the Pillar Drill at a time. 2. Make sure the drill bit is secure in the Jacobs chuck.	Watch demonstrations. Produce an ear bud winder. Produce a practice riveting piece. Produce an Engineers Square. Evaluate progress.

	3. Make sure the table is secure. 4. Make sure the chuck key is removed 5. Long hair is tied up. 6. Use a machine vice where necessary or keep a tight hold. Holes must be drilled before any cutting takes place for safety reasons. Use a framed hacksaw to cut the sloping edges and the straight ones. Use a hand file to Cross file the shape to the line. Use a hand file to Draw file smooth. Finish with emery cloth then wet and dry. Make sure all burrs are removed. **Engineers Square:** Make sure material is safe to handle…file and emery cloth. Square metal with a file…use engineers square to check for square. Mark out holes on handle for rivets. (one piece only) Use rule, odd leg calipers, engineers square. Centre punch holes with a centre punch and Ballpein Hammer. Drill hole for rivets. (Diameter 3.5) Countersink for head of rivet. Use larger twist drill or countersink bit) Important safety rules when using the Pillar Drill. 1.One person to use the Pillar Drill at a time. 2.Make sure the drill bit is secure in the Jacobs chuck. 3.Make sure the table is secure. 4.Make sure the chuck key is removed 5.Long hair is tied up.	

	6.Use a machine vice where necessary or keep a tight hold. On blade pieces check these are totally square. These are ready to Braze. Process for Brazing. (There is a jig available to hold the metal securely.) 1. Ensure metal is clean and free from rust and grease. (Dirty metal will not braze). Use a hand file and emery cloth. 2.Apply flux to the joint. (The flux can be mixed with water to make it easier to apply.) The flux stops any contamination from the air and helps the braze to flow. 3.Heat the metal until it's bright red. Remember to use the torch correctly (GAGA) Gas, Air and when finished switch them off Gas Air again. 4.Apply the brazing rod. 5.Allow to cool naturally. (Cooling to quick will make the joint brittle and it could come apart.) Important safety rules when using the Brazing Hearth. 1. Make sure the extractor is on. (This takes all the fumes that build up when brazing to the outside.) 2. Make sure you wear the correct PPE (full face mask, leather apron, gloves. You also need to wear suitable footwear mesh type trainers can catch fire.) 3. One person at a time...no distractions. 4. Use the tongs to hold hot metal. 5. Make sure you understand fully what you have been asked to do...ask if unsure. Clean work after Brazing to remove all the excess rod and heat blackening. Hand file and emery cloth. Use a hand vice to hold the blade (now one part) and the two parts of the handle together.	

	Use the Pillar drill to drill through the middle hole from the top, straight through the blade and into the bottom handle piece. Only drill this hole or your rivets might not fit. (Alignment issues!) Countersink the back of this hole, with a larger drill or a countersink bit on the Pillar drill. Rivet this hole. Use a countersink head rivet to suit countersink. Process for riveting: **1.** Make sure rivet is correct length. Cut using rivet cutters or junior hacksaw, if necessary. Rivets that are too long will bend and look unsightly. **2.** Use a rivet set and snap to 'set' the rivet. **3.** Use a ball pein hammer and the ballpein end to start to form the rivet into the countersink. **4.** Finish neatly with the flat head of the ballpein hammer. Fill up all the countersink. **5.** Draw file flat with the surface of the handle. Use a hand file. Repeat this for the top hole and the bottom hole. Tidy up the engineers square with cross filing and draw filing. Make sure the engineers square is square...use a engineers square. Oil to give some protection from rust	

Sequencing Order: 4
Level: 4 (TCH 4 - 11a)

Topic:	**Computer Aided Modelling (CAD)**	
Sub-Topic:	**Basics of Computer Aided Modelling (CAD)**	
Overview:	Understanding Computer Aided Modelling (CAD) to be able to create a variety of CAD Models in Inventor.	
Term	**Knowledge & Skills**	**Experiences**
	Being able to identify and use the following Computer Aided Modelling (CAD) Commands, Generic Terms & Features: • Creating a Part • Assembly of Parts • Adding Textures, Materials & Colours • Rendering & Lighting • Creating Production Drawings **Creating a Part: Need to be able to identify and apply the following Commands & Features in CAD software.** • Modelling Tree • Pan, Rotate, Work plane, offset. • 2D & 3D Sketching: 2D Sketch, Profile, Sketch Plane, Sketch tools: Line, Circle, Arc, Rectangle, Trim, Copy, Zoom, Scale, Pattern Fill, Chamfer, Fillet. • 3D Modelling: Extrude, Revolve, Extrude Subtract, Loft, Axis • 3D Modelling Edits; Shell, Fillet, Chamfer, Array (Rectangular, Box & Radial), Mirror **Assembly of Parts: Need to be able to identify and apply the following in CAD software.** • Align, Mate, Centre Axis, Orientate • CAD Libraries	Watch demonstrations. Produce a given object.

	Adding Textures, Materials & Colours: Need to be able to choose and apply the following in CAD software. • Suitable & Realistic Textures, Materials & Colours for 3D Model • Decals **Rendering & Lighting: Need to be able to choose and apply the following in CAD software.** • Global Illumination • Focused Illumination • Reflection • Shadows • Solid Rendering & Transparent Background **Creating Production Drawings: Need to be able to identify and apply the following in CAD software.** • Creating a Drawing Template with Title Block • Creating three views; Elevation, End Elevation, Plan • Creating additional views; Section, Detail & Pictorial. • Creating an Exploded view with parts list and labels • Use British Standard Conventions **Knowledge and Understanding of:** • Use & Function of CAD Libraries • Describing Processes and Generic CAD commands • Computer Systems File Management • Digital Input & Output Devices • Advantages of CAD • Disadvantages of CAD	Develop a Render Create a CAD Drawing