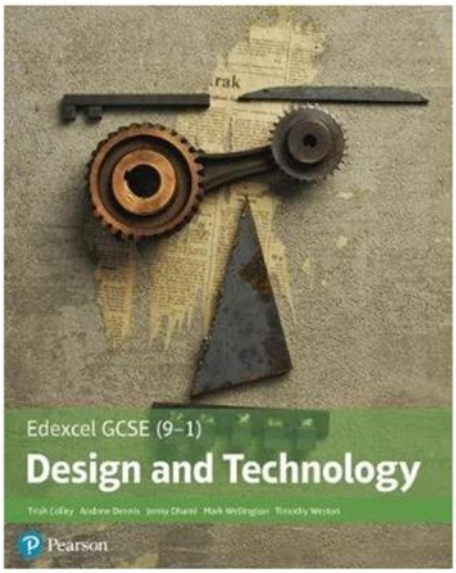
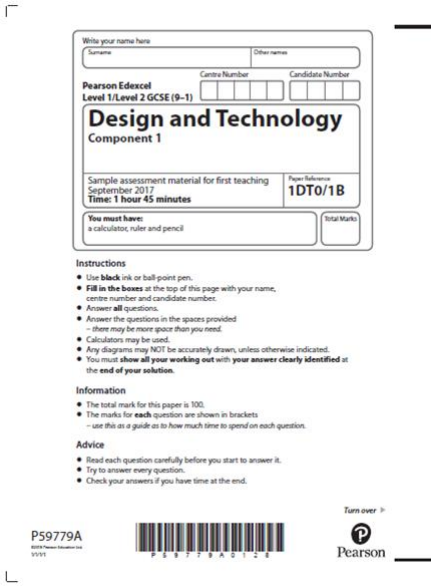


Design & Technology Year 9 Home Study

GCSE Edexcel Design & Technology



Write your name here

Surname | Other names

Centre Number | Candidate Number

Pearson Edexcel
Level 1/Level 2 GCSE (9–1)

Design and Technology
Component 1

Sample assessment material for first teaching
September 2017
Time: 1 hour 45 minutes

Paper Reference
1DT0/1B

You must have:
a calculator, ruler and pencil

Total Marks

Instructions

- Use **black** ink or ball-point pen.
- **Fill in the boxes** at the top of this page with your name, centre number and candidate number.
- Answer **all** questions.
- Answer the questions in the spaces provided – *there may be more space than you need.*
- Calculators may be used.
- Any diagrams may NOT be accurately drawn, unless otherwise indicated.
- You must **show all your working out** with **your answer clearly identified** at the **end of your solution.**

Information

- The total mark for this paper is 100.
- The marks for **each** question are shown in brackets – *use this as a guide as to how much time to spend on each question.*

Advice

- Read each question carefully before you start to answer it.
- Try to answer every question.
- Check your answers if you have time at the end.

Turn over

P59779A

Pearson

Tasks to Complete

This booklet has been designed for our Design & Technology studies. All tasks set are related to the work you would be completing if you were in class. However, this half term we will be spending some time in the workshops so your lessons may not run in the same order as below. Try to look for the topic you were looking at last lesson as your starting point.

Week Beginning	Lesson Content	Tasks to complete
Week 1	Health & Safety, Recalling timber knowledge.	1, 2 & 3
Week 2	Design tasks.	4 & 5.
Week 3	Using the Pillar drill safely	6
Week 4	Polymers and plastics	7 & 8
Week 5	Polymers you need to know for Section A.	9 & 10
Week 6	Design task and using the line bender safely.	11 & 12

Timbers Module

Task 1. Produce a poster about health and safety in the workshops. **Remember things like wearing goggles and aprons. No running. Where tools and equipment should be stored.**

Task 2. Create a fact file about Wood. Use the information provided below for a starting point about wood**.** You need to ensure that your work is interesting to look at (not like the information below!) Use diagrams, colour and labels to make your work stand out. You can add further facts that are not on the sheet if you know any!

WOOD

Q+A

Where does wood come from?

Trees

List 5 products made from wood.

Building construction, furniture, toys, doors, floors, sculptures, boxes, kitchen utensils.

Name 5 different types of wood.

Mahogany, beech, pine, teak, oak, ash, balsa.

Give 3 reasons why wood is used:

Aesthetically pleasing: a wide variety of grains and colours, easy to use, durable.

Natural wood are divided into hardwoods and softwoods. This is not a physical classification as some hardwoods are soft to work with.

Softwoods grow quickly and reach maturity in around 30 years. This means they can be replaced at a faster rate than hardwoods which are slow growing and can take much longer to replace.

What impact does cutting down trees have on the environment?

Deforestation threatens wildlife by removing their natural habitat, causes soil erosion which can lead to drought. Trees remove carbon dioxide from the atmosphere and so can decrease the effects of human air pollution.

Social impact of trees.

Write a short paragraph about how trees improve the quality of our daily lives.

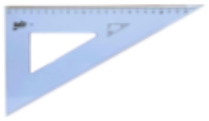
Imagine a world without trees and describe what you think it would be like.

Task 3. Produce a table like the one below, sketch each image carefully. Write the correct name for each tool then write a sentence to explain what you used the tool for in the workshop. If you do not have access to a printer try to sketch each picture onto plain paper and write a sentence about each.

Design & Technology: Tools

- Match the correct names to the tools below.
- Write a sentence to explain what you used the tool for in the workshop..

PVA Glue, Scissors, Coping Saw, Junior Hacksaw, Pencil, Glass Paper / Sanding Board, File, Ruler, 30/60 Set Square, Pillar Drill.

Tool	Name	Explanation
		
		
		
		
		
		
		
		
		
		

Task 4. Use the mood board below to develop a design idea inspired by nature. You can choose the product type, it could be a lamp, a chair, a piece of furniture or something of your own choice.

1. Draw your design on an A4 piece of paper, it must be in full colour with labels.

Include the material/s the design would/could be made from, how it could be made, the size of the product and the links to biomimicry. You may need to look up what biomimicry means.

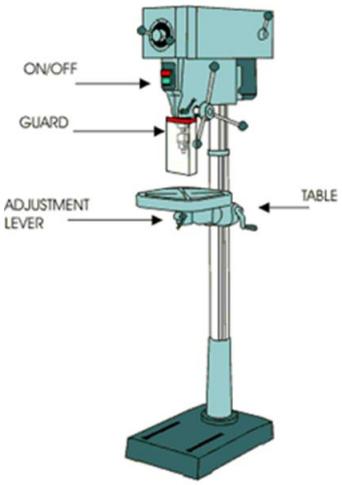
2. Design a poster to advertise your product. It must be eye catching and appealing. It should include a slogan and a price for the item. Colour must be used.

Task 5. Design Brief. You need to design a desk tidy. The desk tidy must:

- Provide a space for 40 business card that allows each card to be easily removed
- Hold a pencil securely
- Have a stable base that does not damage the desk surface.

On A4 paper sketch out a range of quick ideas to show what you think your design solution would look like. Add annotations to your most suitable design to explain how it meets each of these requirements.

Task 6. In this project you need to be able to use the pillar drill safely.



To show your understanding of using this equipment complete the following tasks.

1. Produce a diagram with annotations that explain how to use the machine safely.

2. Write a list of instructions for using the machine safely.

3. Design a sign that warns you of a potential hazard when using the machine.

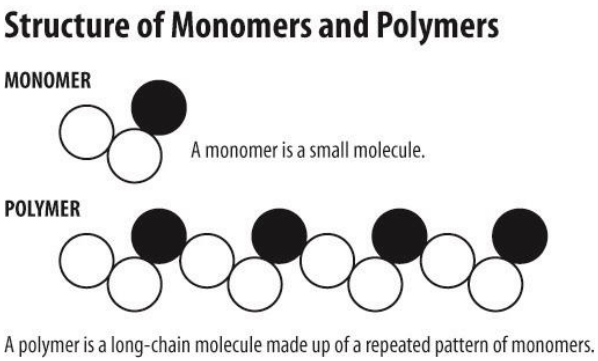
Polymers Module

Task 7. Write down as many different items that you come into contact with on a daily basis that are made from plastic. **Include any products that you use on a daily basis, any food packaging you come into contact with etc.**

Task 8. Create a fact file on plastics. Use the information below about plastics**.** You need to ensure that your work is interesting to look at (not like the information below!) Use diagrams, colour and labels to make your work stand out. You can add further facts that are not on the sheet if you know any!

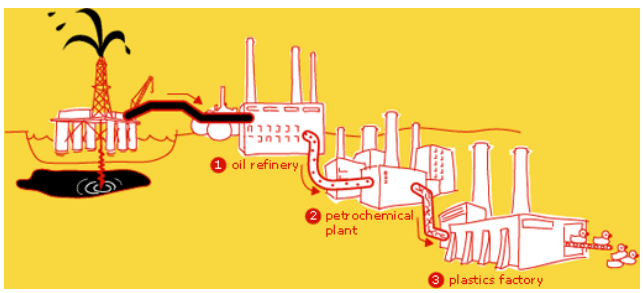
PLASTICS AND POLYMERS

"The key difference between polymers and plastics is that plastic is a specific type of polymer. Plastics are comprised of a long chain of polymers, where polymers are composed of smaller, uniform molecules."



What are polymers?

Polymers are *synthetic* materials, which means that they are artificial, or manufactured. *Synthesis* means that "something is put together," and synthetic materials are made of building blocks that are put together in factories.



Polymers/plastics
Where do they come from?

1. Crude oil, the unprocessed oil that comes out of the ground, contains hundreds of different hydrocarbons, as well as small amounts of other materials. The job of an oil refinery is to separate these materials and also to break down (or "crack) large hydrocarbons into smaller ones.

2. A petrochemical plant receives refined oil containing the small monomers they need and creates polymers through chemical reactions.

3. A plastics factory buys the end products of a petrochemical plant - polymers in the form of resins - introduces additives to modify or obtain desirable properties, then moulds or otherwise forms the final plastic products.

Task 9. Create a further fact file about plastics. There is no hand out for this one. What facts do you know? Again use colour and diagrams.

Task 10. Produce a table like the one below. Use the information below the table to complete it. Ensure that you include in detail each material property and give as end uses as possible.

Polymers

For your exam you need to know the properties and end uses of all of these polymers. Make plenty of notes and revise them thoroughly!

Name of Polymer	Thermoforming polymer/ thermosetting polymer	Properties	End uses
Acrylic (PMMA: Polymethyl methacrylate)			
High Impact Polystyrene (HIPS)			
Biopol			
Polyester resin			
Urea formal-dehyde			

Thermoforming polymer	Form	Properties	Common uses	Advantages/ Disadvantages
Acrylic (PMMA: polymethyl methacrylate)	• Sheets, rods and tubes • Available in a wide range of opaque and translucent colours • Also available in a wide range of sizes	• Tough, easily finished, easily cleaned, food safe and can be easily scratched	• Shop signs, rear car lights, baths, fish tanks and menu holders	• Widely available • Common in the school environment as it is easy to cut and finish to a high standard • Can be shaped using heat • Does not need painting • Breaks easily if dropped
High-impact polystyrene (HIPS)	• Sheets, rods and tubes • Available in a wide range of opaque and translucent colours • Also available in a wide range of sizes	• Lightweight, high stiffness, impact resistant but can be easily scratched	• Toys, television parts and refrigerator linings	• Commonly used for vacuum forming, but can be formed using many techniques • Compared to other polymers it has a low melting point • Becomes brittle when exposed to UV light
Biopol®	• Fibre, granules and sheets	• Lightweight, good electrical insulator, degrades over time when in contact with soil, so can safely be disposed of at landfill sites	• Disposable cups, razors, cutlery and other packaging products, surgical stitches and pins	• Degrades in soil and can be disposed of at landfill sites • Can be injection moulded and vacuum formed • Expensive to produce • Has low resistance to impact (e.g. being dropped or having something dropped onto it)

Thermosetting polymer	Form	Properties	Common uses	Advantages/ Disadvantages
Polyester resin	• Thick liquid for casting and layup • Usually used with a catalyst to harden resin • Can be coloured through use of pigments	• Rigid, brittle, (unless laminated) good electrical and heat insulation, good chemical resistance	• Boat hulls and sports car bodies • Normally formed in conjunction with glass fibre • Can also be cast to form decorative objects	• Can be used with glass fibres (**glass reinforced plastic**) to create lightweight and very strong products • Can be polished to a high finish • Can chip if dropped
Urea formaldehyde	• Powder, granules, preforms	• Rigid, hard, brittle, heat resistant, excellent electrical insulation	• Electrical fittings – plugs, sockets and switches • Used as an adhesive in man-made boards	• Can be coloured using pigments • Can break if dropped

Task 11. Use the mood board below to develop a design idea inspired by space. You can choose the product type, it could be a lamp, a chair, a piece of furniture or something of your own choice.

1. Draw your design on an A4 piece of paper, it must be in full colour with labels.

Include the material/s the design would/could be made from, how it could be made, the size of the product and the links to the space theme.

2. Design a poster to advertise your product. It must be eye catching and appealing. It should include a slogan and a price for the item. Colour must be used.

Task 12. In this project you need to be able to use the **line bender/strip heater**.
To show your understanding of using this equipment complete **ONE** of the following tasks.

1. Produce a diagram with annotations that explain how to use the machine safely.

2. Write a list of instructions for using the machine safely.

3. Design a sign that warns you of a potential hazard when using the machine.