




Unit = Year 10/11 Hodder Core Principals	Road Map					
In this unit you will learn the Core Principles content of the exam specification	Assessment Grades					
Themes	Learning Goals/Outcomes/Content					
Lesson 1: Knowledge focus: What are common materials and their working properties? (1)	Materials and their working properties 1 Learning objectives Know and understand physical properties of materials such as: absorbency (resistance to moisture) density fusibility electrical and thermal conductivity.					
Lesson 2: Knowledge focus: What are common materials and their working properties? (2)	Materials and their working properties 2 Learning objectives Know and understand the following working properties of materials: strength hardness toughness malleability ductility elasticity.					
Lesson 3: Knowledge focus: What are common papers and boards and their properties?	Papers and boards Learning objectives Know the primary sources of materials for producing papers and boards. Be able to recognise and characterise different types of papers and boards. Understand how the physical and working properties of a range of paper and board products affect their performance.					
Lesson 4: Knowledge focus: What are common natural and manufactured timbers?	Natural and manufactured timbers Learning objectives Explain the different classifications of natural timber. Explain the properties and uses of a variety of softwoods. Explain the properties and uses of a variety of hardwoods. Explain the different classifications of manufactured timber. Explain the properties and uses of a variety of manufactured boards. Explain the advantages and disadvantages of using natural and manufactured timber.					
Lesson 5: Knowledge focus: What are common metals and alloys?	Metals and alloys Learning objectives Explain the different classifications of metals. Explain the properties and uses of a variety of ferrous metals. Explain the properties and uses of a variety of non-ferrous metals. Define a ferrous and a non-ferrous alloy. Explain the properties and uses of a variety of ferrous alloys. Explain the properties and uses of a variety of non-ferrous alloys.					
Lesson 6: Knowledge focus: What are common polymers?	Polymers Learning objectives Understand the different classifications of polymers. Explain the properties and uses of a variety of thermoforming polymers. Explain the properties and uses of a variety of thermosetting polymers.					

	Understand how additives can alter the mechanical and physical properties of polymers.			
Lesson 7: Knowledge focus: What are common textiles?	Textiles Learning objectives Be able to list the main categories and types of textiles. Be able to give examples of fibres and fabrics in each category. Understand the physical and working properties of each category. Be able to identify products that different fibres/fabrics could be used for.			
Lesson 8: Knowledge focus: What are common modern materials?	Modern materials Learning objectives Understand about the invention of new materials such as graphene, metal foams and titanium. Understand the properties of these materials and why this helps with their selection. Understand how materials can be altered to specific applications.			
Lesson 9: Knowledge focus: What are common smart materials?	Smart materials Learning objectives Understand how a smart material works. Know what thermochromic pigments are and how they work. Know what photochromic pigments are and how they work. Know what shape memory alloys are and how they work			
Lesson 10: Knowledge focus: What are common composites?	Composites In this lesson students will learn about composite materials and how they can improve the properties of the material. Learning objectives Understand how new materials can be created by combining two or more materials. Recognise a range of composite materials.			
Lesson 11: Knowledge focus: What are common technical textiles?	Technical textiles Learning objectives Explain what is meant by the term technical textiles. Explain how conductive fabrics are produced. Give examples of uses of fire resistant fabrics and state their properties. State the properties of Kevlar® and give example applications. Explain how microfibres incorporate micro encapsulation.			
Lesson 12: Knowledge focus: New and emerging technologies: What is the role of industry and enterprise?	New and emerging technologies: industry and enterprise Learning objectives Understand how new and emerging technologies have impacted on the design and organisation of the workplace (including automation and the use of robotics). Understand how new and emerging technologies affect where we work. Understand the tools and equipment we use and how it has been affected by technology. Describe enterprise that has developed as a result of business innovation (for example, crowd funding, virtual marketing and retail, co-operatives and fair trade.			
Lesson 13: Knowledge focus: New and emerging technologies: What are the role of people, culture and society?	New and emerging technologies: people, culture and society Learning objectives Understand how technology push/market pull affects choice. Know the changing job roles due to the emergence of new ways of working driven by technological change. Understand changes in fashion and trends in relation to new and emergent technologies. Understand the importance of respecting people of different faiths and beliefs.			

	Know how products are designed and made to avoid having a negative impact on others, including design for disabled, the elderly and different religious groups.			
Lesson 14: Knowledge focus: New and emerging technologies: What are the role of sustainability and the environment?	New and emerging technologies: sustainability and the environment Learning objectives: Explain the impact that resource consumption has on the environment. Understand the effects that waste disposal has on the environment and state more sustainable alternatives to landfill that make use of new technologies. Understand that developing new products can contribute to pollution and global warming. Explain how continuous improvement of products and efficient working can reduce the environmental impact of a product on the environment.			
Lesson 15: Knowledge focus: New and emerging technologies: What are the role of production techniques?	New and emerging technologies: production techniques Learning objectives: Know and understand the contemporary and potential future use of: automation computer-aided design (CAD) and computer-aided manufacture (CAM) flexible manufacturing systems (FMS) just in time (JIT) lean manufacturing.			
Lesson 16: Knowledge focus: Critical evaluation of new and emerging technologies	Critical evaluation of new and emerging technologies This lesson draws together learning on new and emerging technologies in the previous four lessons to critically evaluate new and emerging technologies and how they inform design decisions from different perspectives. Learning objectives Know how new and emerging technologies can inform design decisions in relation to: planned obsolescence design for maintenance ethics the environment			
Lesson 17: Knowledge focus: Energy generation: fossil fuels	Energy generation: fossil fuels In this lesson students will learn about how power is generated from coal, gas and oil. Learning objectives Explain how power is generated from coal, gas and oil. Understand the environmental impact of power generation from fossil fuels. Explain the arguments for and against the selection of fossil fuels.			
Lesson 18: Knowledge focus: Energy generation: nuclear power	Energy generation: nuclear power In this lesson students will learn about how nuclear power is generated and the arguments for and against nuclear power generation. Learning objectives Explain how nuclear power is generated. Understand how nuclear power generation can impact the environment. Understand how nuclear power generation can impact on human health. Explain the arguments for nuclear power generation.			
Lesson 19: Knowledge focus:	Energy generation: renewable energy Learning objectives			

<p>Energy generation: renewable energy</p>	<p>Understand how energy can be generated from wind power.  Understand how energy can be generated from solar power.  Understand how energy can be generated from tidal power.  Understand how energy can be generated from hydro-electric sources.  Understand how biomass can be used to generate energy.  Explain the arguments for and against the selection of renewable power.</p>			
<p>Lesson 20:  Knowledge focus:  Energy generation: energy storage systems.</p>	<p>Energy generation: energy storage systems.  Learning objectives  Understand how kinetic energy can be stored ready for use.  Understand what alkaline batteries are and how they can be used for energy storage.  Understand what re-chargeable batteries are and how they can be used for energy storage.</p>			
<p>Lesson 21:  Knowledge focus:  Systems approach to designing 1: inputs and outputs</p>	<p>Systems approach to designing 1: inputs and outputs  Learning objectives  Understand the basic principles of an electronic system.  Know how to use systems diagrams.  Know the names of input devices, what they are used for and how they work.  Know the names of output devices, what they are used for and how they work.</p>			
<p>Lesson 22:  Knowledge focus:  Systems approach to designing 2: processes and microcontrollers</p>	<p>Systems approach to designing 2: processes and microcontrollers  In this lesson students will learn about how programming microcontrollers provides functionality to products and processes.  Learning objectives  Know how programming microcontrollers as counters, timers and for decision making can provide functionality to products and processes.</p>			
<p>Lesson 23:  Knowledge focus:  Types of movement, levers and linkages</p>	<p>Types of movement, levers and linkages  Learning objectives  Know the different types of movement and be able to give examples of products that use them.  Know what levers are and what they do.  Know the different orders of lever.  Know what linkages are and what they do.  Know how to convert one type of motion to another.</p>			
<p>Lesson 24:  Knowledge focus:  Rotary systems</p>	<p>Rotary systems  Learning objectives  Know how a cam and follower works and understand that it converts rotary motion into reciprocating motion.  Know how simple gear trains work and understand that it transmits rotary motion and torque.  Be able to calculate the velocity ratio of a simple gear train.  Know how pulleys and belts work and understand that they transmit rotary motion to rotary motion.  <ul style="list-style-type: none"> <li>Be able to calculate the velocity ratio of pulleys and belts.</li> </ul> </p>			