KS4 Constructing the built environment Knowledge organiser

1.1 The Construction sector

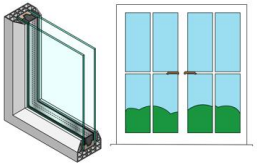
- buildings and structures
- infrastructure and civil engineering products
- building services engineering
- professional and managerial roles and responsibilities associated with the built environment sector.

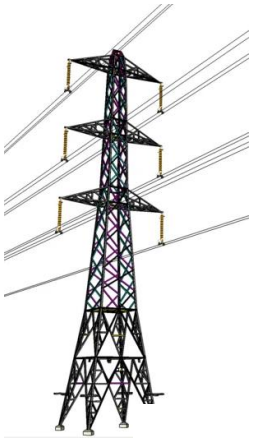
1.1.1. Buildings and structures	• Name the 2 main types of buildings. • What are the 4 types of Residential buildings? • List 3 different Non-Residential buildings • Name 4 typical components of a building? • Houses connected in a row are known as….
1.1.2. Infrastructure and civil engineering products	• Name 3 components of a cities Infrastructure. • Explain the function of the Electrical Grid. • Why do roads require maintenance? • What is the function of a Bridge? • What benefit do railways offer over roads?



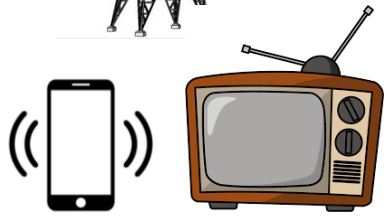








KS4 Constructing the built environment Knowledge organiser

1.1 The Construction sector

- buildings and structures
- infrastructure and civil engineering products
- building services engineering
- professional and managerial roles and responsibilities associated with the built environment sector.

1.1.3. Building services engineering	• What are the 3 categories of building services? • Name 3 products that would be part of the Electrical services. • Air conditioning and Lifts fall under which service category? • Name 2 elements of the services in support of public health. • What is the role of a building service engineer?
1.1.4. Professional and managerial roles and responsibilities associated with the built environment sector	• Name 3 key professional roles in the Construction Industry. • What is the difference between a professional role and a trade role? • Name 2 responsibilities of any professional construction role. (How many different roles can you do?) • Which professional role designs the buildings? • Which professional role works on costings and procurement? • Who has the senior responsibility on site? • Which professional may be a member of RIBA? • Name 3 products a civil engineer may be involved in the design of? • Which professional may be a member of RICS? • Which professional may be a member of ICE?

RIBA Royal Institute of British Architects

ice Institution of Civil Engineers

CIOB

RICS

Quantity Surveyor

Site Manager

Surveyor

Architect

Contract Manager

Structural Engineer

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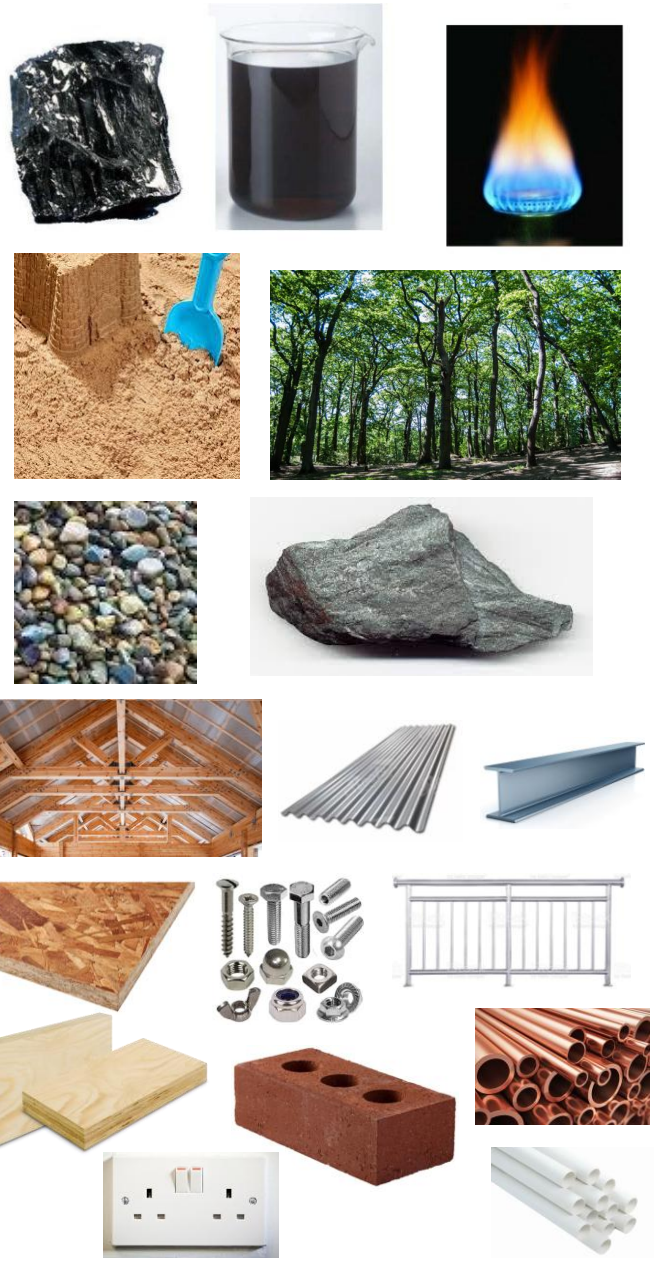
1.2 The Built Environment life cycle

- raw material extraction
- manufacturing
- construction
- operation and maintenance
- demolition
- disposal, reuse or recycling

1.2.1 Raw material extraction	• What material is extracted through fracking? • What is the most common process of extracting oil? • What is the process of cutting down trees for timber called? • Metal ores are extracted through what process? • What is the most extracted material through quarrying? • List 3 disadvantages of one of the raw material extraction processes. • List 2 advantages of one of the raw material extraction processes.
1.2.2 Manufacturing	• What is the process of Seasoning used for? • OSB and Plywood are examples of what material? • What benefits do Engineered wood products have over natural timber? • Name 3 different uses for Steel in construction? • Name a joining method for Steel columns and beams. • Profiled sheeting is used for what part of a building? • Name the 2 products in a building that commonly use copper • PVC or UPVC can be used for 3 main parts of a building, name 2 of them. • Grading is the process of doing what to gravel? • Aggregate is used for what purpose? • Bricks are fired in ovens from what raw material? • Mortar is made up from what 3 main ingredients? • What is the purpose of mortar?

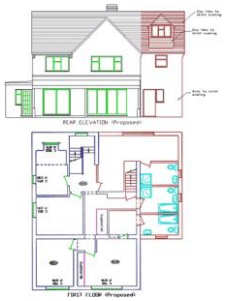


KS4 Constructing the built environment Knowledge organiser

1.2 The Built Environment life cycle

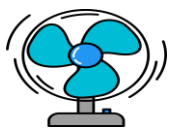
- raw material extraction
- manufacturing
- construction
- operation and maintenance
- demolition
- disposal, reuse or recycling

1.2.3 Construction	• Define renovation • Which part of a structure is produced underground? • What services will usually be included in any building project? • Explain why we use prefabricated components as part of building projects.
1.2.4 Operation and maintenance	• What is given to the client or end user on completion in accordance with the Construction, Design and Management (CDM) Regulations? • Define Maintenance. • List 3 things in a block of flats that may require maintenance. • What is the difference between planned and emergency maintenance?
1.2.5 Demolition	• List 3 different demolition methods? • List 3 things that may be included in a pre demolition plan • How would Asbestos effect a demolition? • Why must any demolition have a pre demolition plan? • List 2 health and safety precautions for any demolition • What is a "soft strip" and why is it used?
1.2.6 Disposal, reuse or recycling	• List 3 benefits of recycling waste material. • What is the difference between recycling and reusing? • Name 2 materials from a construction site that may be recycled. • Name 2 materials from a construction site that may be reused. • Give one disadvantage of recycling waste materials.









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1.3 Types of building and structure

- different forms of infrastructure construction
- residential dwellings
- commercial buildings
- industrial buildings
- agricultural buildings
- community buildings
- religious buildings
- recreational buildings.

1.3.1 Different forms of infrastructure construction	• List 3 forms of Infrastructure. • List 3 benefits to a good transport infrastructure. • List 3 drawbacks of a good transport infrastructure. • Why is a good telecommunication infrastructure important?
1.3.2 Residential dwellings	• What is the purpose of a residential dwelling? • List the 4 different types of residential dwelling. • How do residential dwellings differ between rural and urban areas?
1.3.3 Commercial buildings	• What is the purpose of a commercial building? • List 3 different types of commercial building.

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1.3.7 Religious buildings	• What is the purpose of a religious building? • Give 2 key features of religious buildings.
1.3.8. Recreational buildings	• What is the purpose of a recreational building? • Give 4 different types of recreational building. • What properties will recreational buildings often have?

1.3.4 Industrial buildings	• What is the purpose of an industrial building? • Give 2 different types of industrial building. • Give 3 key features of industrial buildings.
1.3.5 Agricultural buildings	• What is the purpose of an agricultural building? • List 3 different types of agricultural building. • What is one major consideration in the design and construction of agricultural buildings? • Give 3 key features of an agricultural building.
1.3.6 Community buildings	• What is the purpose of a community building? • Give 2 different types of community building. • Where would you usually find a community building?

1.3 Types of building and structure

- different forms of infrastructure construction
- residential dwellings
- commercial buildings
- industrial buildings
- agricultural buildings
- community buildings
- religious buildings
- recreational buildings.

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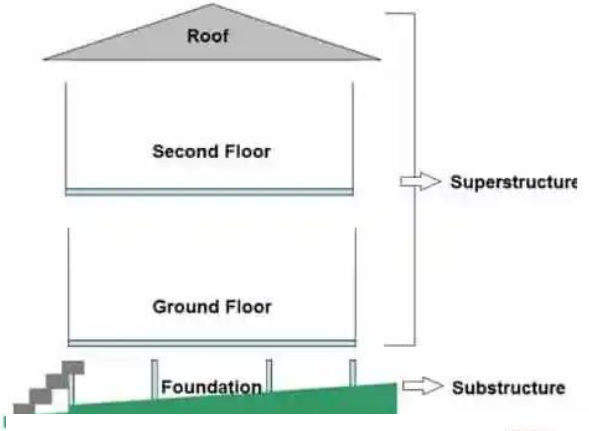
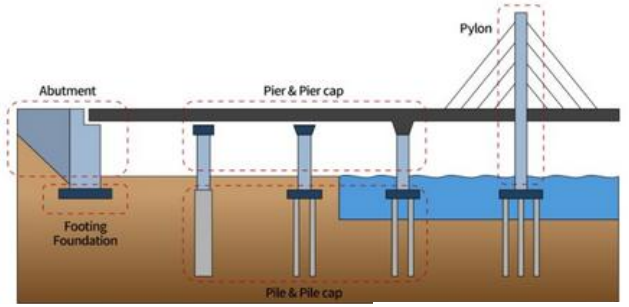
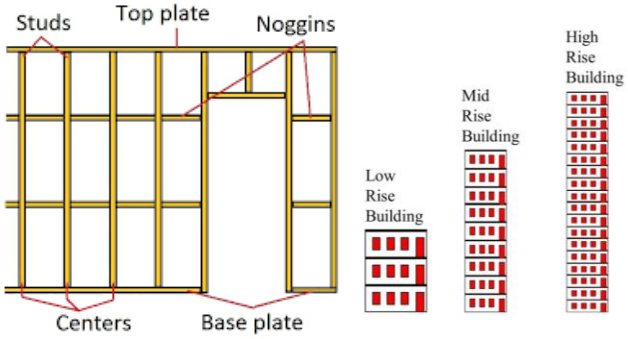
1.4 Technologies and Materials

- main elements and components of low-rise buildings
- main materials involved in constructing walls, installing building services, fitting roofs and finishing interiors
- renewable technologies and materials, including heat pumps, wind turbines and solar panels.

1.4.1 Main elements and components of low-rise buildings	• Define Substructure. • Define Superstructure. • List 3 different types of foundation, explain the reasons for using one. • Name 5 elements of a low-rise building.
1.4.2 Main materials involved in constructing walls, installing building services, fitting roofs and finishing interiors	• Name 3 materials used in external walls. • Name 2 different forms of insulation. • What is the purpose of external cladding? What materials may be used? • Name the key materials used in a stud wall. • Name 3 parts of a stud wall. • What is the purpose of a lintel? What materials could be used for them? • Name 3 potential roofing materials. • Where would you use plasterboard? • What elements of a structure may be made from copper? • What elements may be made from PVC or uPVC?







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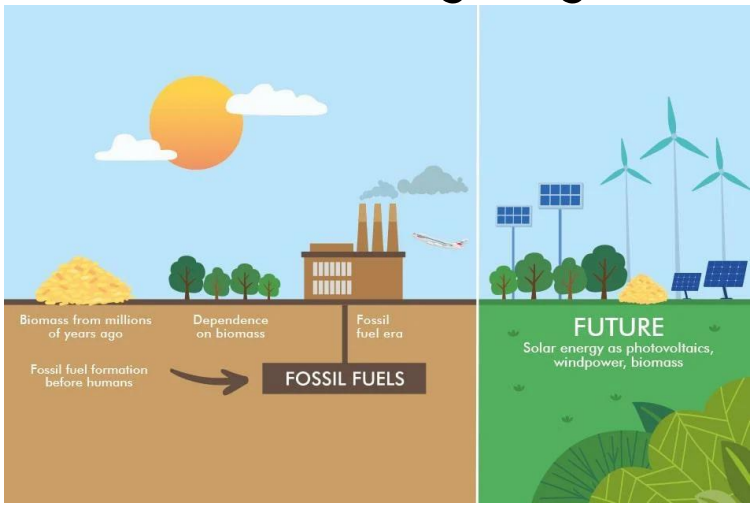
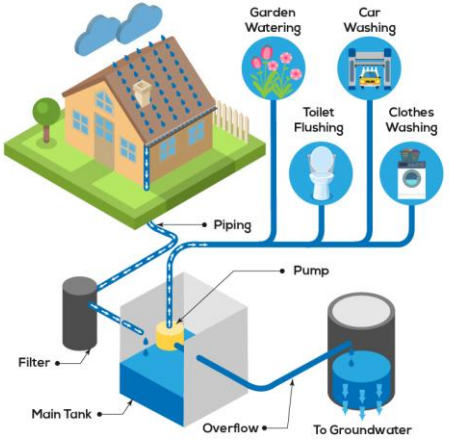
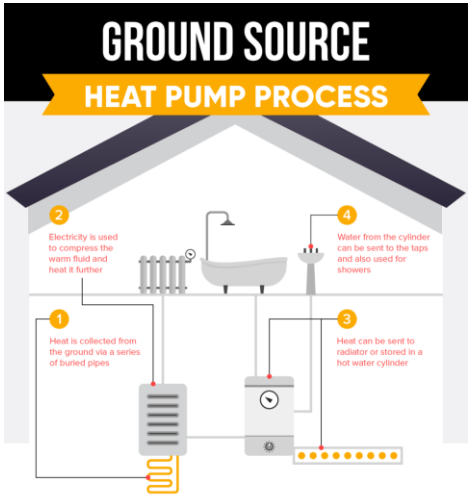
1.4 Technologies and Materials

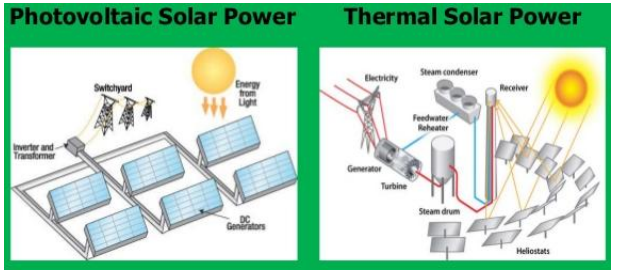
- main elements and components of low-rise buildings
- main materials involved in constructing walls, installing building services, fitting roofs and finishing interiors
- renewable technologies and materials, including heat pumps, wind turbines and solar panels.

1.4.3 Renewable technologies and materials, including heat pumps, wind turbines and solar panels	• List 5 benefits and drawbacks of renewable energy. • Name the two types of solar energy. • Give 3 drawbacks of wind turbines. • Name the 3 different heat pumps available. • Pick one form of renewable energy and compare the benefits and drawbacks. • What would be the best form of renewable energy for a rural farmhouse in Scotland? Why? • Explain the process of rainwater harvesting. • Where can grey water be reused in a block of flats?







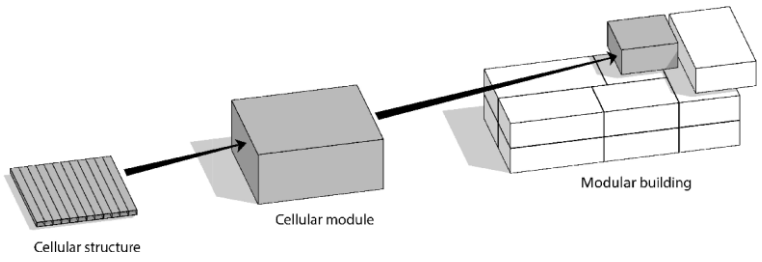


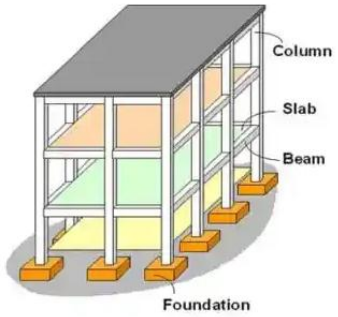
KS4 Constructing the built environment Knowledge organiser

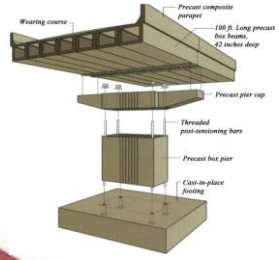
1.5 Building Structures and Forms

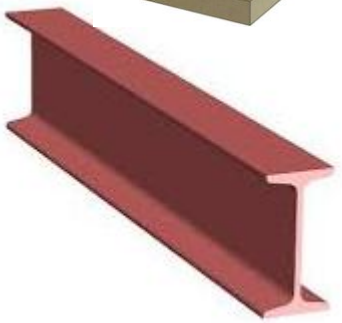
- cellular constructions
- rectangular frame constructions
- portal frame constructions
- heritage and traditional methods.

1.5.1 Cellular constructions	• What part of a cellular construction provides the main strength? • List 2 benefits to cellular construction. • Define the term prefabricated. • What types of building may be constructed using cellular construction?
1.5.2 Rectangular frame constructions	• What part of a rectangular frame construction provides the main strength? • List 2 benefits to rectangular frames. • Define the term bracing. • What material is most likely used for a small-scale residential frame? • What material is most likely used for a large-scale multistorey frame?







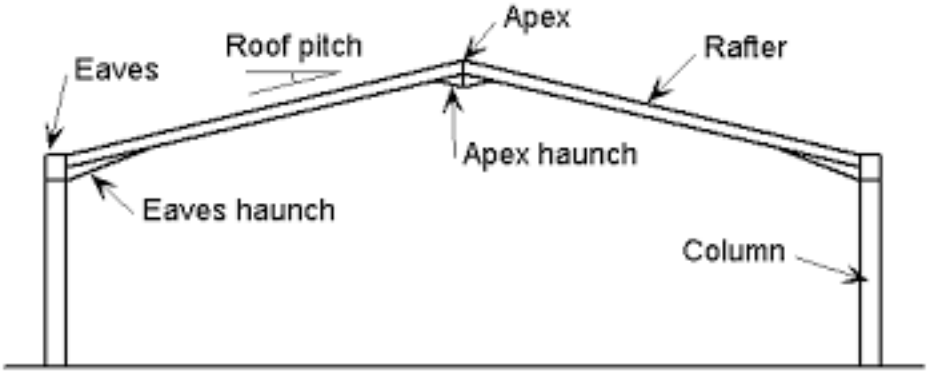


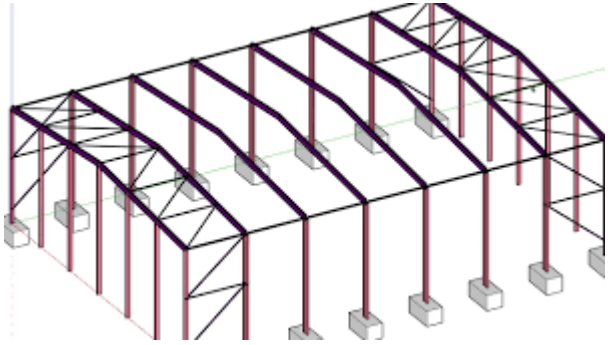
KS4 Constructing the built environment Knowledge organiser

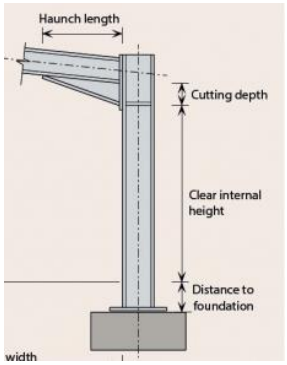
1.5 Building Structures and Forms

- cellular constructions
- rectangular frame constructions
- portal frame constructions
- heritage and traditional methods.

1.5.3 Portal frame constructions	• Name 4 components of a portal frame. • List 2 benefits to portal frames. • Explain the benefits of cold formed steel for portal frames. • Explain the benefits of Reinforced concrete for portal frames. • Explain the benefits of Laminated timber for portal frames. • Which types of buildings are commonly made using portal frame construction?
1.5.4 Heritage and traditional methods	• Name 4 heritage methods. • Why are heritage methods important in construction? • Why is maintenance a key feature in heritage buildings? • What is Thatching?.





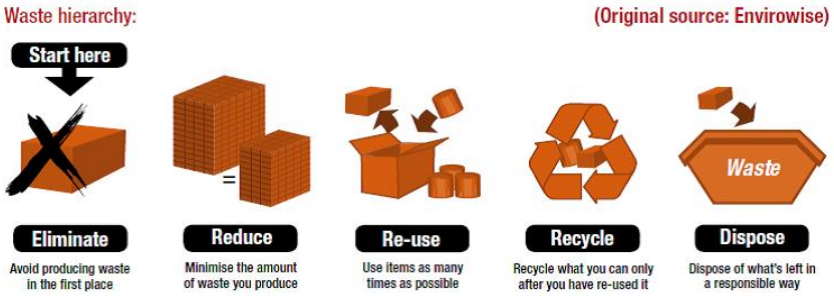


KS4 Constructing the built environment Knowledge organiser

1.6 Sustainable Construction Methods

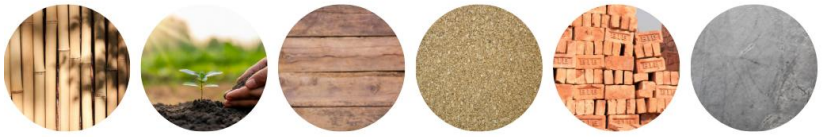
- the environmental, financial, cultural and social benefits of sustainable construction methods
- pollution and the preservation of the natural environment and natural habitats
- sustainable materials used to create building frames, walls, roofs
- waste disposal, re-use and recycling
- planning permission, brownfield sites and greenfield sites.

1.6.1 The environmental, financial, cultural and social benefits of sustainable construction methods	• What are the key benefits of minimising construction waste? • Give 3 ways to get a financial benefit in Construction. • Give 2 ways to get a cultural benefit in Construction. • Why may Construction companies wish to improve air quality?
1.6.2 Pollution and the preservation of the natural environment and natural habitats	• List 3 ways Construction can reduce environmental impact. • Give 2 reasons areas may have protected status. • Suggest 3 measures that may be taken to reduce the impact on wildlife of new construction. • What hazards can be caused by incorrect storage of materials on site?
1.6.3 Sustainable materials used to create building frames, walls, roofs	• Name 3 renewable construction materials. • How can bricks be recycled for use in future projects? (2 ways) • Name 2 sustainable insulation materials. • How can steel be sustainable in construction?



Sustainable Construction:
Methods and Benefits

COMMON SUSTAINABLE BUILDING MATERIALS



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1.6 Sustainable Construction Methods

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- pollution and the preservation of the natural environment and natural habitats
- sustainable materials used to create building frames, walls, roofs
- waste disposal, re-use and recycling
- planning permission, brownfield sites and greenfield sites.

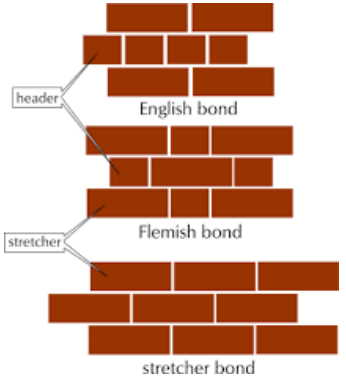
1.6.4 Waste disposal, re-use and recycling	• How can construction companies reduce waste? • What classifications of waste are there? • Define Salvaged. • Define Recycling. • What construction materials may be salvaged rather than wasted? • What construction materials may be recycled?
1.6.5. Planning permission, brownfield sites and greenfield sites	• What is planning permission? • Who deals with planning permission once submitted? • What is a Brownfield site? • Give 4 advantages of using a brownfield site for a new construction project. • Give 2 disadvantages of using a brownfield site for a new construction project? • Give 3 advantages of using a greenfield site for a new construction project. • Give 3 disadvantages of using a greenfield site for a new construction project?

KS4 Constructing the built environment Knowledge organiser

1.7 Trades, Employments and Careers

- bricklaying
- stonemasonry
- plastering
- carpentry and joinery
- electrical installation
- plumbing installation
- painting and decorating
- flooring and tiling.

1.7.1 Bricklaying	• What is the role of a bricklayer? • What materials does a bricklayer work with? • Name 3 different brick bonds. • Name 3 bricklaying tools.
1.7.2 Stonemasonry	• What is the role of a stonemason? • What materials does a stonemason work with? • Name 1 product that a stonemason would produce.
1.7.3 Plastering	• What is the role of a plasterer? • What materials does a plasterer work with? • Name 3 health and safety considerations for mixing plaster.



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- stonemasonry
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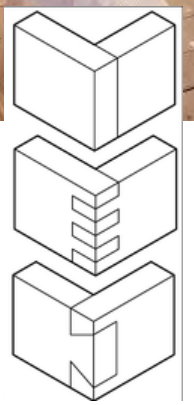
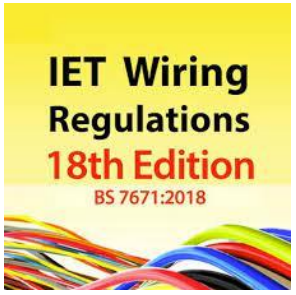
- flooring and tiling.

1.7.4 Carpentry and joinery	• What is the role of a Joiner? • What is the role of a carpenter? • What materials does a carpenter work with? • Name 3 different wood joints. • Name 5 tools a carpenter may use.
1.7.5 Electrical installation	• What is the role of an electrician? • What materials does an electrician work with? • What safety regulations should an electrician follow? • What should an electrician do before working on any existing electrical work?
1.7.6 Plumbing installation	• What is the role of a plumber? • What materials does a plumber work with? • Name 2 products a plumber may be involved in installing.









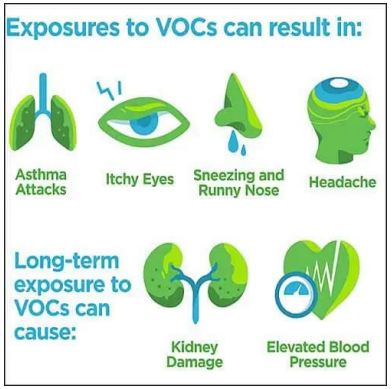


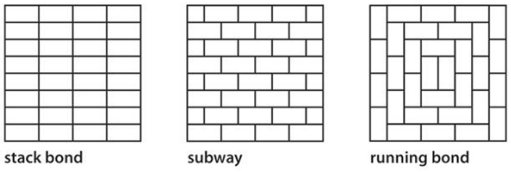
KS4 Constructing the built environment Knowledge organiser

1.7 Trades, Employments and Careers

- bricklaying
- stonemasonry
- plastering
- carpentry and joinery
- electrical installation
- plumbing installation
- painting and decorating
- flooring and tiling.

1.7.7 Painting and decorating	• What is the role of a decorator? • What materials does a decorator work with? • Name 3 different types of paint? • What are VOC's? • Define COSHH. How does this apply to decorators? • Name 2 painting tools.
1.7.8 Flooring and tiling	• What is the role of a floor layer? • What materials does a floor layer work with? • What is the role of a tiler? • What material are most tiles made from? • Name 3 different tiling patterns. • Name 3 tiling tools.





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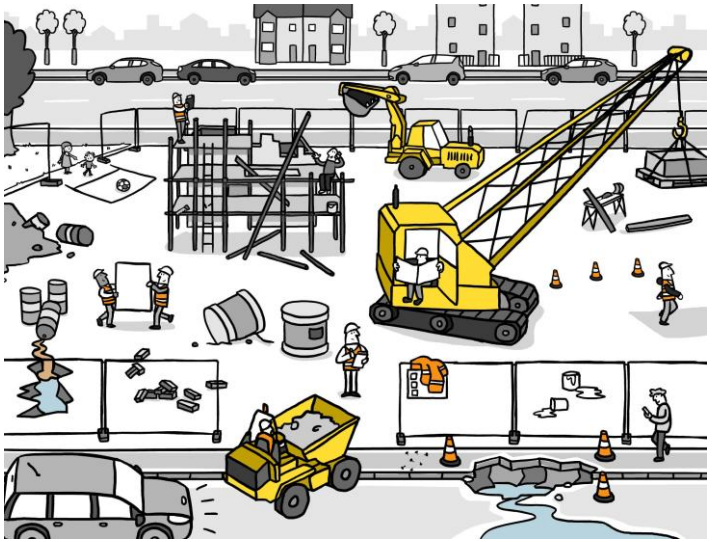
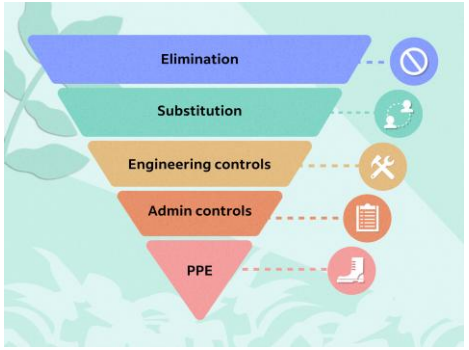
1.8 Health and Safety

- risks for employees, employers and the public during construction and the built environment projects
- following procedures and carrying out risk assessments
- relevant legislation, including Health and Safety at Work Act and Control of Substances Hazardous to Health (COSHH) regulations
- using personal protective equipment (PPE)
- safely working with gas, water and electricity
- working at height and in enclosed spaces.

1.8.1 Risks for employees, employers and the public during construction and the built environment projects	• Name as many hazards as you can for a construction site. • Who has overall responsibility for safe operation of sites? • Who may be at risk on a construction site? • Define Hazard. • Define Risk. • Explain why risks may be greater in certain environments.
1.8.2 Following procedures and carrying out risk assessments	• What is a risk assessment? • Why do we use risk assessments? • Why does manual handling require a risk assessment? • Name 3 things required in a risk assessment. • Define Control measure. • Why are control measures required? • Who needs to read/be aware of the risk assessment?





KS4 Constructing the built environment Knowledge organiser

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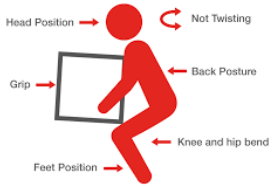
- using personal protective equipment (PPE)
- safely working with gas, water and electricity
- working at height and in enclosed spaces.

1.8.3 Relevant legislation, including Health and Safety at Work Act and Control of Substances Hazardous to Health (COSHH) regulations	• What is legislation? • Name 3 Legislations that apply to Construction. • Why do we need legislation? • Who are the HSE? What do they do? • What is HASAWA? What does it cover? • What is COSHH? What does it cover? • What is RIDDOR? What does it cover? • What is PUWER? What does it cover? • What is Control of Asbestos regulations? What does it cover? • What is Manual Handling Operations Regulations? What does it cover? • Can you name the dates for any of the legislations?

HSE Health & Safety Executive

HASAWA	Health and safety at work act 1974
RIDDOR	Reporting of injuries diseases and dangerous occurrences regulations 1995
COSHH	Control of substances hazardous to health regulations 2002
PPER	Personal protective equipment at work regulations 1992 http://www.hse.gov.uk/pubns/indg174.pdf
MHR	Manual handling operations regulations 1993



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1.8 Health and Safety

- risks for employees, employers and the public during construction and the built environment projects
- following procedures and carrying out risk assessments
- relevant legislation, including Health and Safety at Work Act and Control of Substances Hazardous to Health (COSHH) regulations
- using personal protective equipment (PPE)
- safely working with gas, water and electricity
- working at height and in enclosed spaces.

1.8.4 Using personal protective equipment (PPE)	• What does PPE stand for? • Why is maintenance of PPE essential? • Name 4 different types of PPE. • What PPE would you use to control exposure to dust? • Who is responsible for provision of PPE? • Is PPE the best control measure? • Name 1 item of PPE for working with hot materials. • Who is responsible for correct use of PPE?
1.8.5 Safely working with gas, water and electricity	• Why is it important to be correctly trained and certified to work with Gas or Electric? • What should be done before working with Gas or Electric? • What does NICEIC stand for? What does it regulate? • What is Gas safe? • Where can you shut off electricity or gas to a property?

GAS safe REGISTER

NICEIC APPROVED CONTRACTOR

National Inspection Council for Electrical Installation Contracting

KS4 Constructing the built environment Knowledge organiser

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1.8.6 Working at height and in enclosed spaces	• Why is working a height or in enclosed spaces more dangerous? • What increased risk exists when working in enclosed spaces? • What methods could be used to ensure working a height is safer? • List 3 risks of working in enclosed spaces.