SENIOR SCHOOL CURRICULUM DESIGN

GRADE 10

BUILDING CONSTRUCTION

KENYA INSTITUTE OF CURRICULUM DEVELOPMENT
2024

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Nurturing Every Learner's Potential

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JUNE, 2024

First Published in 2024

ISBN: 978-9914-52-902-9

Published and printed by Kenya Institute of Curriculum Development

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NATIONAL GOALS OF EDUCATION

Education in Kenya should:

i) Foster nationalism and patriotism and promote national unity.

Kenya's people belong to different communities, races and religions, but these differences need not divide them. They must be able to live and interact as Kenyans. It is a paramount duty of education to help young people acquire this sense of nationhood by removing conflicts and promoting positive attitudes of mutual respect which enable them to live together in harmony and foster patriotism in order to make a positive contribution to the life of the nation.

ii) Promote the social, economic, technological and industrial needs for national development.

Education should prepare the youth of the country to play an effective and productive role in the life of the nation.

a) Social Needs

Education in Kenya must prepare children for changes in attitudes and relationships which are necessary for the smooth progress of a rapidly developing modern economy. There is bound to be a silent social revolution following in the wake of rapid modernization. Education should assist our youth to adapt to this change.

b) Economic Needs

Education in Kenya should produce citizens with the skills, knowledge, expertise and personal qualities that are required to support a growing economy. Kenya is building up a modern and independent economy which is in need of an adequate and relevant domestic workforce.

c) Technological and Industrial Needs

Education in Kenya should provide learners with the necessary skills and attitudes for industrial development. Kenya recognizes the rapid industrial and technological changes taking place, especially in the developed world. We can only be part of this development if our education system is deliberately focused on the knowledge, skills and attitudes that will prepare our young people for these changing global trends.

iii) Promote individual development and self-fulfilment

Education should provide opportunities for the fullest development of individual talents and personality. It should help children to develop their potential interests and abilities. A vital aspect of individual development is the building of character.

iv) Promote sound moral and religious values.

Education should provide for the development of knowledge, skills and attitudes that will enhance the acquisition of sound moral values and help children to grow up into self-disciplined, self-reliant and integrated citizens.

v) Promote social equality and responsibility.

Education should promote social equality and foster a sense of social responsibility within an education system which provides equal educational opportunities for all. It should give all children varied and challenging opportunities for collective activities and corporate social service irrespective of gender, ability or geographical environment.

vi) Promote respect for and development of Kenya's rich and varied cultures.

Education should instill in the youth of Kenya an understanding of past and present cultures and their valid place in contemporary society. Children should be able to blend the best of traditional values with the changing requirements that must follow rapid development in order to build a stable and modern society.

vii) Promote international consciousness and foster positive attitudes towards other nations.

Kenya is part of the international community. It is part of the complicated and interdependent network of peoples and nations. Education should therefore lead the youth of the country to accept membership of this international community with all the obligations and responsibilities, rights and benefits that this membership entails.

viii) Promote positive attitudes towards good health and environmental protection.

Education should inculcate in young people the value of good health in order for them to avoid indulging in activities that will lead to physical or mental ill health. It should foster positive attitudes towards environmental development and conservation. It should lead the youth of Kenya to appreciate the need for a healthy environment.

LEARNING OUTCOMES FOR SENIOR SCHOOL

By the end of senior school, the learner should be able to:

1. Communicate effectively and utilize information and communication technology across varied contexts.
2. Apply mathematical, logical and critical thinking skills for problem solving.
3. Apply basic research and scientific skills to manipulate the environment and solve problems.
4. Exploit individual talents for leisure, self-fulfillment, career growth, further education and training.
5. Uphold national, moral and religious values and apply them in day to day life.
6. Apply and promote health care strategies in day to day life.
7. Protect, preserve and improve the environment for sustainability.
8. Demonstrate active local and global citizenship for harmonious co-existence.
9. Demonstrate appreciation of diversity in people and cultures.
10. Manage pertinent and contemporary issues responsibly.

THE SENIOR SCHOOL IN THE COMPETENCY BASED CURRICULUM (CBC)

Senior School is the forth level of Basic Education in the Competency Based Curriculum (CBC) that learners shall come to after the Pre-Primary, Primary and Junior School (JS). The essence of Senior School is to offer learners a Pre- University/ Pre-career experience where the learners have an opportunity to choose pathways where they have demonstrated interest and/or potential at the earlier levels. Senior school comprises three years of education for learners in the age bracket of **15 to 18 years** and lays the foundation for further education and training at the tertiary level and the world of work. In the CBC vision, learners exiting this level are expected to be ***engaged, empowered and ethical citizens*** ready to participate in the socio-economic development of the nation.

At this level, learners shall take **SEVEN (07) learning areas (LAs)** as recommended by the *Presidential Working Party on Educational Reforms* (PWPER). These shall comprise **Four Compulsory** learning areas, and Three learning areas opted for by the learner according to their choses Pathway. While English and Kiswahili are indicated as Compulsory, the learners who opt for these learning areas as their subjects of specialization shall go through a *differentiated curriculum* in terms of scope, experiences and assessment. Such learners shall; therefore, take *Advanced English* or *Kiswahili Kipevu* with additional two lessons. It is recommended that AT LEAST TWO learning areas should be from chosen Pathway. In exceptional cases, some learners may opt for ONE learning area from the chosen Pathway and a maximum of TWO learning areas from any of the three pathways; depending on the learner's career projections and with guidance by the principals at Senior School.

PROPOSED LIST OF SUBJECTS AT SENIOR SCHOOL

Compulsory Subjects	**Science, Technology, Engineering & Mathematics (STEM)**	**Social Sciences**	**Arts & Sports Science**
1. English 2. Kiswahili/KSL 3. Community Service Learning 4. Physical Education ***NB: ICT skills will be offered to all students to facilitate learning and enjoyment***	5. Mathematics/Advanced Mathematics 6. Biology 7. Chemistry 8. Physics 9. General Science 10. Agriculture 11. Computer Studies 12. Home Science 13. Drawing and Design 14. Aviation Technology 15. Building and Construction 16. Electrical Technology 17. Metal Technology 18. Power Mechanics 19. Wood Technology 20. Media Technology* **21.** Marine and Fisheries Technology*	22. Advanced English 23. Literature in English 24. Indigenous Language 25. Kiswahili Kipevu/Kenya Sign Language 26. Fasihi ya Kiswahili 27. Sign Language 28. Arabic 29. French 30. German 31. Mandarin Chinese 32. History and Citizenship 33. Geography 34. Christian Religious Education/ Islamic Religious Education/Hindu Religious Education 35. Business Studies	36. Sports and Recreation 37. *Physical Education (C)* 38. Music and Dance 39. Theatre and Film 40. Fine Arts

LESSON DISTRIBUTION AT SENIOR SCHOOL

The number of lessons in each of the compulsory learning areas shall be 4; while the optional areas shall be 6 lessons each. A lesson shall be 40 minutes. The "free" lessons shall be used for development of ICT skills, Pastoral Instruction Programme (PPI), projects, collaborative study and further reading.

ESSENCE STATEMENT

As a country with a robust construction industry coupled with a rapid growth in human population and need for descent housing, Kenya needs qualified personnel equipped with knowledge, skills and desired attitudes in building construction processes especially at the operative level.

The introduction of Building Construction as a technical and engineering studies subject at senior school shall prepare learners to acquire knowledge, develop technical skills and form positive attitudes in masonry, plumbing, concreting and other trades in building construction. It builds on competencies acquired in Pre-Technical Studies at junior school. It is anchored on Sessional Papers No. 1 of 2005 and No. 1 of 2019 which recommended the promotion of technical and vocational education with an emphasis on Science, Technology and Innovation (ST&I) in the school curriculum.

The course has been designed in such a way as to cater for the needs of students who wish to further their education as well as those who wish to exit Senior School to the world of work. For students who wish to go on to higher levels of education and training in Technical Universities, National Polytechnics, Technical and Vocational Colleges, or Vocational Training Centres, it provides adequate knowledge and skills for success at such levels. Students who wish to terminate their course at Senior School would also have had adequate level of skills and knowledge in building resources, building construction processes and financial management that will enable them get into the world of work.

GENERAL SUBJECT LEARNING OUTCOMES

By the end of the senior school, the learner should be able to:

a) Select a preferred career in building construction
b) Draw and interpret working drawings
c) Carry out masonry works
d) Carry out concreting works for simple buildings
e) Install and maintain plumbing systems
f) Provide for and observe safety on a building construction site
g) Care for and maintain construction plant, tools and equipment
h) Prepare quantities for simple building projects
i) Develop financial literacy for management of building construction projects

SUMMARY OF STRANDS AND SUB STRANDS

Strands	Sub strands	Suggested number of lessons
1.0 Foundation of Building Construction	1.1 Introduction to Building Construction	6
	1.2 Site Preparation	12
2.0 Related Drawing	2.1 Isometric Drawing	8
	2.2 Computer Aided Drawing	12
3.0 Building Construction Processes	3.1 Concreting	20
	3.2 Foundations	25
	3.3 Timbering	10
	3.4 Foundation Walling	22
	3.5 Ground Floors	15
4.0 Building Services	4.1 Plumbing Tools and Equipment	15
	4.2 Plumbing Materials	10
	4.3 Pipework	25
Total number of lessons		**180**

Note: The suggested number of lessons per sub strand may be more or less depending on the context

STRAND 1.0: FOUNDATION OF BUILDING CONSTRUCTION

Strand	Sub Strand	Specific Learning Outcomes	Suggested Learning Experiences	Suggested Key Inquiry Question(s)
1.0 Foundation of Building Construction	**1.1 Introduction to Building Construction** (6 lessons)	By the end of the sub strand, the learner should be able to; a) outline the functions of a building in day-to-day life, b) explain the historical development of buildings through ages, c) illustrate the basic components of a building to detail, d) categorise buildings based on their use, e) appreciate the importance of buildings in the locality.	The learner is guided to; • brainstorm on the meaning of the term 'building', • discuss the functions of a building, • use print or digital media to search for information on the historical development of buildings (*from caves to modern buildings*), • use visual aids to discuss the components of a building, • sketch a building showing its basic components (*floor, wall, roof, door and window*), • use visual aids to discuss different types of buildings, • take a walk in the locality to observe buildings used for different purposes (*commercial, social and residential*), • use charts to list buildings based on their uses,	1. How are buildings classified? 2. Why are buildings important?

			• prepare a portfolio of different types of buildings.	

Core competencies to be developed:

- Communication and Collaboration: learner speaks clearly and effectively as they present points on the functions of a building.
- Citizenship: learner interacts with others appropriately during a walk in the locality to observe buildings used for different purposes.
- Self-Efficacy: learner mobilizes resources when preparing a portfolio of different types of buildings.

Values:

- Unity: learner develops the attribute of cooperation during group discussions on the functions of a building.
- Patriotism: learner develops the attribute of citizenship as they take a walk in the locality to observe buildings used for different purposes.

Pertinent and Contemporary Issues (PCIs):

- Citizenship Education: learner acquires attributes of good governance as they lead discussions on functions of buildings.
- Life Skills: learner acquires the skill of effective communication as they brainstorm on the meaning of the term 'building'.

Strand	Sub Strand	Specific Learning Outcomes	Suggested Learning Experiences	Suggested Key Inquiry Question(s)
1.0 Foundation of Building Construction	**1.2 Site Preparation** (12 lessons)	By the end of the sub strand, the learner should be able to; a) explain factors to consider when selecting a site for a given building, b) describe the safety measures to observe in site preparation, c) clear a site for construction using appropriate hand tools, d) strip off the top soil of a building site, e) illustrate methods of levelising a site for building construction, f) appreciate the importance of proper site selection and preparation before construction of a building.	The learner is guided to; • use the building code to discuss the factors to consider when selecting a building construction site, • brainstorm on appropriate safety measures to observe when preparing a site, • use print or digital media to search for the meaning of the terms used in site preparation *(site selection, site clearing, and site levelling)*, • use hand tools and equipment to carry out site clearing (*slasher, panga, jembe, rake, spade, axe, wheelbarrow*), • use appropriate hand tools and equipment to carry out site stripping (*jembe, panga,*	1. Why are site preliminaries important in building construction? 2. Why is it important to observe safety when preparing a building site?

			axe, mattock, spade, wheelbarrow), • use visual aids to discuss the methods of leveling a building site (*cut, fill, cut and fill*), • sketch the methods of leveling a site, • conduct a debate on the importance of proper site selection and preparation.	

Core competencies to be developed:

- Communication and Collaboration: learner develops the competence of listening keenly and actively when brainstorming on appropriate safety measures to observe during site preparation.
- Learning to Learn: learner develops the skill of sharing what they have learnt as they debate on the importance of proper site selection and preparation.

Values:

- Love: learner develops sharing attributes as they share hand tools and equipment when carrying out site clearing and site stripping.
- Responsibility: learner develops accountability attributes as they use print or digital media to search for the meaning of the terms used in site preparation.
- Respect: learner develops open mindedness attributes as they conduct a debate on the importance of proper site selection and preparation.

Pertinent and Contemporary Issues (PCIs):

- Socioeconomic and Environmental issues: learner develops environmental conservation attributes as they carry out site preparation activities.

- Citizenship: learner develops equity and non-discrimination as they share hand tools and equipment to carry out site stripping
- Socioeconomic and environmental issues: learner develops the attribute of waste management as they perform site preparation activities

Suggested Assessment Rubric

Level / Indicator	Exceeds expectations	Meets expectations	Approaches expectations	Below expectations
Ability to outline the functions of a building in day to day life	Outlines the functions of a building in day to day life comprehensively	Outlines the functions of a building in day to day life	Outlines some functions of a building in day to day life	Outlines some functions of a building in day to day life with assistance
Ability to clear a site for construction using appropriate hand tools	Clears a site for construction using appropriate hand tools comprehensively	Clears a site for construction using appropriate hand tools	Clears a site for construction using appropriate hand tools partially	Clears a site for construction using appropriate hand tools with assistance
Ability to strip off the top soil of a building site	Strips off the top soil of a building site comprehensively	Strips off the top soil of a building site	Strips off the top soil of a building site partially	Strips off the top soil of a building site with assistance

STRAND 2.0: RELATED DRAWING

Strand	Sub Strand	Specific Learning Outcomes	Suggested Learning Experiences	Suggested Key Inquiry Question(s)
2.0 Related Drawing	**2.1 Isometric Drawing** (8 lessons)	By the end of the sub strand, the learner should be able to; a) explain the characteristics of isometric drawings, b) draw a shaped block in isometric projection, c) dimension shaped blocks drawn in isometric projection, d) appreciate the importance of isometric projection in construction.	The learner is guided to; • use visual aids to discuss characteristics of isometric drawings, • discuss the steps to follow when drawing shaped blocks in isometric projection, • use drawing instruments to construct shaped blocks in isometric projection, • use print or digital media to discuss the procedure for dimensioning drawings in isometric projection, • dimension blocks drawn in isometric projection, • make a presentation on the importance of isometric projection in construction.	Why is isometric drawing important in building construction?
Core competencies to be developed: • Creativity and Imagination: learner develops the competence of discovering new ways of doing things as they use drawing instruments to construct shaped blocks in isometric projection.				

- Critical thinking and problem solving: learner develops the competence of following instructions to dimension blocks drawn in isometric projection.
- Self-Efficacy: learner develops the competence of showing attention to detail while drawing isometric blocks.

Values:

- Social Justice: learner shares resources equitably as they use drawing instruments to construct shaped blocks in isometric projection.
- Responsibility: learner develops excellence attributes as they dimension blocks drawn in isometric projection.
- Respect: learner develops acceptance of other peers' views when discussing the importance of isometric projection in building construction.

Pertinent and Contemporary Issues (PCIs):

- Life Skills: learner develops self-esteem attributes as they construct shaped blocks in isometric projection to successful completion.
- Life Skills: learner develops self-awareness skills as they make a presentation on the importance of isometric projection in construction

Strand	Sub Strand	Specific Learning Outcomes	Suggested Learning Experiences	Suggested Key Inquiry Question(s)
2.0 Related Drawing	**2.2 Computer Aided Drawing** (12 lessons)	By the end of the sub strand, the learner should be able to; a) identify types of CAD software used in building drawing, b) set up a CAD drawing environment on a digital device, c) draw plane shapes using CAD software, d) appreciate the importance of CAD in building drawing.	The learner is guided to; • engage a resource person on the types of CAD software used in building drawing, • engage the resource person on the steps to follow when setting up a CAD drawing environment, • practice how to set up a CAD drawing environment, • engage the resource person on the steps to follow when using CAD to draw plane shapes • develop plane shapes using a CAD software, • create an e-portfolio of plane shapes made using CAD software.	How important is CAD in building construction?
Core competencies to be developed: • Digital Literacy: learner develops the competence of adopting new digital technology as they draw plane shapes using CAD software.				

- Self-Efficacy: learner develops the competence of setting goals that go beyond their comfort zones as they develop an e-portfolio of plane shapes made using CAD software.

Values:

- Respect: learner develops etiquette as they interact with the resource person on types of CAD software used in building drawing.
- Responsibility: learner develops self-drive as they follow the steps required when setting up a CAD drawing environment,
- Patriotism: learner develops citizenship as they engage a resource person on the steps to follow when using CAD to draw plane shapes.

Pertinent and Contemporary Issues (PCIs):

- Socioeconomic and environmental issues: learner develops safety and security as they handle digital media safely in the laboratory.
- Life Skills: learner develops resolution skills as they develop plane shapes using a CAD software.
- Socioeconomic and environmental issues: learner develops cyber security they save drawings to create an e-portfolio of plane shapes made using CAD software.

Assessment Rubric

Indicator \ Level	Exceeds expectations	Meets expectations	Approaches expectations	Below expectations
Ability to draw a shaped block in isometric projection	Neatly draws a shaped block in isometric projection to detail	Draws a shaped block in isometric projection	Draws a shaped block in isometric projection leaving out a few details	Draws a shaped block in isometric projection leaving out many details
Ability to dimension given figures in isometric projection	Neatly dimensions given figures in isometric projection	Dimensions given figures in isometric projection	Dimensions given figures in isometric projection leaving out a few parts	Dimensions given figures in isometric projection leaving out many parts
Ability to set up a CAD drawing environment on a digital device	Comprehensively sets up a CAD drawing environment on a digital device	Sets up a CAD drawing environment on a digital device	Sets up a CAD drawing environment on a digital device leaving out a few commands	Sets up a CAD drawing environment on a digital device leaving out many commands
Ability to draw a plane shape using CAD software	Comprehensively draws a plane shape using CAD software with all details	Draws a plane shape using CAD software	Draws a plane shape using CAD software leaving out a few details	Draws a plane shape using CAD software leaving out many details

STRAND 3.0: BUILDING CONSTRUCTION PROCESSES

Strand	Sub Strand	Specific Learning Outcomes	Suggested Learning Experiences	Suggested Key Inquiry Question(s)
3.0 Building Construction Processes	**3.1 Concreting** (20 lessons)	By the end of the sub strand, the learner should be able to; a) explain the constituent materials for concrete, b) select hand tools and equipment used for concrete production, c) describe the process of producing concrete, d) perform the tasks for producing concrete, e) appreciate the importance of concreting in building construction.	The learner is guided to; • brainstorm the meaning of the term 'concrete', • use print or digital media to discuss the constituent materials for concrete (*cement, sand, coarse aggregates and water*) • use visual aids to discuss hand tools and equipment used for concrete production, • discuss the steps to follow when making concrete (*batching, mixing, transporting, placing, compacting and curing*) • discuss safety precautions to observe when concreting, • use appropriate tools and equipment to perform tasks in making concrete (*batching, mixing, transporting, placing, compacting and curing*),	How is concrete essential in building construction?

			• make presentations on the importance of concreting in building construction.	

Core competencies to be developed:

- Communication and Collaboration: learner develops the competence of teamwork as they discuss safety precautions to observe when concreting.
- Learning to Learn: learner develops the competence of prioritising activities when performing tasks in making concrete.
- Self-Efficacy: learner develops the competence of task execution as they clearly describe the procedure followed in making concrete.

Values:

- Love: learner develops the attribute of caring as they share tools and equipment while performing tasks in making concrete.
- Responsibility: learner develops accountability by caring for the print or digital media that they use to discuss the constituent materials for concrete.
- Respect: learner develops acceptance of each other's opinion as they brainstorm the meaning of the term 'concrete'.

Pertinent and Contemporary Issues (PCIs):

- Socioeconomic and environmental issues: learner develops the attribute of waste management as they perform tasks in making concrete
- Citizenship Education: learner develops attribute of leadership skills as learners coordinate each other in groups during discussions of the constituent materials for concrete

Strand	Sub Strand	Specific Learning Outcomes	Suggested Learning Experiences	Suggested Key Inquiry Question(s)
3.0 Building Construction Processes	**3.2 Foundations** (25 lessons)	By the end of the sub strand, the learner should be able to; a) describe types of foundations used in building construction, b) set out a strip foundation from working drawings, c) prepare trenches for construction of a strip foundation, d) lay a strip foundation for a building, e) acknowledge the importance of foundations in a building.	The learner is guided to; • brainstorm on the functions of a foundation in a building, • use the building code to discuss the functional requirements of a foundation in a building, • use visual aids to discuss types of foundations used in building construction (*strip*, *pad*, *raft*), • use appropriate drawing tools to sketch different types of shallow foundations, • interpret a strip foundation plan for a building, • discuss appropriate safety measures to observe when constructing a strip foundation, • use appropriate hand tools and equipment to set out a strip	Why is a foundation important to a building?

			foundation (*3-4-5, builder's square and trammel methods*), • use appropriate hand tools to prepare a trench for laying a strip foundation (*excavate, align the sides, level and compact the base),* • use appropriate hand tools to lay a strip foundation (*set the thickness of the concrete strip, prepare concrete material, place concrete, compact concrete, cure concrete)* • make a presentation on the importance of a foundation in a building.	

Core competencies to be developed:

- Critical Thinking and Problem Solving: learner develops the competence of exploring complex problems as they interpret a strip foundation plan for a building.
- Learning to Learn: learner develops the competence of sharing what they have learnt as they use the building code to discuss the functional requirements of a foundation in a building.
- Self-Efficacy: learner develops the competence of task execution as they make a presentation on the importance of a foundation in a building.

Values:

- Responsibility: learner develops accountability as they care for the building code in print or digital form when discussing the functional requirements of a foundation in a building.

- Patriotism: learner catches the attribute of democracy and the rule of law as they use the building code to discuss the functional requirements for foundations in buildings.
- Respect: learner develops the attribute of patience as they share hand tools and equipment to set out a strip foundation

Pertinent and Contemporary Issues (PCIs):

- Life Skills: learner develops effective communication as they make a presentation on the importance of a foundation in a building
- Citizenship Education: learner develops the attribute of leadership skills as learners coordinate each other when preparing a trench for laying a strip foundation using appropriate hand tools

Strand	Sub Strand	Specific Learning Outcomes	Suggested Learning Experiences	Suggested Key Inquiry Question(s)
3.0 Building Construction Processes	**3.3 Timbering** (10 lessons)	By the end of the sub strand, the learner should be able to; a) identify materials for timbering, b) describe the use of different types of timbering, c) illustrate timbering methods for different soils, d) perform timbering to a foundation trench, e) value the importance of timbering to foundation trenches.	The learner is guided to; • brainstorm on the meaning and purpose of timbering, • use visual aids to discuss different materials for timbering, • use the building code to discuss the requirements for timbering, • use visual aids to discuss the use of different types of timbering *(timbering to firm soils, timbering to loose dry soils, timbering to loose wet soils)*, • sketch different methods of timbering suitable for different types of soils, • discuss appropriate safety measures to observe when timbering, • use appropriate hand tools to erect timbering to a shallow foundation trench,	What is the role of timbering in building construction?

			• make a presentation on the importance of timbering to foundation trenches.	

Core competencies to be developed:

- Learning to Learn: learner develops the competence of sharing what they have learnt when using the building code to discuss the requirements for timbering.
- Self-Efficacy: learner develops the competence of task execution as they make a presentation on the importance of timbering to foundation trenches.

Values:

- Respect: learner develops the attribute of acceptance for each other's opinion as they discuss appropriate safety measures to observe when timbering.
- Responsibility: learner develops accountability as they care for visual aids that they use to discuss different materials for timbering.
- Patriotism: learner catches the attribute of democracy and the rule of law as they use the building code to discuss the requirements for timbering.

Pertinent and Contemporary Issues (PCIs):

- Socioeconomic and Environmental issues: learner develops the attribute of environmental technology as they preserve timbering materials for future reuse.
- Life Skills: learner develops self-awareness skills as they make a presentation on the importance of timbering to foundation trenches.

Strand	Sub Strand	Specific Learning Outcomes	Suggested Learning Experiences	Suggested Key Inquiry Question(s)
3.0 Building Construction Processes	**3.4 Foundation Walling** (22 lessons)	By the end of the sub strand, the learner should be able to; a) select materials for foundation walling, b) set out a foundation wall from profile boards, c) construct a masonry foundation wall in a given bond, d) appreciate the importance of foundation walls in a building.	The learner is guided to; • use visual aids to discuss materials for foundation walling (*bricks, blocks, stones, mortar),* • use the building code to discuss the requirements for foundation walling, • discuss the procedure of setting out a masonry wall on a foundation *(transfer wall measurements from profile boards, setting corner stone, plumbness, alignment, levelling, squareness),* • use visual aids to discuss appropriate tools for masonry foundation walling (*plumb bob, builder's line, water level, tape measure, spirit level, builder's square, trowel, float, mortar pan, bolster),*	1. How do you select suitable materials for foundation walling? 2. Why is bonding necessary in masonry?

			• discuss appropriate safety measures to observe during foundation walling, • set out a masonry wall on a foundation *(transfer wall measurements from profile boards, setting corner stone, plumbness, alignment, levelling, squareness),* • use visual aids to discuss bonding in masonry walls (*stretcher, header, Flemish, English*), • use drawing tools to sketch elevations of different types of bonds used in masonry work, • use appropriate tools and equipment to construct a masonry foundation wall in stretcher bond, • backfill and compact trenches • discuss the importance of foundation walls in buildings.	
Core competencies to be developed: • Critical Thinking and Problem Solving: learner develops the competence of exploring complex problems as they set out a masonry wall on the foundation.				

- Learning to Learn: learner develops the competence of sharing what they have learnt when they use the building code to discuss the requirements for foundation walling.
- Self-Efficacy: learner develops the competence of task execution as they use drawing tools to sketch different types of bonding in masonry.

Values:

- Responsibility: learner develops accountability as they care for the visual aids that they use to discuss materials for foundation walling.
- Integrity: learner develops the attribute of discipline as they observe safety measures during foundation walling.
- Patriotism: learner catches the attribute of the rule of law as they use the building code to discuss requirements for foundation walling.
- Respect: learner develops the attribute of patience as they share tools and equipment when constructing a foundation wall.
- Social Justice: learner develops the attribute of cooperation as they use visual aids to discuss appropriate tools for foundation walling.

Pertinent and Contemporary Issues (PCIs):

- Socioeconomic and Environmental issues: learner acquires the attribute of safety and security as they observe safety when constructing foundation walling.
- Life Skills: learner develops effective communication as they discuss appropriate tools used for foundation walling.
- Citizenship Education: learner develops the attribute of leadership skills as they coordinate each other while constructing a foundation walling.

Strand	Sub Strand	Specific Learning Outcomes	Suggested Learning Experiences	Suggested Key Inquiry Question(s)
3.0 Building Construction Processes	**3.5 Ground Floors** (15 lessons)	By the end of the sub strand, the learner should be able to; a) identify types of ground floors used in buildings, b) illustrate the components of a solid ground floor c) construct a solid ground floor for a building, d) appreciate the importance of solid ground floors in a building.	The learner is guided to; • use print or digital media to search for information on the types of ground floors (*solid, suspended*), • use the building code to discuss the requirements of ground floors, • use visual aids to discuss the components of a solid ground floor, • sketch construction details of a ground floor (*hardcore, blinding, damp proofing, floor slab*), • engage a resource person on the procedure for constructing a solid ground floor *(hardcore packing, blinding, termite treatment, damp proofing, BRC, concrete laying, curing),* • use print or digital media to discuss safety measures to observe when constructing a solid ground floor, • use appropriate tools and materials to construct a solid ground floor.	How are ground floors constructed?

Core competencies to be developed:

- Communication and Collaboration: learner develops the competence of teamwork as they use the building code to discuss the requirements for ground floors.
- Critical Thinking and Problem Solving: learner develops the competence of following instructions as they use drawing tools and materials to sketch construction details of a ground floor.
- Self-Efficacy: learner develops the competence of task execution as they illustrate the components of a solid ground floor

Values:

- Patriotism: learner catches the attribute of the rule of law as they use the building code to discuss the requirements for ground floors.
- Responsibility: learner develops accountability as they care for the visual aids they use to discuss the components of a solid ground floor.
- Respect: learner develops the attribute of patience as they share drawing tools and materials that they use to sketch components of a ground floor.
- Integrity: learner develops the attribute of discipline as they observe safety when constructing a solid ground floor.
- Social Justice: learner develops the attribute of cooperation as they use print and digital media to search for information on the types of ground floors.

Pertinent and Contemporary Issues (PCIs):

- Life Skills: learner develops effective communication as they use the building code to discuss the requirements of ground floors.
- Citizenship Education: learner develops the attribute of leadership skills as learners coordinate each other when constructing a solid ground floor.

Assessment Rubric				
Level / **Indicator**	**Exceeds expectations**	**Meets expectations**	**Approaches expectations**	**Below expectations**
Ability to select hand tools and equipment used for concrete production	Selects hand tools and equipment used for concrete production exhaustively	Selects hand tools and equipment used for concrete production	Selects some hand tools and equipment used for concrete production	Selects some hand tools and equipment used for concrete production when guided
Ability to set out a strip foundation from a working drawing	Skilfully sets out a strip foundation from a working drawing to a given level of accuracy	Sets out a strip foundation from a working drawing	Partially sets out a strip foundation from a working drawing	With guidance, sets out a strip foundation from a working drawing
Ability to apply safety measures in construction of solid ground floors,	Consistently applies safety measures in construction of solid ground floors	Applies safety measures in construction of solid ground floors	Occasionally applies safety measures in construction of solid ground floors	Applies safety measures in construction of solid ground floors when reminded

STRAND 4.0: BUILDING SERVICES

Strand	Sub Strand	Specific Learning Outcomes	Suggested Learning Experiences	Suggested Key Inquiry Question(s)
4.0 Building Services	**4.1 Plumbing Tools and Equipment** (15 lessons)	By the end of the sub strand, the learner should be able to; a) identify tools and equipment for plumbing works, b) explain the safety measures to observe when handling plumbing tools and equipment, c) use plumbing tools and equipment to perform a given task, d) maintain plumbing tools and equipment at the workplace, e) appreciate the importance of tools and equipment in plumbing.	The learner is guided to; • use a gallery walk to identify tools and equipment used in plumbing works *(die stock, pipe vice, pipe wrench, reamer, file, anvil, pipe cutter, pipe bender, caulking tool)*, • use print or digital media to search for information on the safety precautions to observe when using plumbing tools and equipment, • discuss how to perform tasks using plumbing tools and equipment *(cutting, forming, bending)*, • perform tasks using plumbing tools and equipment *(cutting, forming, bending)*, • carry out care and maintenance of plumbing tools and equipment *(sharpening, oiling, storing, cleaning)*,	1. How important are tools and equipment in plumbing? 2. Why is it important to care for and maintain plumbing tools and equipment?

			• make presentations on the importance of using tools and equipment in plumbing works.	

Core competencies to be developed:

- Communication and Collaboration: learner develops the competence of speaking fluently as they discuss how to perform tasks using plumbing tools and equipment.
- Learning to Learn: learner develops the competence of reflecting on their own work and adjusting accordingly as they use a gallery walk to identify tools and equipment used in plumbing works.
- Self-Efficacy: learner develops the competence of task management as they make presentations on the importance of using appropriate tools and equipment in plumbing works.

Values:

- Responsibility: learner develops accountability as they take care of the resources during a gallery walk to identify tools and equipment used in plumbing.
- Social Justice: learner develops the attribute of cooperation as they use print and digital media to search for information on the safety precautions to observe when using plumbing tools and equipment.
- Respect: learner develops the attribute of patience as they listen to one another during discussions of how to perform tasks using plumbing tools and equipment.
- Integrity: learner displays honesty as they make presentations on the importance of using appropriate tools and equipment in plumbing works.

Pertinent and Contemporary Issues (PCIs):

- Socioeconomic and Environmental issues: learner acquires the attribute of safety and security when discussing safety measures to observe when using plumbing tools and equipment.
- Life Skills: learner develops effective communication as they make presentations on the importance of using tools and equipment in plumbing works.
- Citizenship Education: learner develops the skills of leadership as they coordinate each other while performing tasks using plumbing tools and equipment.

Strand	Sub Strand	Specific Learning Outcomes	Suggested Learning Experiences	Suggested Key Inquiry Question(s)
4.0 Building Services	**4.2 Plumbing Materials** (10 lessons)	By the end of the sub strand, the learner should be able to; a) identify materials used in plumbing, b) describe the properties of materials used in plumbing, c) select materials for specified plumbing use, d) recognise importance of materials used in plumbing.	The learner is guided to; • use a gallery walk to identify materials used in plumbing *(plastic, metal, ceramic, concrete)*, • use print or digital media to search for information on the properties of materials used in plumbing *(corrosion, thermal properties, malleability, ductility)*, • match different materials to their uses in plumbing, • make presentations on the importance of materials used in plumbing.	Why is selection of materials important in plumbing?

Core competencies to be developed:

- Communication and Collaboration: learner develops fluent speaking as they make presentations on the importance of materials used in plumbing.
- Learning to Learn: learner develops the competence of reflecting on their own work as they match different materials to their uses in plumbing.
- Self-Efficacy: learner develops the competence of task management as they make presentations on the importance of materials used in plumbing.
- Citizenship: learner develops the competence of critical and constructive dialogue as they use a gallery walk to identify materials used in plumbing.

Values:

- Respect: learner develops the attribute of patience as they listen to one another during presentations on the importance of materials used in plumbing.
- Responsibility: learner develops accountability as they care for the resources during a gallery walk to identify materials used in plumbing.
- Social Justice: learner develops the attribute of cooperation as they use print and digital media to search for information on the properties of materials used in plumbing

Pertinent and Contemporary Issues (PCIs):

- Life Skills: learner develops effective communication as they make presentations on the importance of materials used in plumbing.
- Citizenship Education: learner develops the skills of leadership as they coordinate when using a gallery walk to identify materials used in plumbing.

Strand	Sub Strand	Specific Learning Outcomes	Suggested Learning Experiences	Suggested Key Inquiry Question(s)
4.0 Building Services	**4.3 Pipework** (25 lessons)	By the end of the sub strand, the learner should be able to; a) identify types of pipes and fittings used in plumbing, b) prepare pipe joints in plumbing, c) perform pipe bending in plumbing, d) observe safety when performing pipework, e) appreciate the importance of proper pipework in plumbing.	The learner is guided to; • use a gallery walk to identify pipes and fittings used in plumbing, • read and interpret working drawings for pipework, • discuss the procedure to follow when jointing pipes *(measuring and marking, holding, cutting, threading/welding/coupling),* • use suitable tools and equipment to carry out pipe jointing *(measuring and marking, holding, cutting, threading/welding/coupling),* • discuss the procedure to follow when bending pipes *(calculate radius and angle of bend, measure and mark the bend, bend),* • use suitable tools and equipment to bend a pipe *(calculate radius and angle of bend, measure and mark the bend, bend),* • apply appropriate safety measures when performing pipework.	Why is good pipework necessary in plumbing?

Core competencies to be developed:

- Communication and Collaboration: learner develops fluent speaking as they discuss the procedure to follow when jointing pipes.
- Learning to Learn: learner develops the competence of reflecting on their own work as they use a gallery walk to identify pipes and fittings used in plumbing.
- Self-Efficacy: learner develops the competence of task management as they use tools and equipment to bend a pipe to a given radius and angle.
- Citizenship: learner develops the competence of critical and constructive dialogue as they use a gallery walk to identify pipes and fittings used in plumbing.

Values:

- Responsibility: learner takes care as they apply appropriate safety measures when performing pipework.
- Integrity: learner displays honesty as they follow specifications in the working drawing for pipework.

Pertinent and Contemporary Issues (PCIs):

- Socioeconomic and Environmental issues: learner acquires the attribute of safety and security when applying appropriate safety measures when performing pipework
- Life Skills: learner develops effective communication as they discuss the procedure to follow when bending pipes
- Citizenship Education: learner develops the skills of leadership as they coordinate each other while performing pipe bending using suitable tools and equipment.

Assessment Rubric

Level / Indicator	Exceeds expectations	Meets expectations	Approaches expectations	Below expectations
Ability to identify types of pipes and fittings used in plumbing	Exhaustively identifies types of pipes and fittings used in plumbing	Identifies types of pipes and fittings used in plumbing	Identifies some types of pipes and fittings used in plumbing	With assistance, identifies some types of pipes and fittings used in plumbing
Ability to prepare pipe joints in plumbing	Neatly prepares pipe joints in plumbing	Prepares pipe joints in plumbing	Prepares some pipe joints in plumbing	With prompts, prepares pipe joints in plumbing
Ability to observe safety when performing pipework	Consistently observes safety when performing pipework	Observes safety when performing pipework	Occasionally observes safety when performing pipework	When reminded, observes safety when performing pipework

APPENDIX: SUGGESTED ASSESSMENT METHODS, SUGGESTED LEARNING RESOURCES AND NON-FORMAL ACTIVITIES

Strands	Sub Strands	Suggested Assessment Methods	Suggested Learning Resources	Suggested Non-Formal Activities
1.0 Foundations of Building Construction	1.1 Introduction to Building Construction	• Observation schedule • Checklist • Written test	• Video clips and visual aids • Photographs • Charts • Models of assorted buildings	• Model Building using materials like cardboard. • Organize visits to construction sites. • Group Presentations on different aspects of Building construction
	1.2 Site Preparation	• Observation schedule • Checklist • Written test • Rubrics • Project • Practical work	• Working drawings • GPS devices • Personal protective equipment(PPEs) • Charts • Building code • Termite control chemicals • hammers	• Organize visits to construction sites. • Material Exploration: experiment with different building materials (e.g., wood, metal, concrete). • Group Presentations on different aspects of Building construction • Guest Speakers: Invite architects, engineers, or

				construction professionals. • Building Site Visits
2.0 Related Drawing	2.1 Isometric Drawing	• Observation schedule • Checklist • Written test • Rubrics • Project • Practical work • Portfolio	• Drawing papers • Pencils • Digital devices such as; computer, laptop, smart phone, tablets among others • Plain parpers (A_0-A_3) • Three - dimensional realia • Drawing set • T-square • Squares (30^0-60^0, 45^0-90^0) • clamps	• Group Presentations on different aspects of Building construction • Guest Speakers: Invite architects, engineers, or construction professionals. • Participate in drawing and sketching clubs
	2.2 Computer Aided Design	• projects • portfolios • oral questions • aural questions, • written tests • observation schedules • checklists	• Reference materials • Internet • models • CAD software • computers	• Group Presentations on different aspects of Building construction • Guest Speakers: Invite architects, engineers, or construction professionals. • Participate in drawing and sketching clubs

3.0 Building Construction Processes	3.1 Concreting	• Observation Schedule • Checklist • Written test • Rubrics • Project • Practical work	• Ballast • Lime • Wheelbarrow • Spade • Tamper boards • Digital devices such as; computer, laptop, smart phone, tablets among others	• Organize visits to construction sites. • Material Exploration: experiment with different building materials (e.g., wood, metal, concrete). • Group Presentations on different aspects of Building construction • Guest Speakers: Invite architects, engineers, or construction professionals.
	3.2 Foundations	• Checklist • Observation schedule • Written test • Project • Practical work • Rubrics	• Working drawings • Jembe • Panga • Plumb bob • Builders line • Pegs • Builders square • Wooden float • Tape measure	• Organize visits to construction sites. • Material Exploration: experiment with different building materials (e.g., wood, metal, concrete). • Group Presentations on different aspects of Building construction • Guest Speakers: Invite architects, engineers, or construction professionals.

				• Building Site visits
	3.3 Timbering	• Checklist • Oral tests • Observation • Written test • Project • Practical work Rubrics	• Digital devices like video • Wood planks/timber • Nails(assorted) • Jembe • Panga • pegs	• Organize visits to construction sites. • Material Exploration: experiment with different building materials (e.g., wood, metal, concrete). • Group Presentations on different aspects of Building construction • Guest Speakers: Invite architects, engineers, or construction professionals.
	3.4 Foundation Walling	• Checklist • Oral tests • Observation • Written test • Project • Practical work Rubrics	• Digital devices like video • Bricks • Fine aggregate • Lime • Builders line • Plumb bob • Working drawings • Gauge boxes • Shovel • Mason trowel	• Organize visits to construction sites. • Material Exploration: experiment with different building materials (e.g., wood, metal, concrete). • Group Presentations on different aspects of Building construction

				• Guest Speakers: Invite architects, engineers, or construction professionals.
	3.5 Ground Floors	• Checklist • Oral tests • Observation • Written test • Project • Practical work Rubrics	• Digital devices like video • Timber boards • Fine and coarse aggregates • Lime • Tampering rods • Murram • Damproofing materials	• Organize visits to construction sites. • Material Exploration: experiment with different building materials (e.g., wood, metal, concrete). • Group Presentations on different aspects of Building construction
4.0. Building Services	4.1 Plumbing Tools and Equipment	• Oral tests • Observation • Checklist • Written test • Rubrics • Project • Practical work	• Pliers, Clamps, spanners, vice, Tongs, clips among others • Pipe stock and dies complete with stocks, bushing, bushing holders, Taps and • wrenches sizes covered, to suit pipes • Stillson pattern pipe wrenches • Stillson pattern pipe	• Organize visits to construction sites. • Material Exploration: experiment with different building materials (e.g., wood, metal, concrete). • Group Presentations on different aspects of Building construction

			wrenches • Chain :pipe wrench	Guest Speakers: Invite plumbers, engineers, or construction professionals
	4.2 Plumbing Materials	• Oral tests • Observation • Checklist • Written test • Rubrics • Project • Practical work	• PVC pipes heavy duty • PVC pipe light duty • PVC fittings - reducer FTA Reducer, Plain coupling, TEE, Bend, Elbow, MTA, FTA , socket • C.PVC pipe • PPR pipe • AC sanitary pipe coupling • File Half round rough • Jack plane • File triangular rough • File triangular smooth	• Organize visits to construction sites. • Material Exploration: experiment with different building materials (e.g., wood, metal, concrete). • Group Presentations on different aspects of Building construction • Guest Speakers: Invite plumbers, engineers, or construction professionals
	4.3 Pipework	• Portfolio • Observation • interview	• M.S FLAT • M.S ROD • GI pipe "B" grade • GI pipe fittings • Socket, Tee, Bend • Union, Hex Nipple • Wooden plank • MS gas welding filler rod	• Organize visits to construction sites. • Material Exploration: experiment with different building materials (e.g., wood, metal, concrete).

				• Group Presentations on different aspects of Building construction • Guest Speakers: Invite plumbers, engineers, or construction professionals. • Field visits to plumbing workshopps

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